codling wind park

Natura Impact Statement

Volume 5

Assessment of Implications for Special Protection Areas - Part 2


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Abbreviations

Abbreviation	Term in Full
AC	Alternating current
AESI	Adverse effect on site integrity
CEMP	Construction Environmental Management Plan
CRM	Collision risk modelling
CWP	Codling Wind Park
CWPE	Codling Wind Park Extension
CWPL	Codling Wind Park Limited
EC	European Commission
EcIA	Ecological Impact Assessment
EDF R	Électricité de France Renewables
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
EMF	Electromagnetic field
EU	European Union
FOS	Fred Olsen Seawind
INNS	Invasive non-native species
MW	megawatts
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Services
OECC	Offshore Export Cable Corridor
OfTW	Offshore transmission works
OWF	Offshore wind farm
O&M	Operations and maintenance
OSS	Offshore substation structure
OTI	Onshore transmission infrastructure
SAC	Special Area of Conservation
SCI	Special Conservation Interest
SPA	Special Protection Area
SSC	Suspended sediment concentration
TJB	Transition joint bay
WTG	Wind turbine generator

Abbreviation	Term in Full
ZoI	Zone of influence

Definitions

Glossary	Meaning
the Applicant	The developer, Codling Wind Park Limited (CWPL).
array site	The red line boundary area within which the wind turbine generators (WTGs), inter-array cables (IACs) and the Offshore Substation Structures (OSSs) are proposed.
Codling Wind Park (CWP) Project	The proposed development as a whole is referred to as the Codling Wind Park (CWP) Project, comprising of the offshore infrastructure, the onshore infrastructure and any associated temporary works.
Codling Wind Park Limited (CWPL)	A joint venture between Fred. Olsen Seawind (FOS) and Électricité de France (EDF) Renewables, established to develop the CWP Project.
Environmental Impact Assessment (EIA)	A systematic means of assessing the likely significant effects of a proposed project, undertaken in accordance with the EIA Directive and the relevant Irish legislation.
Environmental Impact Assessment Report (EIAR)	The report prepared by the Applicant to describe the findings of the EIA for the CWP Project.
export cables	The cables, both onshore and offshore, that connect the offshore substations with the onshore substation.
inter-array cables (IACs)	The subsea electricity cables between each WTG between and the OSSs.
interconnector cables	The subsea electricity cables between OSSs
landfall	The point at which the offshore export cables are brought onshore and connected to the onshore export cables via the transition joint bays (TJB).
metocean	Meteorological and oceanographic data (for example metocean data or metocean conditions).
offshore development area	The entire footprint of the offshore infrastructure and associated temporary works that will form the offshore boundary for the development consent application.
offshore export cables	The cables which transport electricity generated by the WTGs from the offshore substations (OSSs) to the landfall.
offshore export cable corridor (OECC)	The area between the array site and the landfall, within which the offshore export cables cable will be installed along with cable protection and other temporary works for construction.
offshore infrastructure	The offshore infrastructure, comprising of the WTGs, IACs, OSSs, Interconnector cables, offshore export cables and other associated infrastructure such as cable and scour protection.
offshore substation structure (OSS)	A fixed structure located within the array site, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
onshore development area	The entire footprint of the OTI and associated temporary works that will form the onshore boundary for the development consent application.

Glossary	Meaning
onshore transmission infrastructure (OTI)	The onshore transmission assets comprising the TJBs, onshore export cables and the onshore substation. The EIAR considers both permanent and temporary works associated with the OTI.
onshore substation	Site containing electrical equipment to enable connection to the national grid.
operations and maintenance (O&M) activities	Activities (e.g., monitoring, inspections, reactive repairs, planned maintenance) undertaken during the O&M phase of the CWP Project.
O&M phase	This is the period of time during which the CWP Project will be operated and maintained.
operations and maintenance base (OMB)	The operational and maintenance facilities to support the CWP Project, including buildings/warehouses, laydown areas, cranes, parking and marine works such as pontoons for maintenance vessels.
oarameters	Set of parameters by which the CWP Project is defined, and which are used to form the basis of assessments.
Phase 1 Project	On 19 May 2020, the Government announced that seven offshore renewable energy projects had been designated as Relevant Projects, namely Oriel Wind Park, Arklow Bank II, Bray Bank, Kish Bank. North Irish Sea Array, Codling Wind Park and Skerd Rocks. These projects are now known as Phase 1 Projects.
planning application boundary	The area subject to the application for development consent, including all permanent and temporary works for the CWP Project.
Strategic infrastructure development	Strategic infrastructure development includes development which would: - contribute significantly to meeting any of the objectives of the National Planning Framework, or - contribute significantly to meeting any regional spatial and economic strategy for an area, or - have a significant effect on the area of more than one planning authority.
transition joint bay (TJB)	This is required as part of the OTI and is located at the landfall. It is an underground bay housing a joint which connects the offshore and onshore export cables.
wind turbine generator (WTG)	All the components of a wind turbine, including the tower, nacelle, and rotor.
Zone of Influence (ZoI)	Spatial extent of potential impacts resulting from the project.

3 INTRODUCTION

1. This **Volume** of the NIS provides the scientific examination of the CWP Project on relevant European sites (Special Protection Areas (SPAs)), to identify and characterise any possible implications of the CWP Project on the integrity of European sites.

2. The NIS is laid out as follows:

- **Volume 1** contains the introduction to the CWP Project, document structure and a summary of the conclusions of the other volumes.
- **Volume 2** contains the introductory sections of the document, detailing the relevant legislation, assessment methodology, and the project description.
- **Volume 3** provides the report to inform AA Screening.
- **Volume 4** provides the scientific examination of the CWP Project and any relevant European sites (Special Areas of Conservation (SACs)), to identify and characterise any possible implications of the CWP Project, alone on the integrity of European sites.
- This volume (**Volume 5 Part 2** and the prior **Part 1**) provides the scientific examination of the CWP Project on relevant European sites (Special Protection Areas (SPAs)), to identify and characterise any possible implications of the CWP Project on the integrity of European sites.
- **Volume 6 (Part 1 and Part 2)** provides the scientific examination of the CWP Project and examines the in-combination impacts screened into the analysis of project-only assessment (**Volumes 4 and 5**).

3. This **Volume** is structured to give a scientific consideration of potential impacts each 'screened in' European designated site, drawing on the conclusions presented in **Volume 3.** Each section in this volume initially provides a summary of the conclusions for the site, through reference to the Conservation Objectives and potential impact pathways, before then providing a detailed SCI by SCI impact assessment. **Section 4** presents this detailed examination and analysis in a site-by-site structure to allow the reader to understand the implications for each site.

4 EXAMINATION AND ANALYSIS OF POTENTIAL IMPACTS ON EUROPEAN SITES

4. Of the European Sites screened in for consideration in this Natura Impact Statement (NIS), a further 92 [beyond those assessed in **Volume 5 Part 1**], which do not overlap with the Planning Application Boundary, are assessed within **Volume 5 Part 2**: these sites are considered in relation to five broad categories:

- Special Protection Areas (SPAs) designated for breeding seabird Special Conservation Interests (SCIs);
- SPAs designated in relation to important marine areas;
- SPAs designated for migratory wildfowl and wader SCIs;
- SPAs designated for non-breeding seabird SCIs; and
- SPAs designated for other migratory non-seabird SCIs.

5. The sites falling under these five broad categories are as follows:

- Special Protection Areas (SPAs) designated for breeding seabird SCIs. These are:
    - Wicklow Head SPA (IE004127), screened in for kittiwake.
    - Howth Head Coast SPA (IE004113), screened in for kittiwake.
    - Ireland's Eye SPA (IE 004117), screened in for kittiwake, herring gull, guillemot, razorbill and cormorant.
    - Lambay Islands SPA (IE004069), screened in for kittiwake, fulmar, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, cormorant and greylag goose (as a migratory feature).
    - Rockabill SPA (IE004014), screened in for common tern, Arctic tern, roseate tern and purple sandpiper.
    - Skerries Islands SPA (IE004122), screened in for herring gull, light-bellied brent goose (as a migratory feature), purple sandpiper (as a migratory feature) and turnstone (as a migratory feature).
    - Aberdaron Coast and Bardsey Island SPA (Wales – UK9013121), screened in for Manx shearwater.
    - Saltee Islands SPA (IE004002), screened in for kittiwake, fulmar, lesser black-backed gull, guillemot, razorbill, puffin and gannet.
    - Skomer, Skokholm and the Seas off Pembrokeshire SPA (Wales – UK9015051), screened in for lesser black-backed gull, puffin, Manx shearwater and European storm petrel.
    - Grassholm SPA (Wales – UK9014041), screened in for gannet.
    - Copeland Islands SPA (Northern Ireland – UK902091), screened in for Manx shearwater.
    - Ribble and Alt Estuaries SPA (England – UK9005103), screened in for lesser black-backed gull.
    - Helvick Head to Ballyquin SPA (IE004192), screened in for kittiwake.
    - Morecambe Bay and Duddon Estuary SPA (England – UK9005103), screened in for lesser black-backed gull and Mediterranean gull.
    - Ailsa Craig SPA (Scotland – UK9003091), screened in for kittiwake, lesser black-backed gull and gannet.
    - Rathlin Island SPA (Northern Ireland – UK9020011), screened in for kittiwake.
    - Old Head of Kinsale SPA (IE004021), screened in for kittiwake.
    - Isles of Scilly SPA (England – UK9020288), screened in for European storm petrel.
    - Horn Head to Fanad Head SPA (IE004194), screened in for fulmar.
    - Beara Peninsula SPA (IE004155), screened in for fulmar.
    - Tory Island SPA (IE004073), screened in for fulmar and corncrake.
    - The Bull and the Cow Rocks SPA (IE004066), screened in for gannet.
    - West Donegal Coast SPA (IE004150), screened in for fulmar.

- Deenish Islands and Scariff Island SPA (IE004175), screened in for fulmar and Manx shearwater.
- Iveragh Peninsula SPA (IE004154), screened in for fulmar.
- Puffin Island SPA (IE004003), screened in for fulmar and Manx shearwater.
- Skelligs SPA (IE004007), screened in for fulmar, gannet and Manx shearwater.
- Rum SPA (Scotland – UK9001341), screened in for Manx shearwater.
- Mingulay and Berneray SPA (Scotland – UK9001121), screened in for fulmar.
- Blasket Islands SPA (IE004008), screened in for fulmar and Manx shearwater.
- Dingle Peninsula SPA (IE004153), screened in for fulmar.
- Kerry Head SPA (IE002263), screened in for fulmar.

- SPAs designated in relation to important marine areas. These are:
  - North-west Irish Sea SPA (IE004236), screened in for red-throated diver, Great northern diver, fulmar, Manx shearwater, cormorant, shag, common scoter, little gull, black-headed gull, common gull, lesser black-backed gull, herring gull, great black-backed gull, kittiwake, roseate tern, common tern, Arctic tern, little tern, guillemot, razorbill and puffin.
  - Seas off Wexford SPA (IE004237), screened in for kittiwake, fulmar, cormorant, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, red-throated diver, common scoter and gannet.
  - Irish Sea Front SPA (England – UK9020328), screened in for Manx shearwater.

- SPAs designated for migratory wildfowl and wader SCIs. These are:
  - Dundalk Bay SPA (IE004026), screened in for bar-tailed godwit, black-tailed godwit, Curlew, Dunlin, golden plover, Greenland white-fronted goose, grey plover, greylag goose, knot, lapwing, light-bellied brent goose, mallard, oystercatcher, pintail, redshank, ringed plover, shelduck, teal, common scoter, black-headed gull, red-breasted merganser, herring gull, common gull and great crested grebe.
  - Boyne Estuary SPA (IE004080), screened in for black-tailed godwit, golden plover, grey heron, knot, lapwing, light-bellied brent goose, oystercatcher, redshank, sanderling and shelduck, turnstone.
  - River Nanny Estuary and Shore SPA (IE004158), screened in for golden plover, knot, light-bellied brent goose, oystercatcher, ringed plover, sanderling and herring gull.
  - Rogerstown Estuary SPA (IE004015), screened in for black-tailed godwit, dunlin, grey plover, greylag goose, knot, light-bellied brent goose, oystercatcher, redshank, Ringed plover, shelduck and shoveler.
  - Baldoyle Bay SPA (IE004016), screened in for bar-tailed godwit, golden plover, grey plover, light-bellied brent goose, ringed plover and shelduck.
  - Malahide Estuary SPA (IE004025), screened in for bar-tailed godwit, black-tailed godwit, golden plover, grey plover, knot, oystercatcher, pintail, redshank, shelduck, red-breasted merganser, great crested grebe and goldeneye.
  - Cahore Marshes SPA (IE004143), screened in for Bewick's swan, golden plover, Greenland white-fronted goose, lapwing, whooper swan and wigeon.
  - The Raven SPA (IE004019), screened in for Greenland white-fronted goose, grey plover, sanderling, common scoter, red-throated diver and cormorant.
  - Wexford Harbour and Slobs SPA (IE004076), screened in for bar-tailed godwit, Bewick's swan, black-tailed godwit, coot, curlew, dunlin, golden plover, Greenland white-fronted goose, grey heron, grey plover, knot, lapwing, light-bellied brent goose, little grebe, mallard, oystercatcher, pintail, redshank, sanderling, shelduck, teal, whooper swan, wigeon, lesser black-backed gull, black-headed gull, red-breasted merganser, great crested grebe, cormorant, scaup and hen harrier.
  - Lady's Island Lake SPA (IE004009), screened in for gadwall and common scoter.
  - Tacumshin Lake SPA (IE004092), screened in for Bewick's swan, black-tailed godwit, coot, gadwall, golden plover, Greenland white-fronted goose, grey plover, lapwing, light-bellied brent goose, little grebe, pintail, teal, tufted duck, whooper swan and wigeon.

- Ballyteige Burrow SPA (IE004020), screened in for bar-tailed godwit, black-tailed godwit, golden plover, grey plover, lapwing, light-bellied brent goose and shelduck.
- Bannow Bay SPA (IE004033), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, grey plover, knot, lapwing, light-bellied brent goose, oystercatcher, pintail, redshank and shelduck.
- Tramore Back Strand SPA (IE004027), screened in for bar-tailed godwit, black-tailed godwit, curlew, golden plover, grey plover, lapwing and light-bellied brent goose.
- Dungarvan Harbour SPA (IE004032), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, grey plover, knot, lapwing, light-bellied brent goose, oystercatcher, redshank, shelduck and turnstone.
- Blackwater Estuary SPA (IE004028), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, lapwing, light-bellied brent goose, redshank and wigeon.
- Ballymacoda Bay SPA (IE004023), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, greylag goose, lapwing, light-bellied brent goose, redshank, ringed plover, sanderling, teal, turnstone and wigeon.
- Ballycotton Bay SPA (IE004022), screened in for bar-tailed godwit, black-tailed godwit, curlew, golden plover, grey plover, lapwing, ringed plover, teal and turnstone.
- Cork Harbor SPA (IE004030), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, grey heron, grey plover, lapwing, little grebe, oystercatcher, pintail, redshank, shelduck, shoveler, teal, whooper swan and wigeon.
- Courtmacsherry Bay SPA (IE004219), screened in for bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, lapwing, shelduck and wigeon.
- Clonakilty Bay SPA (IE004081), screened in for black-tailed godwit, curlew, dunlin and shelduck.
- Poulaphouca Reservoir SPA (IE004063), screened in for greylag goose.
- Strangford Lough SPA (Northern Ireland – UK9020111), screened in for bar-tailed godwit, golden plover, knot, light-bellied brent goose, redshank and shelduck.
- Outer Ards SPA (Northern Ireland – UK9020271), screened in for golden plover, light-bellied brent goose, ringed plover and turnstone.
- Carlingford Lough SPA (Northern Ireland – UK9020160), screened in for light-bellied brent goose.
- Killough Bay SPA (Northern Ireland – UK9020221), screened in for light-bellied brent goose.
- Larne Lough SPA (Northern Ireland – UK9020042), screened in for light-bellied brent goose.
- Lough Neagh and Lough Beg SPA (Northern Ireland – UK9020091), screened in for Bewick's swan and whooper swan.
- Upper Lough Erne SPA (Northern Ireland – UK9020071), screened in for whooper swan.
- Lough Foyle SPA (Northern Ireland – UK9020031), screened in for Bewick's swan and whooper swan.

- SPAs designated for non-breeding seabird SCIs. These are:
  - Liverpool Bay SPA / Bae Lerpwl SPA (England / Wales – UK9020294), screened in for common scoter, red-throated diver and little gull.
  - Traeth Lafan / Lavan Sands, Conway Bay SPA (Wales – UK9013031), screened in for red-breasted merganser and great crested grebe.
  - Mersey Narrows and North Wirral Foreshore SPA (England – UK9020287), screened in for little gull.
  - Belfast Lough Open Water SPA (Northern Ireland – UK9020290), screened in for great crested grebe.
  - Belfast Lough SPA (Northern Ireland – UK9020101), screened in for great crested grebe.
  - Solway Firth SPA (Scotland/England – UK9005012), screened in for common scoter, black-headed gull, herring gull, common gull, goldeneye, red-throated diver and cormorant.

- SPAs designated for other migratory non-seabird SCIs. These are:
  - Connemara Bog Complex SPA (IE004181), screened in for merlin.

- Derryveagh and Glendowan Mountains SPA (IE004039), screened in for merlin.
- Falcarragh to Meenlaragh SPA (IE004149), screened in for corncrake.
- Fanad Head SPA (IE004148), screened in for corncrake.
- Inishbofin, Inishdooey and Inishbeg SPA (IE004083), screened in for corncrake.
- Inishbofin, Omey Island and Turbot Island SPA (IE004231), screened in for corncrake.
- Killarney National Park SPA (IE004038), screened in for merlin.
- Lough Corrib SPA (IE004042), screened in for hen harrier.
- Lough Nillan Bog SPA (IE004110), screened in for merlin.
- Malin Head SPA (IE004146), screened in for corncrake.
- Middle Shannon Callows SPA (IE004096), screened in for corncrake.
- Mullaghanish to Musheramore Mountains SPA (IE004162), screened in for hen harrier.
- Mullet Peninsula SPA (IE004227), screened in for corncrake.
- Owenduff/Nephin Complex SPA (IE004098), screened in for merlin.
- Slieve Aughty Mountains SPA (IE004168), screened in for hen harrier and merlin.
- Slieve Beagh SPA (IE004167), screened in for hen harrier.
- Slieve Bloom Mountains SPA (IE004160), screened in for hen harrier.
- Slievefelim to Silvermines Mountains SPA (IE004165), screened in for hen harrier.
- Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (IE004161), screened in for hen harrier.
- West Donegal Islands SPA (IE004230), screened in for corncrake.
- Wicklow Mountains SPA (IE004040), screened in for merlin.

6. As the above listed sites assessed within **Volume 5 Part 2** do not spatially overlap with any part of the Codling Wind Park (CWP) Project, screened in impacts to SCIs of those SPAs primarily (and generally entirely) relate to ex situ effects insofar that they do not impact areas within SPA boundaries, i.e. in situ impacts do not occur.

4.1 Use of proxy conservation objectives in the absence of SCI-specific conservation objectives in Irish SPAs

7. For some Irish SPAs, the National Parks and Wildlife Services (NPWS) provides a single 'generic' set of conservation objectives which are applied to the full suite of SCIs or features which are designated under those given sites. For other SPAs, each SCI / feature has its own set of specific conservation objectives, attributes and targets individually outlined. Within this document assessment of AESI is undertaken in relation to conservation objectives as they are presented within presently available NPWS documentation for each site.

8. For Irish SPAs where conservation objectives may be construed as being generic, specifically in relation to breeding seabird SPAs, additional assessment of AESI against proxy 'SCI-specific' conservation objectives, attributes and targets is presented in **Appendix 7 Additional assessment of AESI against SCI-specific proxy COs for selected Irish breeding seabird SPAs** in **Volume 7** of this NIS.

4.2 Introduction or spread of invasive non-native species: High level assessment for non-overlapping SPAs

9. For impacts relating to the introduction or spread of invasive non-native species (INNS), for all of the above listed non-overlapping SPAs assessed within **Volume 5 Part 2**, due to the separation distances between these SPAs and activities and infrastructure associated with the CWP Project, there is considered to be no potential for CWP Project activities to result in the introduction or spread of INNS within in the in situ habitats used by the SCIs of these SPAs.

10. Potential introduction or spread of INNS impacts to non-overlapping SPAs is entirely limited to potential upon ex situ habitats which may support the SCIs of those SPAs. As CWP Project areas where the introduction or spread of non-native INNS may coincide with, at most, very limited proportions of the ex situ supporting habitats of SCIs from the above listed SPAs, it is considered that the potential for such ex situ impacts to impede the Conservation Objectives of non-overlapping SPAs is negligible, and there is no meaningful pathway for such impacts to result in AESI.

11. Despite this, the implementation of mitigation measures to align with EU policy (specifically EU Regulation 1143 [regarding the prevention and management of the introduction and spread of INNS]; and The EU Biodiversity Strategy for 2030 [which contains a commitment to manage established INNS and decrease the number of Red List species they threaten by 50% by 2030]) in the form of biosecurity protocols outlined within the Construction Environmental Management Plan (CEMP), shall eliminate or reduce CWP Project risk relating to the introduction or spread of INNS across all areas and phases of the project. This will have the effect of eliminating or reducing potential ex situ introduction or spread of INNS impacts within supporting habitats of the SCIs of the above listed non-overlapping SPAs.

12. In relation to the Conservation Objectives, attributes and targets for SCIs of all non-overlapping SPAs listed above, for introduction and spread of INNS impacts it can be concluded that there is no impediment to their Conservation Objectives being met for any SCIs and, in turn, that there is no project-only AESI for these SPAs.

4.3 Note on evidence-led disturbance and displacement values

13. For the impact of disturbance and displacement in the array site, evidence-led displacement and mortality rates are used.

4.3.1 Auk species

14. Auk species, which for the purpose of this assessment are taken to include guillemot, razorbill and puffin, are broadly considered to be moderately sensitive to disturbance and potential associated displacement resultant from vessel traffic (Garthe and Hüppop, 2004; Furness and Wade, 2012; Langston, 2010; Bradbury et al., 2014).

15. Although behavioural responses by auks to operational offshore wind farms (OWFs) is varied, a general tendency to avoid WTG array sites has been noted. For example, in a review of displacement response studies from 12 European OWF sites which compare pre-construction baseline abundances with abundances from post-construction monitoring, Dierschke et al., 2016, note operational phase auk displacement rates ranging from 0% to 95%.

16. Variability in auk displacement response estimates between studies is likely a consequence of differing conditions between studies. These would include differences in baseline characterisation methods such as survey platform and programme duration and timings, as well as site conditions such as proximity to breeding colonies and array design. Where study conditions are different from conditions at CWP, those studies are less informative about potential displacement responses than for sites which are more directly comparable. For example, the high auk displacement rates reported in studies of OWFs outside UK and Irish waters (Bligh Bank, Thornton bank, Prinses Amalia and Alpha Ventus – 55% to 75% displacement) and which have considerably smaller footprint sizes (< 17 km^2) are therefore not appropriate for consideration in relation to CWP, considering that their site configurations and ecology are not comparable to the location and configuration of the CWP array site.

17. Following reinterpretation of evidence considered by Dierschke et al. (2016), MacArthur Green (2019) determined appropriate displacement rates for guillemot and razorbill for Norfolk Vanguard OWF in

the English Southern North Sea to be 50% from within the array site and 30% from a surrounding 1 km buffer.

18. Therefore, applying a single displacement rate across all bio-seasons of 50% within the CWP array site and out to a 2 km buffer would ensure a precautionary rate is used for the assessment of displacement.

19. Further evidence that an auk displacement rate of 50% is precautionary comes from studies that indicate auk habituation to OWFs. This was demonstrated at Thanet OWF in the English southern North Sea, where auk displacement was shown to be statistically significant, but-only in the short term, with abundances increasing within the wind farm from year two post-construction, suggesting some level of habituation after one year of operation. Indeed, year two and three displacement rates for auks fell from a range of 75% to 85% in the first year of operation to a low of 31% to 41% within year two and three of operations (Royal Haskoning, 2013). There is also further emerging evidence as additional post-construction monitoring of OWFs continues, with reports of auk numbers increasing and observations of foraging behaviour within the wind farm itself (Leopold & Verdaat, 2018).

20. Therefore, in conclusion, there is good evidence to support an auk displacement rate during operation and management phase of 50% within OWF array sites and out to a 2 km buffer, which would still be considered as precautionary.

21. For the purpose of this assessment, an evidence-led displacement and mortality rate of 50% and 1% respectively was applied to each bio-season, based on evaluation of the published literature and in line with values used by other OWF displacement assessments. Additional consideration is provided by reference to UK SNCBs preferred method of assessing potential impacts from displacement using a range of between 30% to 70% displacement and between 1% and 5% mortality rates.

22. However, it should be noted that, due to the large expanse of available habitat outside of the array site, the mortality rate due to displacement could be as low as 0%, as the increase in density outside of the array site in comparison to the whole of the western Irish sea and UK Western Waters BDMPS region would be negligible.

23. In comparison to the number of studies which consider operational phase distributional responses, there are fewer which provide empirically derived displacement proportions in relation to OWF construction phase activities. For auks (guillemot, razorbill, puffin), construction phase displacement responses have been demonstrated to be either significantly lower than during the operational phase (Royal Haskoning, 2013) or similar (Vallejo et al., 2017). Similarly, in a review of gannet displacement responses by APEM (2022), while some OWFs noted no significant displacement during construction (i.e. much less than during the operational phase), others noted construction phase displacement rates which were broadly similar, or slightly lower than during those collected during the operational phase. As such, construction phase displacement studies indicate that, although impacts can occur, as effects are over a smaller area, overall displacement effects (across the array site and across the construction period) are less than during the operational phase.

24. In the general absence of construction specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Mor EIAR, 2022), displacement central values during the construction phase are considered to be half of those used in the operational phase assessment. For example, where operational phase gannet displacement within the array site is undertaken on the basis of a central value of 70%, a central value of 35% is used in the construction-phase. The same mortality rates resultant from displacement are used to determine construction phase disturbance as used during the operational phase assessment.

4.3.2 Gannet

25. Although gannets demonstrate a low level of sensitivity to vessel activity (Garthe and Hüppop, 2004; Furness and Wade, 2012), studies have demonstrated a consistent pattern of avoidance of areas in which operational WTGs are present. A recent review of gannet displacement rates from 25 OWFs was undertaken by APEM Ltd to inform assessment for Hornsea Project Four OWF in the English part of the southern North Sea (APEM, 2022). Key findings of this review include:

- Observed displacement rates vary over a greater range than the 60–80% range presently advocated by UK SNCBs. At-only 26% of OWFs were displacement rates considered to fall into this advised range, while 32% of OWFs reported displacement rates above this range and 42% reported rates below.
- High displacement rates (>75%) are associate with four particular OWF design characteristics:
    1. WTG densities exceeding 2.7 per km^2 (0.48–0.6 for the CWP Project);
    2. Array site less than 2,500 ha (125 km^2 for the CWP Project);
    3. Distance between WTGs less than 900 m (1000 m minimum for the CWP Project); and
    4. Distance between array site and shore more than 19 km (11 km for the CWP Project).

26. As referenced above, none of these design characteristics are proposed in relation to the CWP Project.

27. As such the use of a 60–80% displacement range following precedence from recent UK OWFs as advocated by UK SNCBs (2022), with a 70% central value for assessment is considered conservative for the purpose of this assessment.

28. A mortality rate of 1% was selected for this assessment, based on expert judgement supported by evidence that gannet have a very large foraging range (mean max + 1 SD = 509.4 km; Woodward et al., 2019) and feed on a variety of different prey items across a wide range of habitats (i.e. Bradbury et al., 2014). On this basis it is considered that sufficient alternative foraging opportunities will be available despite the potential loss of habitat within the CWP array site and consequently displacement from this area is unlikely to translate to significant fitness reductions.

29. Support that the use of a 1% mortality rate is conservative is also provided in the review to inform assessment for Hornsea Project Four OWF (APEM, 2022), which predicts an additional mortality for displaced birds of approximately 0.4%.

4.3.3 Manx shearwater

30. Although Manx shearwater are generally considered to demonstrate a low level of sensitivity to vessel activity (Furness and Wade, 2012, Furness et al., 2013, Bradbury et al., 2014, MMO, 2018, Rogerson et al., 2021), there is a lack of empirical evidence, and therefore high levels of uncertainty, relating to their vulnerability to disturbance and displacement from OWF infrastructure (Wade et al., 2016, Kelsey et al., 2018), with some evidence of the species avoiding operational WTGs.

31. A decline in Manx shearwater abundance detected in comparisons of pre- and post-construction data from Robin Rigg OWF, in the Scottish / English part of the northern Irish Sea (Canning et al., 2013a & b) was interpreted as suggesting a degree of avoidance of the array site. Similarly, from post-construction monitoring of North Hoyle OWF in the Welsh / English part of the southern Irish Sea, a notable gap in Manx shearwater distribution has been observed (Dierschke et al., 2016). These responses have resulted in the species being provisionally classified as weakly avoiding OWFs (Dierschke et al., 2016).

32. On the basis of described avoidance behaviours, a 30–70% displacement range, with a 50% central value for assessment, has been used to estimate numbers of Manx shearwater potentially displaced by the presence of operational WTGs within the CWP array site.

33. A mortality rate of 1% was selected for this assessment, based on expert judgement supported by evidence that Manx shearwater have a very large foraging range (mean max + 1 SD = 2,365.5 km; Woodward et al., 2019) and feed on a variety of different prey items across a wide range of habitats (Bradbury et al., 2014). On this basis, it is considered that sufficient alternative foraging opportunities will be available despite the potential loss of habitat within the CWP array site and consequently displacement from this area is unlikely to translate to significant fitness reductions.

Breeding seabird SPAs

4.4 Wicklow Head SPA (IE004127)

34. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: kittiwake.

35. The minimum separation distance between SPA and the array site is 10.58 km.

36. The minimum separation distance between SPA and the offshore export cable corridor (OECC) is 14.04 km.

37. The minimum separation distance between SPA and the OECC intertidal landfall is 40.26 km (with a 'by-sea' separation distance of 41.43 km).

Table 4-1 Assessment of adverse effects on site integrity (project alone) – Wicklow Head SPA

Objective: **Attributes and targets**	**Predicted effect** **[Attribute(s) potentially affected]**	**Link to assessment**	**Mitigation**	**Residual effect**	**Conclusion**
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's population on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 4.4.1**	None	No change	No AESI
	Changes in prey availability [1,2,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.4.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

38. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

39. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This ex situ direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

40. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

41. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

42. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors,

it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

43. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Wicklow Head SPA.

Residual effect

44. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

45. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

46. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

47. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

48. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain

its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

49. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

50. Areas affected by increased Suspended Sediment Concentration (SSC) levels during construction phase activities within the array site the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

51. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2)[1] is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

52. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

53. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

54. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Wicklow Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

[1] This sum comprises *inter alia* the spatial effects associated with boulder clearance (2.934 km^2), sandwave clearance (0.259 km^2), anchor handling (0.280 km^2), and both inter array and interconnector cable installation (2.214 km^2). Cable installation will be undertaken within the area previously cleared of boulders and as such the total footprint is considered to be precautionary and reflective in some cases of the same areas impacted on more than one occasion (such as boulder clearance followed by cable installation, or sandwave clearance followed by cable installation).

Proposed mitigation

55. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Wicklow Head SPA.

Residual effect

56. As per project-only assessment, above.

OECC

Project-only assessment

57. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

58. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

59. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

60. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

61. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to

enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

62. The spatial extent of temporarily disturbed areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2)[2] is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

63. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

64. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

65. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Wicklow Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

66. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Wicklow Head SPA.

Residual effect

67. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

68. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

[2] This sum comprises the spatial effects associated with boulder clearance (2.616 km^2), sandwave clearance (0.198 km^2), anchor handling (0.631 km^2), and offshore cable installation (2.187 km^2). Cable installation will be undertaken within the area previously cleared of boulders and as such the total footprint is considered to be precautionary and reflective in some cases of the same areas impacted on more than one occasion (such as boulder clearance followed by cable installation, or sandwave clearance followed by cable installation).

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI.**

Construction phase impact 3 – Introduction or spread of INNS

Array site, OECC, OECC intertidal landfall and onshore infrastructure

Project-only assessment

69. Due to the separation distances between this SPA and areas in which works will be undertaken during the CWP Project construction phase, activities within the array site, OECC, OECC intertidal landfall area and around onshore infrastructure do not have the potential to result in the introduction or spread of INNS which may result in a reduction in the quality of in situ habitats used by the kittiwake SCI of Wicklow Head SPA.

70. Potential introduction or spread of INNS impacts associated with the CWP construction phase are limited to ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA. These ex situ effects have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

71. In relation to these Conservation Objective attributes, introduction or spread of INNS due to construction phase activities associated with the CWP Project may affect SCI population dynamics by changing the ecosystems of the receiving environment in such a way as to reduce the utility of ex situ habitats to the SCI. This, in turn, may alter the extent of habitat available to the SCI to maintain its population on a long-term basis or directly impact demographic parameters by, for example, inhibiting foraging, reducing offspring provisioning and reducing population level productivity rates.

72. Despite the above potential pathways to impact, the potential area of ex situ habitat in which the introduction of INNS may impact receiving ecosystems represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

73. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that area which may experience reduced utility to the kittiwake SCI of Wicklow Head SPA should INNS be introduced in relation to construction-phase activities associated with the CWP Project, the scale of potential impacts from the introduction or spread of INNS is considered to be negligible. Such impacts are not considered capable of altering the population dynamics, or extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

74. No specific mitigation is required in respect of introduction or spread of INNS impacts during construction within the array site, OECC, OECC intertidal landfall or onshore infrastructures as this impact will not give rise to any AESI in relation to Wicklow Head SPA. Despite this, the implementation of mitigation measures to align with EU policy (specifically EU Regulation 1143 [regarding the prevention and management of the introduction and spread of invasive alien species]; and The EU Biodiversity Strategy for 2030 [which contains a commitment to manage established invasive alien species and decrease the number of Red List species they threaten by 50% by 2030]) in the form of biosecurity protocols outlined within the CEMP, shall eliminate or reduce INNS introduction risks within areas in which construction activities are undertaken. This will have the effect of eliminating or reducing potential ex situ introduction or spread of INNS impacts within supporting habitats of the kittiwake SCI of Wicklow Head SPA.

Residual effect

75. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

76. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to introduction or spread of INNS impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

77. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

78. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

79. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of the spatial footprint of operational infrastructure within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

80. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

81. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA.

82. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

83. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Wicklow Head SPA.

Residual effect

84. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

85. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

86. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

87. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

88. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

89. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

90. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

91. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available ex situ benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

92. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely Electro-Magnetic Field (EMF) effects, associated with electricity passing along infrastructure cables. Any effects on fish

are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

93. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Wicklow Head SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

94. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

95. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Wicklow Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

96. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Wicklow Head SPA.

Residual effect

97. As per project-only assessment, above.

OECC

Project-only assessment

98. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA.

99. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCIs populations on a long-term basis.

100. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, alteration or loss of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

101. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

102. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

103. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

104. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

105. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Wicklow Head SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

106. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

107. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Wicklow Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

108. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Wicklow Head SPA.

Residual effect

109. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

110. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

111. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Wicklow Head SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

112. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Wicklow Head SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Wicklow Head SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

113. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** [3] of the EIAR, are presented in **Table 4-2**. These values are apportioned to Wicklow Head SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-2.**

114. Collision mortalities are presented in relation to Representative scenarios A and B (75 and 60 WTGs respectively) and collision risk modelling (CRM) Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-2:Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Wicklow Head SPA

	Representative scenario	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.18%	13.02%	0.14%	
Impact to SPA	A	**1**	**0.008**	**0.553**	**0.014**	**0.574**
		2	0.017	1.265	0.031	1.313
	B	**1**	**0.007**	**0.481**	**0.012**	**0.500**
		2	0.015	1.112	0.027	1.154

115. **Table 4-2**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Wicklow Head SPA for each bio-season it is estimated, for example, that 0.18% of total

[3] Collision Risk Modelling within this Appendix is undertaken based on guidance prior to the publication of the 2024 Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments. The parameters presented within the updated advice note do not materially alter the modelled values presented in **Appendix 10.3** and therefore the apportionment presented in **Appendix 3**, and conclusions based upon them.

predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Wicklow Head SPA; this equates to 0.008 and 0.007 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Wicklow Head SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Wicklow Head SPA is calculated as 0.574 individuals in relation to Representative scenario A and 0.500 individuals in relation to Representative scenario B.

116. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-2**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-3: Increase to annual mortality rates resulting from collision mortalities apportioned to Wicklow Head SPA

Representative scenario	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.574**	**1290**	**14.60%**	**188.34**	**0.30%**
	2	1.313				0.70%
B	**1**	**0.500**				**0.27%**
	2	1.154				0.61%

117. As additional mortality to the kittiwake SCI of Wicklow Head SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

118. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Wicklow Head SPA.

Residual effect

119. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

120. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI.**

Operation and maintenance phase impact 4 – Introduction or spread of INNS

Array site, OECC, OECC intertidal landfall and onshore infrastructure

Project-only assessment

121. Due to the separation distances between this SPA and operational infrastructure associated with the CWP Project, activities within the array site, OECC, OECC intertidal landfall area and around onshore infrastructure do not have the potential to result in the introduction or spread of INNS which may result in a reduction in the quality of in situ habitats used by the kittiwake SCI of Wicklow Head SPA.

122. Potential introduction or spread of INNS impacts associated with the CWP operation and maintenance phase are limited to ex situ habitats which may support the kittiwake SCI of Wicklow Head SPA. These ex situ effects have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Wicklow Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

123. In relation to these Conservation Objective attributes, introduction or spread of INNS due to operation and maintenance phase activities associated with the CWP Project may affect SCI population dynamics by changing the ecosystems of the receiving environment in such a way as to reduce the utility of ex situ habitats to the SCI. This, in turn, may alter the extent of habitat available to the SCI to maintain its population on a long-term basis or directly impact demographic parameters by, for example, inhibiting foraging, reducing offspring provisioning and reducing population level productivity rates.

124. Despite the above potential pathways to impact, the potential area of ex situ habitat in which the introduction of INNS may impact receiving ecosystems represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Wicklow Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

125. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that area which may experience reduced utility to the kittiwake SCI of Wicklow Head SPA should INNS be introduced in relation to operation and maintenance phase activities associated with the CWP Project, the scale of potential impacts from the introduction or spread of INNS is considered to be negligible. Such impacts are not considered capable of altering the population dynamics, or

extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Wicklow Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Wicklow Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Wicklow Head SPA.

Proposed mitigation

126. No specific mitigation is required in respect of introduction or spread of INNS impacts during operation and maintenance phase activities within the array site, OECC, OECC intertidal landfall or around onshore infrastructures as this impact will not give rise to any AESI in relation to Wicklow Head SPA. Despite this, the implementation of mitigation measures to align with EU policy (specifically EU Regulation 1143 [regarding the prevention and management of the introduction and spread of invasive alien species]; and The EU Biodiversity Strategy for 2030 [which contains a commitment to manage established invasive alien species and decrease the number of Red List species they threaten by 50% by 2030]) in the form of biosecurity protocols outlined within the CEMP, shall eliminate or reduce INNS introduction risks within areas in which construction activities are undertaken. This will have the effect of eliminating or reducing potential ex situ introduction or spread of INNS impacts within supporting habitats of the kittiwake SCI of Wicklow Head SPA.

Residual effect

127. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

128. The Conservation Objective and its attributes and targets for the kittiwake SCI of Wicklow Head SPA are presented in **Table 4-1**, above. With regards to introduction or spread of INNS impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Wicklow Head SPA kittiwake SCI**.

4.5 Howth Head Coast SPA (IE004113)

129. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: kittiwake.

130. The minimum separation distance between SPA and the array site is 27.49 km.

131. The minimum separation distance between SPA and the OECC is 6.83 km.

132. The minimum separation distance between SPA and the OECC intertidal landfall is 8.19 km (with a ‘by-sea’ separation distance of 8.41 km).

Table 4-4: Assessment of adverse effects on site integrity (project alone) – Howth Head SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI: 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 4.5.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.5.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

133. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

134. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

135. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require

individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

136. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Howth Head Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

137. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

138. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

139. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

140. The Conservation Objective and its attributes and targets for the kittiwake SCI of Howth Head Coast SPA are presented in **Table 4-4**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Howth Head Coast SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

141. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

142. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

143. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

144. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

145. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

146. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

147. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Howth Head Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

148. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

149. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Howth Head Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

150. No specific mitigation is proposed, or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

151. As per project-only assessment, above.

OECC

Project-only assessment

152. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

153. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

154. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment

concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

155. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

156. Ex situ areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

157. The spatial extent of temporarily disturbed ex situ areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

158. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Howth Head Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

159. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

160. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Howth Head Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

161. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

162. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

163. The Conservation Objective and its attributes and targets for the kittiwake SCI of Howth Head Coast SPA are presented in **Table 4-4**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Howth Head Coast SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

164. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

165. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This ex situ direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

166. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their

consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

167. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Howth Head Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

168. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

169. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance within the array site, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

170. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

171. The Conservation Objective and its attributes and targets for the kittiwake SCI of Howth Head Coast SPA are presented in **Table 4-4**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Howth Head Coast SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

172. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes

in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

173. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

174. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

175. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

176. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

177. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

178. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

179. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Howth Head Coast SPA (mean–maximum + 1 SD = 300.6

km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

180. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

181. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Howth Head Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

182. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

183. As per project-only assessment, above.

OECC

Project-only assessment

184. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Howth Head Coast SPA.

185. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

186. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around

electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

187. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

188. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

189. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

190. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

191. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Howth Head Coast SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

192. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

193. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Howth Head Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Howth Head Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. In light of these factors, it can

be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

194. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

195. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

196. The Conservation Objective and its attributes and targets for the kittiwake SCI of Howth Head Coast SPA are presented in **Table 4-4**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Howth Head Coast SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

197. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Howth Head Coast SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Howth Head Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

198. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Howth Head Coast SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Howth Head Coast SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

199. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-5**. These values are apportioned to Howth Head Coast SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-5**.

200. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most

appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-5: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Howth Head Coast SPA

	Representative scenario	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.50%	7.29%	0.38%	
Impact to SPA	A	**1**	**0.021**	**0.310**	**0.037**	**0.368**
		2	0.047	0.708	0.085	0.840
	B	**1**	**0.018**	**0.270**	**0.033**	**0.320**
		2	0.042	0.623	0.074	0.738

201. **Table 4-5**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Howth Head Coast SPA for each bio-season it is estimated, for example, that 0.50% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Howth Head Coast SPA; this equates to 0.021 and 0.018 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Howth Head Coast SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Howth Head Coast SPA is calculated as 0.368 individuals in relation to Representative scenario A and 0.320 individuals in relation to Representative scenario B.

202. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-6**. In this table, the most recent colony count from the SPA (2018 count – SMP, 2023), is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015).

The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-6: Increase to annual mortality rates resulting from collision mortalities apportioned to Howth Head Coast SPA

Representative scenario	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	1	**0.368**	3546	14.60%	517.716	**0.071%**
	2	0.840				0.162%
B	**1**	**0.320**				**0.062%**
	2	0.738				0.143%

203. As additional mortality to the kittiwake SCI of Howth Head Coast SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Howth Head Coast SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Howth Head Coast SPA.

Proposed mitigation

204. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Howth Head Coast SPA.

Residual effect

205. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

206. The Conservation Objective and its attributes and targets for the kittiwake SCI of Howth Head Coast SPA are presented in **Table 4-4**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Howth Head Coast SPA kittiwake SCI**.

4.6 Ireland's Eye SPA (IE004117)

207. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: kittiwake, cormorant, herring gull, guillemot, razorbill.

208. The minimum separation distance between SPA and the array site is 31.44 km.

209. The minimum separation distance between SPA and the OECC is 8.99 km (with a 'by-sea' separation distance of 11.09 km).

210. The minimum separation distance between SPA and the OECC intertidal landfall is 9.69 km (with a 'by-sea' separation distance of 12.61 km).

Table 4-7: Assessment of adverse effects on site integrity (project alone) – Ireland's Eye SPA

Objective: Attributes and targets	Predicted Effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 0**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Herring gull [A184]				
	Direct effects on habitat [1,3]	**Section 4.6.2**	None	No change	No AESI
	Disturbance and displacement [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Guillemot [A199]				

Objective: Attributes and targets	Predicted Effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Direct effects on habitat [1,3]	**Section 4.6.3**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Razorbill [A200]				
	Direct effects on habitat [1,3]	**Section 4.6.4**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Cormorant [A017]				
	Direct effects on habitat [1,3]	**Section 4.6.5**	None	No change	No AESI

Objective: Attributes and targets	Predicted Effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Disturbance and displacement [1,3]		None	No change	No AESI
	Disturbance and displacement [1,3]		None	No change	No AESI
	Changes in prey availability 1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.6.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

211. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

212. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

213. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

214. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

215. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA.

The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

216. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

217. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

218. The Conservation Objective and its attributes and targets for the kittiwake SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

219. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

220. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

221. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing

productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

222. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

223. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

224. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

225. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

226. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

227. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

228. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

229. As per project-only assessment, above.

OECC

Project-only assessment

230. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

231. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

232. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

233. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

234. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

235. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

236. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

237. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

238. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

239. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

240. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

241. The Conservation Objective and its attributes and targets for the kittiwake SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

242. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

243. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the kittiwake SCI of Ireland's Eye SPA: the array site

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

244. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

245. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

246. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

247. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

248. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

249. The Conservation Objective and its attributes and targets for the kittiwake SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

250. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

251. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

252. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

253. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

254. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

255. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

256. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

257. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

258. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

259. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

260. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

261. As per project-only assessment, above.

OECC

Project-only assessment

262. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Ireland's Eye SPA.

263. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

264. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

265. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

266. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

267. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

268. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

269. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

270. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

271. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

272. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

273. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

274. The Conservation Objective and its attributes and targets for the kittiwake SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the

operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

275. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Ireland's Eye SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

276. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Ireland's Eye SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Ireland's Eye SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

277. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-8**. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-8.**

278. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-8: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Ireland's Eye SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.11%	1.62%	0.09%	
Impact to SPA	A	**1**	**0.005**	**0.069**	**0.008**	**0.082**
		2	0.011	0.158	0.019	0.188
	B	**1**	**0.004**	**0.060**	**0.007**	**0.071**
		2	0.009	0.139	0.017	0.165

279. **Table 4-8**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated, for example, that 0.11% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.005 and 0.004 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Ireland's Eye SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Ireland's Eye SPA is calculated as 0.082 individuals in relation to Representative scenario A and 0.071 individuals in relation to Representative scenario B.

280. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-9**. In this table, although the SMP count is 1,604 AON, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used as a precautionary basis to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-9: Increase to annual mortality rates resulting from collision mortalities apportioned to Ireland's Eye SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.082**	802	14.60%	117.092	**0.070%**
	2	0.188				0.160%
B	**1**	**0.071**				**0.061%**
	2	0.165				0.141%

281. As additional mortality to the kittiwake SCI of Ireland's Eye SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Ireland's Eye SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

282. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

283. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

284. The Conservation Objective and its attributes and targets for the kittiwake SCI of Irelands Eye SPA are presented in **Table 4-7**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA kittiwake SCI.**

4.6.2 Receptor 2: Herring gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

285. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

286. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

287. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

288. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

289. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors,

it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

290. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

291. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

292. With regards to the OECC intertidal landfall, relevant construction phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate laying of buried export cables through intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

293. Herring gull which breed within Ireland's Eye SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Ireland's Eye SPA, which may otherwise utilise those areas for non-foraging behaviours.

294. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

295. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

296. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal

landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

297. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

298. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

299. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7,** above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI**.

Construction phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

300. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

301. Herring gull which breed within Ireland's Eye SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

302. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

303. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of herring gull from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

304. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

305. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

306. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

307. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

308. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7,** above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

309. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

310. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

311. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

312. As herring gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI.

313. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

314. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

315. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

316. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

317. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA

Proposed mitigation

318. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

319. As per project-only assessment, above.

OECC

Project-only assessment

320. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

321. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

322. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

323. As herring gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

324. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 85.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

325. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

326. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

327. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

328. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the herring gull SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA

Proposed mitigation

329. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

330. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

331. Herring gulls which breed within Ireland's Eye SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

332. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

333. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

334. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of foraging habitat of this SCI

within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

335. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

336. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

337. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

338. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

339. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site

(i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the herring gull SCI of Ireland's Eye SPA: the array site

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

340. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

341. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

342. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

The array site proposed mitigation

343. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

344. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

345. With regards to the OECC intertidal landfall, relevant operation and maintenance phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate required maintenance or repair of buried cables within intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

346. Herring gull which breed within Ireland's Eye SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Ireland's Eye SPA, which may otherwise utilise those areas for non-foraging behaviours.

347. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

348. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

349. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

350. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

351. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

352. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

353. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase activities at the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

354. Herring gull which breed within Ireland's Eye SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

355. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

356. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of herring gull from ex situ intertidal habitats around operation and maintenance phase activity at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

357. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the

condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

358. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is de minimis. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

359. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities at the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

360. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

361. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7,** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

362. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

363. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within

the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

364. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for herring gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

365. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

366. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

367. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

368. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

369. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

370. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

371. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

372. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

373. As per project-only assessment, above.

OECC

Project-only assessment

374. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Ireland's Eye SPA.

375. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

376. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts on prey species reduce the availability of those prey

species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

377. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

378. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

379. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

380. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

381. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

382. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

383. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project

will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

384. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

385. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

386. Herring gulls which breed within Ireland's Eye SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

387. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

388. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may temporarily reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

389. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within

South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

390. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

391. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

392. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

393. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of herring gull from Ireland's Eye SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the herring gull SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

394. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Ireland's Eye SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Ireland's Eye SPA, through reductions to offspring provisioning rates and other parental care metrics.

These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

395. Total bio-seasonal and total annual estimated herring gull collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-10**. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-10.**

396. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-10: Total bio-seasonal and annual collision mortalities to herring gull and mortalities apportioned to Ireland's Eye SPA

	Design option	CRM Band Option	Bio-season		Annual
			Breeding (Apr–Aug)	Non-breeding (Sep–Mar)	
Total impact	A	**1**	**25.018**	**2.393**	**27.411**
		2	18.76	1.876	20.636
	B	**1**	**21.178**	**2.105**	**23.283**
		2	15.724	1.596	17.320
Percentage of impact apportioned to SPA			3.22%	0.34%	
Impact to SPA	A	**1**	**0.806**	**0.008**	**0.814**
		2	0.604	0.006	0.610
	B	**1**	**0.682**	**0.007**	**0.689**
		2	0.506	0.005	0.512

397. **Table 4-10**, above, outlines that, when using Band Option 1 CRM, total annual predicted herring gull collision mortality is calculated as 27.411 individuals in relation to Representative scenario A and 23.283 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated, for example, that 0.18% of total predicted collision mortality during the breeding bio-season (which, for herring gull, is considered as the April to August period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.806 and 0.682 individuals from the SPA per breeding bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to the other (non-breeding) bio-season and both apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Ireland's Eye SPA and, from this, when using Band Option 1 CRM, annual predicted herring gull

collision mortality to Ireland's Eye SPA is calculated as 0.814 individuals in relation to Representative scenario A and 0.689 individuals in relation to Representative scenario B.

398. Increases to SPA herring gull mortality rates resultant from apportioned annual impacts are presented in **Table 4-11**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus herring gull adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-11: Increase to annual mortality rates resulting from collision mortalities apportioned to Ireland's Eye SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.814**	636	16.60%	105.576	**0.771%**
	2	0.610				0.578%
B	**1**	**0.689**				**0.653%**
	2	0.512				0.485%

399. As additional mortality to the herring gull SCI of Ireland's Eye SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Ireland's Eye SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

400. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

401. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

402. The Conservation Objective and its attributes and targets for the herring gull SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA herring gull SCI.**

4.6.3 Receptor 3: Guillemot

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

403. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

404. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

405. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

406. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

407. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a

significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

408. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

409. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

410. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

411. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

412. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

413. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Ireland's Eye SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

414. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, guillemots which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

415. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

416. Total bio-seasonal and total annual estimated construction phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-12**. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-12**.

417. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

418. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-12: Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Ireland's Eye SPA for a range of construction phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Total impact	15% / 1%	5.436	20.010	25.446
	25% / 1%	**9.060**	**33.351**	**42.410**
	35% / 1%	12.684	46.691	59.374
	25% / 2%	18.119	66.701	84.820
	35% / 2%	25.367	93.381	118.748
Percentage of impact apportioned to SPA		3.63%	0.33%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Impact to SPA	15% / 1%	0.197	0.066	0.263
	25% / 1%	**0.329**	**0.110**	**0.439**
	35% / 1%	0.460	0.155	0.615
	25% / 2%	0.657	0.221	0.878
	35% / 2%	0.920	0.309	1.229

419. **Table 4-12**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 42.410 individuals. When predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated that, for example, 3.63% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.329 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Ireland's Eye SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Ireland's Eye SPA is calculated as 0.439 individuals per annum.

420. Increases to Ireland's Eye SPA guillemot mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-13**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). In order to provide a precautionary approach the SMP counts of individuals have not been corrected, using the UK correction factor of 1.34 for guillemot and razorbill, to provide for breeding adults; this provides an overestimate of potential mortality which allows a robust precautionary conclusion to be presented. The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-13: Increase to annual mortality rates resulting from construction phase displacement mortalities apportioned to Ireland's Eye SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.263	4410	6.10%	269.01	0.098%
25% / 1%	0.439				0.163%
35% / 1%	0.615				0.228%
25% / 2%	0.878				0.326%
35% / 2%	1.229				0.457%

421. As additional mortality to the guillemot SCI of Ireland's Eye SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. Specifically, an increase in mortality of 0.163% associated with construction phase displacement will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

422. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

423. As per project-only assessment, above.

OECC

Project-only assessment

424. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

425. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

426. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

427. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

428. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

429. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

430. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

431. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

432. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

433. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

434. Guillemot depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

435. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

436. Of guillemots' key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical guillemot breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

437. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

438. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

439. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

440. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

441. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

442. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

443. As per project-only assessment, above.

OECC

Project-only assessment

444. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

445. Guillemot depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

446. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

447. Of guillemots' key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

448. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 153.7 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

449. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

450. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

451. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

452. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

453. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

454. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

455. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

456. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

457. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

458. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their

consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

459. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

460. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

461. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

462. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

463. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

464. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot

this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

465. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

466. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Ireland's Eye SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

467. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, guillemots which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

468. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

469. Total bio-seasonal and total annual estimated operation and maintenance phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-14**. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-14**.

470. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-14: Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Ireland's Eye SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Total impact	30% / 1%	10.871	40.02	50.891
	50% / 1%	**18.119**	**66.701**	**84.820**
	70% / 1%	25.367	93.381	118.748
	50% / 2%	36.238	133.402	169.640
	70% / 2%	50.733	186.762	237.495
Percentage of impact apportioned to SPA		3.63%	0.33%	
Impact to SPA	30% / 1%	0.394	0.132	0.527
	50% / 1%	**0.657**	**0.221**	**0.878**
	70% / 1%	0.920	0.309	1.229
	50% / 2%	1.315	0.441	1.756
	70% / 2%	1.841	0.618	2.459

471. **Table 4-14**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 84.820 individuals. When predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated that, for example, 3.63% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.657 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Ireland's Eye SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Ireland's Eye SPA is calculated as 0.878 individuals per annum.

472. Increases to Ireland's Eye SPA guillemot mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-15**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-15: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Ireland's Eye SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.527	4410	6.10%	269.01	0.196%
50% / 1%	**0.878**				**0.326%**
70% / 1%	1.229				0.457%
50% / 2%	1.756				0.653%
70% / 2%	2.459				0.914%

473. As additional mortality to the guillemot SCI of Ireland's Eye SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

474. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

475. As per project-only assessment, above.

OECC

Project-only assessment

476. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

477. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

478. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

479. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

480. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

481. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

482. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's

Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

483. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

484. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

485. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

486. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

487. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

488. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and

resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

489. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

490. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

491. Key fish species, upon which guillemot predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

492. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

493. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

494. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

495. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

496. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

497. As per project-only assessment, above.

OECC

Project-only assessment

498. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

499. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

500. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

501. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

502. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

503. Key fish species, upon which guillemot predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

504. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

505. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

506. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

507. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

508. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

509. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

510. The Conservation Objective and its attributes and targets for the guillemot SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the

operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA guillemot SCI.**

4.6.4 Receptor 4: Razorbill

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

511. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

512. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

513. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

514. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

515. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact

is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

516. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

517. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

518. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

519. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

520. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

521. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Ireland's Eye SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

522. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, razorbills which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

523. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

524. Total bio-seasonal and total annual estimated construction phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-16**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-16**.

525. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

526. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-16: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Ireland's Eye SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr–Jul)	Post-breeding migration (Aug–Oct)	Migration free non-breeding (Aug–Mar)	Return migration (Jan–Mar)	
Total impact	15% / 1%	1.012	6.540	0.961	0.614	9.126
	25% / 1%	**1.687**	**10.901**	**1.601**	**1.023**	**15.211**
	35% / 1%	2.361	15.261	2.242	1.432	21.295
	25% / 2%	3.373	21.801	3.202	2.046	30.421
	35% / 2%	4.722	30.521	4.483	2.864	42.590
Percentage of impact apportioned to SPA		7.46%	0.25%	0.44%	0.25%	
Impact to SPA	15% / 1%	0.075	0.017	0.004	0.002	0.098
	25% / 1%	**0.126**	**0.028**	**0.007**	**0.003**	**0.163**
	35% / 1%	0.176	0.039	0.010	0.004	0.228
	25% / 2%	0.252	0.055	0.014	0.005	0.326
	35% / 2%	0.352	0.077	0.020	0.007	0.456

527. **Table 4-16**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 15.211 individuals. When predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated that, for example, 7.46% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.126 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Ireland's Eye SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Ireland's Eye SPA is calculated as 0.163 individuals per annum.

528. Increases to Ireland's Eye SPA razorbill mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-17**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase

to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-17: Increase to annual mortality rates resulting from displacement mortalities apportioned to Ireland's Eye SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.098	1600	10.50%	168	0.058%
25% / 1%	**0.163**				**0.097%**
35% / 1%	0.228				0.136%
25% / 2%	0.326				0.194%
35% / 2%	0.456				0.272%

529. As additional mortality to the razorbill SCI of Ireland's Eye SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

530. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

531. As per project-only assessment, above.

OECC

Project-only assessment

532. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement

impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

533. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

534. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

535. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

536. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 164.6 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

537. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

538. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

539. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

540. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

541. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

542. Razorbill depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

543. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

544. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical razorbill breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

545. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

546. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

547. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

548. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

549. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

550. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

551. As per project-only assessment, above.

OECC

Project-only assessment

552. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

553. Razorbill depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

554. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

555. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

556. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 164.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

557. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

558. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

559. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

560. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

561. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

562. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

563. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being **met** for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

564. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Ireland's Eye SPA.

565. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

566. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

567. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

568. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

569. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

570. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

571. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

572. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

573. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

574. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Ireland's Eye SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

575. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat

loss). Similarly, due to the presence of operational WTGs within the array site, razorbills which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

576. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

577. Total bio-seasonal and total annual estimated operation and maintenance phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-18**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ireland's Eye SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-18**.

578. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-18: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Ireland's Eye SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (Apr–Jul)	**Post-breeding migration (Aug–Oct)**	**Migration free non-breeding (Aug–Mar)**	**Return migration (Jan–Mar)**	
Total impact	30% / 1%	2.024	13.08	1.921	1.227	18.252
	50% / 1%	**3.373**	**21.801**	**3.202**	**2.046**	**30.422**
	70% / 1%	4.722	30.521	4.483	2.864	42.590
	50% /2%	6.746	43.601	6.404	4.091	60.842
	70% /2%	9.444	61.042	8.965	5.728	85.179
Percentage of impact apportioned to SPA		7.46%	0.25%	0.44%	0.25%	
Impact to SPA	30% / 1%	0.151	0.033	0.008	0.003	0.196
	50% / 1%	**0.252**	**0.055**	**0.014**	**0.005**	**0.326**
	70% / 1%	0.352	0.077	0.020	0.007	0.456
	50% / 2%	0.503	0.110	0.028	0.010	0.652

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr–Jul)	Post-breeding migration (Aug–Oct)	Migration free non-breeding (Aug–Mar)	Return migration (Jan–Mar)	
	70% / 2%	0.704	0.154	0.039	0.014	0.912

579. **Table 4-18**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 30.422 individuals. When predicted mortalities are apportioned to Ireland's Eye SPA for each bio-season it is estimated that, for example, 7.46% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Ireland's Eye SPA; this equates to 0.252 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Ireland's Eye SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Ireland's Eye SPA is calculated as 0.326 individuals per annum.

580. Increases to Ireland's Eye SPA razorbill mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-19**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-19: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Ireland's Eye SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.196	1600	10.50%	168	0.116%
50% / 1%	**0.326**				**0.194%**
70% / 1%	0.456				0.272%
50% /2%	0.652				0.388%
70% /2%	0.912				0.543%

581. As additional mortality to the razorbill SCI of Ireland's Eye SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of

Ireland's Eye SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

582. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

583. As per project-only assessment, above.

OECC

Project-only assessment

584. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

585. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

586. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

587. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

588. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition

of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

589. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 164.6 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

590. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

591. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

592. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

593. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

594. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

595. Razorbill depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

596. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

597. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

598. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

599. Key fish species, upon which razorbill predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

600. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

601. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of razorbill breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

602. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

603. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

604. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

605. As per project-only assessment, above.

OECC

Project-only assessment

606. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Ireland's Eye SPA.

607. Razorbill depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

608. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

609. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

610. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

611. Key fish species, upon which razorbill predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

612. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

613. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of razorbill breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

614. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

615. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

616. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

617. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

618. The Conservation Objective and its attributes and targets for the razorbill SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA razorbill SCI.**

4.6.5 Receptor 5: Cormorant

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

619. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

620. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2

within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

621. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

622. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) of cormorant breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

623. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

624. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

625. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

626. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI.**

OECC intertidal landfall

Project-only assessment

627. Cormorant which breed within Ireland's Eye SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to cormorant connected with Ireland's Eye SPA, which may otherwise utilise those areas for non-foraging behaviours.

628. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

629. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

630. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

631. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

632. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

633. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI**.

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

634. Although cormorant are insensitive to disturbance and displacement from presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong attraction' – Dierschke et al., 2016), they are however considered at least somewhat sensitive to disturbance from vessel movements (i.e. high [4/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [9.2/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019).

635. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for cormorant, the mean distance (+ 1 SD) at which individuals demonstrate disturbance responses from vessel traffic has been observed to be 473 m (Fliessbach et al., 2019)) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

636. As such, during the construction phase of the CWP Project, vessel traffic may result in the temporary disturbance and displacement of cormorant which breed within Ireland's Eye SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

637. In relation to these Conservation Objective attributes, disturbance by vessels leading to temporary displacement of cormorant from the vicinity of vessels within the CWP Project array site and

surrounding areas may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

638. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel.

639. Resultant temporary reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to temporarily use alternative areas for such behaviours, may, for periods while vessels are present within the array site, affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

640. Despite the above potential pathways to impact, disturbance and displacement impacts from activities within the array site during the construction phase are not considered capable of inhibiting the achievement of the above listed Conservation Objective attribute targets of the cormorant SCI of Ireland's Eye SPA, because:

- The areas potentially affected by disturbance and displacement impacts associated with construction phase vessel activity within the array site at any given time will be negligible in comparison to the marine area habitat use extents of cormorant from Ireland's Eye SPA;
- Disturbance within these areas will be temporary and of short duration in any particular location; and
- The densities of cormorant recorded within the array site and surrounding areas during baseline surveys were extremely low throughout both years of baseline survey effort.

641. On this basis, The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA..

Proposed mitigation

642. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

643. As per project-only assessment, above.

OECC

Project-only assessment

644. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

645. Cormorant are considered to be at least somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. high [4/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [9.2/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the construction phase of the CWP Project, vessel traffic may result in the temporary disturbance and displacement of cormorant which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

646. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

647. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

648. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for cormorant. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of cormorant breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 33.9 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (primarily in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel, which equates to 0.55% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

649. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

650. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

651. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

652. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

653. Cormorant which breed within Ireland's Eye SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

654. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

655. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

656. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

657. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the

favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA

Proposed mitigation

658. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

659. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

660. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI**.

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

661. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

662. Cormorant depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

663. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing

productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

664. Of cormorant's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical cormorant breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

665. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

666. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

667. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of cormorant breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

668. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

669. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

670. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

671. As per project-only assessment, above.

OECC

Project-only assessment

672. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

673. Cormorant depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

674. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

675. Of cormorant's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

676. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 33.9 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to

enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

677. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

678. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of cormorant breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

679. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

680. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

681. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

682. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

683. Cormorant which breed within Ireland's Eye SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have

the potential to affect areas of intertidal habitat such that prey species availability to cormorant is temporarily reduced within those areas.

684. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

685. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

686. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

687. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

688. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

689. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

690. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

691. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

692. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

693. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) of cormorant breeding within Ireland's Eye SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

694. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors,

it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

695. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

696. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

697. Cormorant which breed within Ireland's Eye SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to cormorant connected with Ireland's Eye SPA, which may otherwise utilise those areas for non-foraging behaviours.

698. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

699. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

700. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance

phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

701. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

702. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

703. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

704. Although cormorant are insensitive to disturbance and displacement from presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong attraction' – Dierschke et al., 2016), they are however considered at least somewhat sensitive to disturbance from vessel movements (i.e. high [4/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [9.2/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019).

705. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for cormorant, the mean distance (+ 1 SD) at which individuals demonstrate disturbance responses from vessel traffic has been observed to be 473 m (Fliessbach et al., 2019)) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

706. As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the temporary disturbance and displacement of cormorant which breed within Ireland's Eye SPA from

areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

707. In relation to these Conservation Objective attributes, disturbance by vessels leading to temporary displacement of cormorant from the vicinity of vessels within the CWP Project array site and surrounding areas may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

708. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel.

709. Resultant temporary reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to temporarily use alternative areas for such behaviours, may, for periods while vessels are present within the array site, affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

710. Despite the above potential pathways to impact, disturbance and displacement impacts from activities within the array site during the construction phase are not considered capable of inhibiting the achievement of the above listed Conservation Objective attribute targets of the cormorant SCI of Ireland's Eye SPA, because:

- The areas potentially affected by disturbance and displacement impacts associated with operation and maintenance phase vessel activity within the array site at any given time will be negligible in comparison to the marine area habitat use extents of cormorant from Ireland's Eye SPA;
- Disturbance within these areas will be temporary and of short duration in any particular location; and
- The densities of cormorant recorded within the array site and surrounding areas during baseline surveys were extremely low throughout both years of baseline survey effort.

711. On this basis, The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA..

Proposed mitigation

712. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

713. As per project-only assessment, above.

OECC

Project-only assessment

714. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

715. Cormorant are considered to be at least somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. high [4/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [9.2/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the temporary disturbance and displacement of cormorant which breed within Ireland's Eye SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

716. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

717. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

718. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for cormorant. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of cormorant breeding within Ireland's Eye SPA (mean–maximum foraging range (+ 1 SD) = 33.9 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (primarily in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel, which equates to 0.55% of the total OECC area. operation and maintenance phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific operation and maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

719. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance

and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

720. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

721. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

722. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

723. Cormorant which breed within Ireland's Eye SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

724. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

725. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from ex situ intertidal habitats around operation and maintenance activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

726. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the

condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

727. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA

Proposed mitigation

728. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

729. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

730. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI**.

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

731. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

732. Cormorant depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

733. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

734. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

735. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

736. Key fish species, upon which cormorant predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

737. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

738. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of cormorant breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

739. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

740. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

741. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

742. As per project-only assessment, above.

OECC

Project-only assessment

743. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Ireland's Eye SPA.

744. Cormorant depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

745. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

746. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

747. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

748. Key fish species, upon which cormorant predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

749. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

750. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of cormorant breeding within Ireland's Eye SPA (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

751. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

752. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Ireland's Eye SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

753. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ireland's Eye SPA.

Residual effect

754. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

755. Cormorant which breed within Ireland's Eye SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to cormorant is temporarily reduced within those areas.

756. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

757. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Ireland's Eye SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

758. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Ireland's Eye SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Ireland's Eye SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Ireland's Eye SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding

population abundance of the cormorant SCI of Ireland's Eye SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

759. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

760. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

761. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7,** above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

762. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of cormorant from Ireland's Eye SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the cormorant SCI of Ireland's Eye SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

763. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Ireland's Eye SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Ireland's Eye SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

764. Flight activity by cormorant recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only one cormorant was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this SCI would be negligible.

765. As additional mortality to the cormorant SCI of Ireland's Eye SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Ireland's Eye SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ireland's Eye SPA.

Proposed mitigation

766. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Ireland's Eye SPA.

Residual effect

767. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

768. The Conservation Objective and its attributes and targets for the cormorant SCI of Ireland's Eye SPA are presented in **Table 4-7**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ireland's Eye SPA cormorant SCI.**

4.7 Lambay Island SPA (IE004069)

769. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: kittiwake, fulmar, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, cormorant and greylag goose.

770. The minimum separation distance between SPA and the array site is 38.83 km.

771. The minimum separation distance between SPA and the OECC is 18.27 km (with a 'by-sea' separation distance of 20.22 km).

772. The minimum separation distance between SPA and the OECC intertidal landfall is 18.49 km (with a 'by-sea' separation distance of 21.74 km).

Table 4-20: Assessment of adverse effects on site integrity (project alone) – Lambay Island SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 0**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.7.2**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Herring gull [A184]				
	Direct effects on habitat [1,3]	**Section 4.7.3**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Lesser black-backed gull [A183]				
	Direct effects on habitat [1,3]	**Section 4.7.4**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Guillemot [A199]				
	Direct effects on habitat [1,3]	**Section 4.7.5**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Razorbill [A200]				
	Direct effects on habitat [1,3]	**Section 4.7.6**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Puffin [A204]				
	Direct effects on habitat [1,3]	**Section 4.7.7**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Cormorant [A017]				
	Direct effects on habitat [1,3]	**Section 4.7.8**	None	No change	No AESI
	Disturbance and displacement [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Greylag goose [A043] – See **Section 4.39**				

4.7.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

773. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

774. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

775. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

776. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

777. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors,

it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

778. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

779. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

780. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20,** above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is no **project-only AESI for the Lambay Island SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

781. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

782. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

783. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

784. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

785. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

786. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

787. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

788. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

789. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

790. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

791. As per project-only assessment, above.

OECC

Project-only assessment

792. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

793. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

794. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

795. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

796. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

797. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

798. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

799. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

800. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

801. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

802. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

803. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

804. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

805. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

806. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

807. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

808. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

809. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

810. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

811. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

812. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

813. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

814. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

815. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

816. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

817. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

818. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

819. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Lambay Island SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

820. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

821. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

822. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

823. As per project-only assessment, above.

OECC

Project-only assessment

824. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Lambay Island SPA.

825. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

826. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

827. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

828. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

829. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

830. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

831. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Lambay Island SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

832. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

833. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

834. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

835. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

836. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

837. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Lambay Island SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

838. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Lambay Island SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Lambay Island SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

839. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-21**. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-21**.

840. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-21: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Lambay Island SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	1	4.183	4.249	9.85	18.282
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.93%	9.93%	0.71%	
Impact to SPA	A	**1**	**0.039**	**0.422**	**0.070**	**0.531**
		2	0.089	0.965	0.159	1.212
	B	**1**	**0.034**	**0.367**	**0.061**	**0.462**
		2	0.078	0.848	0.139	1.065

841. **Table 4-21**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated, for example, that 0.93% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Lambay Island SPA; this equates to 0.039 and 0.034 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Lambay Island SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Lambay Island SPA is calculated as 0.531 individuals in relation to Representative scenario A and 0.462 individuals in relation to Representative scenario B.

842. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-22**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-22: Increase to annual mortality rates resulting from collision mortalities apportioned to Lambay Island SPA

Representative scenario	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.574**	**1290**	**14.60%**	**188.34**	**0.30%**
	2	1.313				0.70%
B	**1**	**0.500**				**0.27%**
	2	1.154				0.61%

843. As additional mortality to the kittiwake SCI of Lambay Island SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Lambay Island SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

844. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

845. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

846. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA kittiwake SCI.**

4.7.2 Receptor 2: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

847. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

848. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

849. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

850. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

851. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

852. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

853. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

854. The Conservation Objective and its attributes and targets for the fulmar SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is no **project-only AESI for the Lambay Island SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

855. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

856. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

857. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

858. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

859. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

860. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

861. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

862. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

863. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

864. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

865. As per project-only assessment, above.

OECC

Project-only assessment

866. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

867. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

868. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

869. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

870. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter

durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

871. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

872. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

873. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

874. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

875. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

876. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

877. The Conservation Objective and its attributes and targets for the fulmar SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

878. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

879. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

880. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

881. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

882. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

883. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

884. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

885. The Conservation Objective and its attributes and targets for the fulmar SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

886. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

887. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

888. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

889. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

890. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

891. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

892. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

893. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Lambay Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

894. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

895. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

896. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

897. As per project-only assessment, above.

OECC

Project-only assessment

898. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Lambay Island SPA.

899. fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

900. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

901. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

902. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this

impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

903. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

904. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

905. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Lambay Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

906. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

907. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

908. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

909. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

910. The Conservation Objective and its attributes and targets for the fulmar SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA fulmar SCI**.

4.7.3 Receptor 3: Herring gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

911. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

912. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

913. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

914. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

915. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat

within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

916. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

917. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

918. With regards to the OECC intertidal landfall, relevant construction phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate laying of buried export cables through intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

919. Herring gull which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

920. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

921. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities

within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

922. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

923. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

924. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

925. The Conservation Objective and its attributes and targets for the herring gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is no **project-only AESI for the Lambay Island SPA herring gull SCI.**

Construction phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

926. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction

phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

927. Herring gull which breed within Lambay Island SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

928. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

929. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of herring gull from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

930. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

931. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Lambay Island SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

932. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

933. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

934. The Conservation Objective and its attributes and targets for the herring gull SCI of Lambay Island SPA are presented in **Table 4-20,** above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA herring gull SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

935. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

936. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

937. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

938. As herring gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI.

939. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels

over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

940. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

941. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

942. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

943. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

944. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

945. As per project-only assessment, above.

OECC

Project-only assessment

946. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

947. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

948. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

949. As herring gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

950. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 85.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

951. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

952. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

953. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

954. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the herring gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

955. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

956. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

957. Herring gull which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

958. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

959. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly

affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

960. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

961. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

962. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

963. The Conservation Objective and its attributes and targets for the herring gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA herring gull SCI**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

964. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

965. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the herring gull SCI of Lambay Island SPA: the array site

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

966. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

967. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

968. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

969. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

970. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

971. With regards to the OECC intertidal landfall, relevant operation and maintenance phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate required maintenance or repair of buried cables within intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

972. Herring gull which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

973. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

974. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

975. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal

landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

976. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

977. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

978. The Conservation Objective and its attributes and targets for the kittiwake SCI of Lambay Island SPA are presented in **Table 4-20,** above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA herring gull SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

979. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

980. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

981. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for herring gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

982. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

983. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

984. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

985. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

986. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Lambay Island SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

987. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

988. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

989. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

990. As per project-only assessment, above.

OECC

Project-only assessment

991. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Lambay Island SPA.

992. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

993. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of

foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

994. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

995. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

996. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

997. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

998. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Lambay Island SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

999. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1000. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1001. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1002. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1003. Herring gull which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

1004. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1005. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1006. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and

maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1007. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1008. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1009. The Conservation Objective and its attributes and targets for the herring gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA herring gull SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

1010. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of herring gull from Lambay Island SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the herring gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

1011. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Lambay Island SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Lambay Island SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

1012. Total bio-seasonal and total annual estimated herring gull collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-23**. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-23**.

1013. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-23: Total bio-seasonal and annual collision mortalities to herring gull and mortalities apportioned to Lambay Island SPA

	Design option	CRM Band Option	Bio-season		Annual
			Breeding (Apr–Aug)	Non-breeding (Sep–Mar)	
Total impact	A	**1**	**25.018**	**2.393**	**27.411**
		2	18.76	1.876	20.636
	B	**1**	**21.178**	**2.105**	**23.283**
		2	15.724	1.596	17.320
Percentage of impact apportioned to SPA			6.69%	0.97%	
Impact to SPA	A	**1**	**1.674**	**0.023**	**1.697**
		2	1.255	0.018	1.273
	B	**1**	**1.417**	**0.020**	**1.437**
		2	1.052	0.015	1.067

1014. **Table 4-23**, above, outlines that, when using Band Option 1 CRM, total annual predicted herring gull collision mortality is calculated as 27.411 individuals in relation to Representative scenario A and 23.283 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated, for example, that 6.69% of total predicted collision mortality during the breeding bio-season (which, for herring gull, is considered as the April to August period) relates to breeding adults from Lambay Island SPA; this equates to 1.674 and 1.417 individuals from the SPA per breeding bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to the other (non-breeding) bio-season and both apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Lambay Island SPA and, from this, when using Band Option 1 CRM, annual predicted herring gull collision mortality to Lambay Island SPA is calculated as 1.697 individuals in relation to Representative scenario A and 1.437 individuals in relation to Representative scenario B.

1015. Increases to SPA herring gull mortality rates resultant from apportioned annual impacts are presented in **Table 4-24**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus herring gull adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-24: Increase to annual mortality rates resulting from collision mortalities apportioned to Lambay Island SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**1.697**	1812	16.60%	300.792	**0.564%**
	2	1.273				0.423%
B	**1**	**1.437**				**0.478%**
	2	1.067				0.355%

1016. As additional mortality to the herring gull SCI of Lambay Island SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Lambay Island SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1017. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1018. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1019. The Conservation Objective and its attributes and targets for the herring gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA herring gull SCI.**

4.7.4 Receptor 4: Lesser black-backed gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1020. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1021. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1022. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1023. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1024. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In

light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1025. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1026. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1027. Lesser black-backed gull which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

1028. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1029. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1030. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects

on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1031. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1032. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1033. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI**.

Construction phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

1034. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1035. Lesser black-backed gull which breed within Lambay Island SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

1036. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1037. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of lesser black-backed gull from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1038. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1039. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1040. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1041. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1042. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI**.

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1043. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1044. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1045. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1046. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI.

1047. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1048. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1049. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1050. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1051. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1052. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1053. As per project-only assessment, above.

OECC

Project-only assessment

1054. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1055. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following

Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1056. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1057. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

1058. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1059. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1060. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1061. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of

changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1062. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1063. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1064. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1065. Lesser black-backed gull which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

1066. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1067. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn

the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1068. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1069. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1070. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1071. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

1072. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and

unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Lesser black-backed gull SCI of Lambay Island SPA.

1073. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull SCI of Lambay Island SPA: the array site

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1074. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1075. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1076. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1077. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1078. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1079. Lesser black-backed gull which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

1080. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1081. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1082. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1083. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1084. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1085. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

OECC intertidal landfall

1086. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1087. Lesser black-backed gull which breed within Lambay Island SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

1088. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1089. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of lesser black-backed gull from ex situ intertidal habitats around operation and maintenance activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1090. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the

condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1091. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1092. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1093. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1094. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI**.

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1095. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1096. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities

within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1097. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1098. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1099. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1100. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1101. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1102. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Lambay Island SPA (mean–maximum + 1

SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1103. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1104. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1105. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1106. As per project-only assessment, above.

OECC

Project-only assessment

1107. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Lambay Island SPA.

1108. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1109. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1110. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1111. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1112. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1113. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1114. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Lambay Island SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1115. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1116. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1117. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1118. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1119. Lesser black-backed gull which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

1120. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1121. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1122. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1123. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1124. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1125. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

1126. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Lambay Island SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the lesser black-backed gull SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

1127. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Lambay Island SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Lambay Island SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

1128. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this SCI would be negligible.

1129. As additional mortality to the lesser black-backed gull SCI of Lambay Island SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Lambay Island SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1130. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1131. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1132. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA lesser black-backed gull SCI**.

4.7.5 Receptor 5: Guillemot

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1133. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1134. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1135. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1136. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1137. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors,

it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1138. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1139. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1140. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1141. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1142. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1143. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Lambay Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1144. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, guillemots which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1145. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1146. Total bio-seasonal and total annual estimated construction phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-25**. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-25**.

1147. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

1148. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-25: Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Lambay Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Total impact	15% / 1%	5.436	20.010	25.446
	25% / 1%	**9.060**	**33.351**	**42.410**
	35% / 1%	12.684	46.691	59.374
	25% / 2%	18.119	66.701	84.820
	35% / 2%	25.367	93.381	118.748
Percentage of impact apportioned to SPA		35.87%	4.50%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Impact to SPA	15% / 1%	1.950	0.901	2.851
	25% / 1%	**3.250**	**1.501**	**4.751**
	35% / 1%	4.550	2.102	6.651
	25% / 2%	6.500	3.002	9.502
	35% / 2%	9.100	4.203	13.303

1149. **Table 4-25**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 42.410 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 35.87% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Lambay Island SPA; this equates to 3.250 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Lambay Island SPA is calculated as 4.751 individuals per annum.

1150. Increases to Lambay Island SPA guillemot mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-26**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-26: Increase to annual mortality rates resulting from displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	2.851	59983	6.10%	3658.963	0.078%
25% / 1%	**4.751**				**0.130%**
35% / 1%	6.651				0.182%
25% / 2%	9.502				0.260%
35% / 2%	13.303				0.364%

1151. As additional mortality to the guillemot SCI of Lambay Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1152. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1153. As per project-only assessment, above.

OECC

Project-only assessment

1154. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1155. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1156. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1157. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such

behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1158. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

1159. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1160. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1161. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1162. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1163. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1164. Guillemot depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1165. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1166. Of guillemot's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical guillemot breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

1167. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

1168. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1169. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1170. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1171. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1172. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1173. As per project-only assessment, above.

OECC

Project-only assessment

1174. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1175. Guillemot depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1176. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1177. Of guillemot's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1178. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 153.7 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

1179. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1180. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1181. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1182. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1183. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1184. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1185. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1186. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1187. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1188. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These

potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1189. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1190. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1191. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1192. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1193. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1194. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1195. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1196. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Lambay Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1197. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, guillemots which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1198. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1199. Total bio-seasonal and total annual estimated operation and maintenance phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-27**. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-27**.

1200. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-27: Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Lambay Island SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Total impact	30% / 1%	10.871	40.02	50.891
	50% / 1%	**18.119**	**66.701**	**84.820**
	70% / 1%	25.367	93.381	118.748
	50% / 2%	36.238	133.402	169.640
	70% / 2%	50.733	186.762	237.495
Percentage of impact apportioned to SPA		35.87%	4.50%	
Impact to SPA	30% / 1%	3.900	1.801	5.701
	50% / 1%	**6.500**	**3.002**	**9.502**
	70% / 1%	9.100	4.203	13.303
	50% / 2%	13.000	6.004	19.004
	70% / 2%	18.199	8.406	26.606

1201. **Table 4-27**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 84.820 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 35.87% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Lambay Island SPA; this equates to 6.500 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Lambay Island SPA is calculated as 9.502 individuals per annum.

1202. Increases to Lambay Island SPA guillemot mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-28**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-28: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	5.701	59983	6.10%	3658.963	0.156%
50% / 1%	**9.502**				**0.260%**
70% / 1%	13.303				0.364%
50% / 2%	19.004				0.519%
70% / 2%	26.606				0.727%

1203. As additional mortality to the guillemot SCI of Lambay Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1204. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1205. As per project-only assessment, above.

OECC

Project-only assessment

1206. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1207. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over

the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

1208. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1209. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1210. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1211. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

1212. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these

factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1213. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1214. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1215. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1216. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1217. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1218. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced

provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1219. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1220. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1221. Key fish species, upon which guillemot predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1222. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1223. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Lambay Island SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1224. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1225. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1226. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1227. As per project-only assessment, above.

OECC

Project-only assessment

1228. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Lambay Island SPA.

1229. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1230. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1231. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1232. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1233. Key fish species, upon which guillemot predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1234. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1235. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Lambay Island SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1236. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1237. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1238. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1239. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1240. The Conservation Objective and its attributes and targets for the guillemot SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA guillemot SCI.**

4.7.6 Receptor 6: Razorbill

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1241. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1242. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1243. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1244. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1245. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat

within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1246. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1247. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1248. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1249. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1250. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1251. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Lambay Island SPA from areas within and surrounding the array site.

Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1252. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, razorbills which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1253. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1254. Total bio-seasonal and total annual estimated construction phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-29**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-29**.

1255. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

1256. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-29: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Lambay Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr – Jul)	Post-breeding migration (Aug – Oct)	Migration Free Non-breeding (Nov-Dec)	Return migration (Jan – Mar)	
Total impact	15% / 1%	1.01	6.54	0.96	0.61	9.126
	25% / 1%	**1.69**	**10.90**	**1.60**	**1.02**	**15.211**
	35% / 1%	2.36	15.26	2.24	1.43	21.295
	25% / 2%	3.37	21.80	3.20	2.05	30.421
	35% / 2%	4.72	30.52	4.48	2.86	42.590
Percentage of impact apportioned to SPA		24.92%	1.16%	2.05%	1.16%	
Impact to SPA	15% / 1%	0.252	0.076	0.020	0.007	0.355
	25% / 1%	**0.420**	**0.127**	**0.033**	**0.012**	**0.592**
	35% / 1%	0.588	0.177	0.046	0.017	0.828
	25% / 2%	0.841	0.253	0.066	0.024	1.184
	35% / 2%	1.177	0.355	0.092	0.033	1.657

1257. **Table 4-29**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 15.211 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 24.92% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Lambay Island SPA; this equates to 0.420 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Lambay Island SPA is calculated as 0.592 individuals per annum.

1258. Increases to Lambay Island SPA razorbill mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-30**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the

proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-30: Increase to annual mortality rates resulting from displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.355	7353	10.50%	772.065	0.046%
25% / 1%	**0.592**				**0.077%**
35% / 1%	0.828				0.107%
25% / 2%	1.184				0.153%
35% / 2%	1.657				0.215%

1259. As additional mortality to the razorbill SCI of Lambay Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1260. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1261. As per project-only assessment, above.

OECC

Project-only assessment

1262. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1263. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1264. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1265. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1266. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 164.6 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

1267. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1268. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1269. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1270. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1271. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1272. Razorbill depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1273. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1274. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical razorbill breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

1275. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

1276. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1277. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1278. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1279. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1280. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1281. As per project-only assessment, above.

OECC

Project-only assessment

1282. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1283. Razorbill depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1284. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1285. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1286. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 164.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

1287. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1288. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1289. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1290. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1291. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1292. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1293. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1294. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1295. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1296. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1297. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1298. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1299. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1300. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1301. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1302. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1303. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1304. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Lambay Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1305. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat

loss). Similarly, due to the presence of operational WTGs within the array site, razorbills which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1306. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1307. Total bio-seasonal and total annual estimated operation and maintenance phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-31**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-31**.

1308. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-31: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Lambay Island SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (Apr–Jul)	**Post-breeding migration (Aug–Oct)**	**Migration free non-breeding (Nov–Dec)**	**Return migration (Jan–Mar)**	
Total impact	30% / 1%	2.024	13.08	1.921	1.227	18.252
	50% / 1%	**3.373**	**21.801**	**3.202**	**2.046**	**30.422**
	70% / 1%	4.722	30.521	4.483	2.864	42.590
	50% / 2%	6.746	43.601	6.404	4.091	60.842
	70% / 2%	9.444	61.042	8.965	5.728	85.179
Percentage of impact apportioned to SPA		24.92%	1.16%	2.05%	1.16%	
	30% / 1%	0.504	0.152	0.039	0.014	0.710

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr–Jul)	Post-breeding migration (Aug–Oct)	Migration free non-breeding (Nov–Dec)	Return migration (Jan–Mar)	
Impact to SPA	50% / 1%	**0.841**	**0.253**	**0.066**	**0.024**	**1.184**
	70% / 1%	1.177	0.355	0.092	0.033	1.657
	50% / 2%	1.681	0.507	0.131	0.048	2.367
	70% / 2%	2.354	0.710	0.184	0.067	3.314

1309. **Table 4-31**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 30.422 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 24.92% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Lambay Island SPA; this equates to 1.184 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Lambay Island SPA is calculated as 1.184 individuals per annum.

1310. Increases to Lambay Island SPA razorbill mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-32**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-32: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.710	7353	10.50%	772.065	0.092%
50% / 1%	**1.184**				**0.153%**

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
70% / 1%	1.657				0.215%
50% /2%	2.367				0.307%
70% /2%	3.314				0.429%

1311. As additional mortality to the razorbill SCI of Lambay Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1312. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1313. As per project-only assessment, above.

OECC

Project-only assessment

1314. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1315. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

1316. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such,

during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1317. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1318. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1319. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

1320. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1321. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1322. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1323. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1324. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1325. Razorbill depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1326. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1327. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1328. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1329. Key fish species, upon which razorbill predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1330. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1331. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of razorbill breeding within Lambay Island SPA (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1332. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1333. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1334. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1335. As per project-only assessment, above.

OECC

Project-only assessment

1336. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Lambay Island SPA.

1337. Razorbill depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1338. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1339. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1340. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1341. Key fish species, upon which razorbill predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1342. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1343. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of razorbill breeding within Lambay Island SPA (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1344. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1345. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1346. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1347. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1348. The Conservation Objective and its attributes and targets for the razorbill SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA razorbill SCI.**

4.7.7 Receptor 7: Puffin

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1349. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1350. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1351. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1352. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1353. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat

within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1354. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1355. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1356. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1357. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1358. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1359. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of puffin which breed within Lambay Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1360. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, puffins which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1361. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1362. Total bio-seasonal and total annual estimated construction phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-33**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-33**.

1363. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

1364. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-33: Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Lambay Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (May–Jun)	Post-breeding migration (Jul–Aug)	Migration free non-breeding (Sep–Feb)	Return migration (Mar–Apr)	
Total impact	15% / 1%	0.141	0.083	0.067	0.010	0.300
	25% / 1%	**0.235**	**0.139**	**0.112**	**0.016**	**0.501**
	35%/ 1%	0.328	0.194	0.156	0.023	0.700
	25% / 2%	0.469	0.277	0.223	0.032	1.000
	35% / 2%	0.656	0.387	0.312	0.045	1.400
Percentage of impact apportioned to SPA		3.51%	0.10%	0.10%	0.10%	
Impact to SPA	15% / 1%	0.005	0.000	0.000	0.000	0.005
	25% / 1%	**0.008**	**0.000**	**0.000**	**0.000**	**0.008**
	35% / 1%	0.012	0.000	0.000	0.000	0.012
	25% / 2%	0.016	0.000	0.000	0.000	0.017
	35% / 2%	0.023	0.000	0.000	0.000	0.024

1365. **Table 4-33**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 0.501 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 3.51% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Lambay Island SPA; this equates to 0.008 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Lambay Island SPA is calculated as 0.008 individuals per annum.

1366. Increases to Lambay Island SPA puffin mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-34**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned

mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-34: Increase to annual mortality rates resulting from displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.005	288	9.40%	27.072	0.019%
25% / 1%	0.008				0.031%
35% / 1%	0.012				0.044%
25% / 2%	0.017				0.063%
35% / 2%	0.024				0.088%

1367. As additional mortality to the puffin SCI of Lambay Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1368. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1369. As per project-only assessment, above.

OECC

Project-only assessment

1370. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement

impacts assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1371. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1372. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1373. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1374. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

1375. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable

conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1376. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1377. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1378. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1379. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1380. Puffin depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1381. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates.

These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1382. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical puffin breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

1383. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

1384. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1385. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1386. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1387. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1388. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1389. As per project-only assessment, above.

OECC

Project-only assessment

1390. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1391. Puffin depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1392. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1393. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1394. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 265.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

1395. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1396. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1397. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1398. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1399. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1400. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1401. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1402. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1403. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1404. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1405. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1406. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1407. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1408. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1409. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1410. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1411. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1412. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of puffin which breed within Lambay Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1413. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, puffins which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1414. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1415. Total bio-seasonal and total annual estimated operation and maintenance phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-35**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Lambay Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-35**.

1416. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-35: Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Lambay Island SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (May–Jun)	**Post-breeding migration (Jul–Aug)**	**Migration free non-breeding (Sep–Feb)**	**Return migration (Sep–Feb)**	
Total impact	30% / 1%	0.281	0.166	0.134	0.019	0.600
	50% / 1%	**0.469**	**0.277**	**0.223**	**0.032**	**1.001**
	70% / 1%	0.656	0.387	0.312	0.045	1.400

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (May–Jun)	Post-breeding migration (Jul–Aug)	Migration free non-breeding (Sep–Feb)	Return migration (Sep–Feb)	
	50% / 2%	0.937	0.553	0.446	0.064	2.000
	70% / 2%	1.312	0.774	0.624	0.09	2.800
Percentage of impact apportioned to SPA		3.51%	0.10%	0.10%	0.10%	
Impact to SPA	30% / 1%	0.010	0.000	0.000	0.000	0.010
	50% / 1%	**0.016**	**0.000**	**0.000**	**0.000**	**0.017**
	70% / 1%	0.023	0.000	0.000	0.000	0.024
	50% / 2%	0.033	0.001	0.000	0.000	0.034
	70% / 2%	0.046	0.001	0.001	0.000	0.048

1417. **Table 4-35**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 1.001 individuals. When predicted mortalities are apportioned to Lambay Island SPA for each bio-season it is estimated that, for example, 3.51% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Lambay Island SPA; this equates to 0.016 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Lambay Island SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Lambay Island SPA is calculated as 0.017 individuals per annum.

1418. Increases to Lambay Island SPA puffin mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-36**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-36: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Lambay Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.010181	288	9.40%	27.072	0.038%
50% / 1%	**0.016992**				**0.063%**
70%/ 1%	0.023767				0.088%
50% / 2%	0.033948				0.125%
70% / 2%	0.047534				0.176%

1419. As additional mortality to the puffin SCI of Lambay Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1420. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1421. As per project-only assessment, above.

OECC

Project-only assessment

1422. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1423. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

1424. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1425. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1426. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1427. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Operation and maintenance phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific operation and maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

1428. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the

level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1429. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1430. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1431. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1432. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1433. Puffin depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1434. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around

electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1435. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1436. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1437. Key fish species, upon which puffin predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1438. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1439. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Lambay Island SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1440. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1441. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation

condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1442. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1443. As per project-only assessment, above.

OECC

Project-only assessment

1444. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Lambay Island SPA.

1445. Puffin depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1446. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1447. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1448. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially

infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1449. Key fish species, upon which puffin predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1450. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1451. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Lambay Island SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1452. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1453. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1454. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1455. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1456. The Conservation Objective and its attributes and targets for the puffin SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA puffin SCI.**

4.7.8 Receptor 8: Cormorant

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1457. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1458. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1459. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1460. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) of cormorant breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1461. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat

within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1462. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1463. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1464. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI.**

OECC intertidal landfall

Project-only assessment

1465. Cormorant which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to cormorant connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

1466. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1467. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with

Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1468. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1469. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1470. As per project-only assessment, above.

Construction phase impact 2 – Disturbance and displacement

OECC

Project-only assessment

1471. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1472. Cormorant are considered to be at least somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. high [4/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [9.2/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the construction phase of the CWP Project, vessel traffic may result in the temporary

disturbance and displacement of cormorant which breed within Lambay Island SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1473. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1474. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1475. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for cormorant. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of cormorant breeding within Lambay Island SPA (mean–maximum foraging range (+ 1 SD) = 33.9 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (primarily in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel, which equates to 0.55% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

1476. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1477. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1478. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1479. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1480. Cormorant which breed within Lambay Island SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

1481. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1482. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1483. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1484. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the

favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1485. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1486. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1487. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI.**

Construction phase impact 3 – Changes in prey availability

OECC

Project-only assessment

1488. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1489. Cormorant depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1490. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing

productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1491. Of cormorant's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1492. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 33.9 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

1493. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1494. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of cormorant breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1495. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1496. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1497. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1498. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1499. Cormorant which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to cormorant is temporarily reduced within those areas.

1500. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1501. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1502. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.27 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1503. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1504. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1505. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

1506. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1507. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1508. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1509. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) of cormorant breeding within Lambay Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1510. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1511. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1512. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1513. Cormorant which breed within Lambay Island SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to cormorant connected with Lambay Island SPA, which may otherwise utilise those areas for non-foraging behaviours.

1514. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1515. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1516. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Lambay Island SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1517. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1518. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1519. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

OECC

Project-only assessment

1520. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (primarily in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel, which equates to 0.55% of the total OECC area.

1521. As such, the consequences of any disturbance and displacement impacts from operational phase activities within the OECC will be negligible, and there is no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for this SCI as stated in **Table 4-20**, above.

Proposed mitigation

1522. No specific mitigation is proposed. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1523. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1524. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1525. Cormorant which breed within Lambay Island SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

1526. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1527. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of cormorant from ex situ intertidal habitats around operation and maintenance activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1528. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1529. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 9.69 km and 'by-sea' distance of 12.61 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA

Proposed mitigation

1530. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1531. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1532. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI**.

Operation and maintenance phase impact 3 – Changes in prey availability

OECC

Project-only assessment

1533. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the cormorant SCI of Lambay Island SPA.

1534. Cormorant depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1535. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact cormorant prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging cormorant, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1536. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1537. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1538. Key fish species, upon which cormorant predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1539. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1540. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of cormorant breeding within Lambay Island SPA (mean–maximum + 1 SD = 33.9 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1541. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1542. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the cormorant SCI of Lambay Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of cormorant prey species in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1543. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Lambay Island SPA.

Residual effect

1544. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1545. Cormorant which breed within Lambay Island SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential

to affect areas of intertidal habitat such that prey species availability to cormorant is temporarily reduced within those areas.

1546. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the cormorant SCI of Lambay Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1547. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Lambay Island SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1548. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Lambay Island SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 18.49 km and 'by-sea' distance of 21.74 km), only a minimal number of individuals connected with Lambay Island SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Lambay Island SPA cormorant population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the cormorant SCI of Lambay Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1549. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1550. As per project-only assessment, above.

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

1551. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of cormorant from Lambay Island SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the cormorant SCI of Lambay Island SPA:

1552. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

1553. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Lambay Island SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Lambay Island SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

1554. Flight activity by cormorant recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only one cormorant was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this SCI would be negligible.

1555. As additional mortality to the cormorant SCI of Lambay Island SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the cormorant SCI of Lambay Island SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Lambay Island SPA.

Proposed mitigation

1556. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Lambay Island SPA.

Residual effect

1557. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1558. The Conservation Objective and its attributes and targets for the cormorant SCI of Lambay Island SPA are presented in **Table 4-20**, above. With regards to collision impacts during the operation and

maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Lambay Island SPA cormorant SCI**.

4.7.9 Receptor 9: Greylag goose

1559. Assessment provided in **Section 4.39** – Distant SPAs designated in relation to migratory wildfowl and waders.

4.8 Rockabill SPA (IE004014)

1560. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: common tern, Arctic tern, roseate tern and purple sandpiper.

1561. The minimum separation distance between SPA and the array site is 47.36 km.

1562. The minimum separation distance between SPA and the OECC is 26.39 km (with a 'by-sea' separation distance of 29.80 km).

1563. The minimum separation distance between SPA and the OECC intertidal landfall is 26.39 km (with a 'by-sea' separation distance of 31.32 km).

Table 4-37 Assessment of adverse effects on site integrity (project alone) – Rockabill SPA

Objective:	Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Common tern [A193]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – Human activities should occur at levels that do not adversely affect the breeding common tern population	Direct effects on habitat [1]	**Section 4.8.1**	None	No change	No AESI
		Disturbance and displacement [1,2]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,4]	See high-level assessment in **Section 4**			No AESI
Arctic tern [A194]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – Human activities should occur at levels that do not adversely affect the breeding Arctic tern population	Direct effects on habitat [1]	**Section 4.8.2**	None	No change	No AESI
		Disturbance and displacement [1,2]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,4]	See high-level assessment in **Section 4**			No AESI
[Roseate tern [A192] – As all project development areas are sited beyond the mean–maximum (+1 SD) foraging range of this SCI (23.2 km; Woodward et al.*, 2019) from Rockabill SPA, this SPA is considered to lie outside the zone of influence (ZoI) defined in Screening.]*						
Purple sandpiper [A148] – See **Section 4.39**						

4.8.1 Receptor 1: Common tern

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

OECC intertidal landfall

Project-only assessment

1564. With regards to the OECC intertidal landfall, relevant construction phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate laying of buried export cables through intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the common tern SCI of Rockabill SPA.

1565. Common tern which breed within Rockabill SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to common tern connected with Rockabill SPA, which may otherwise utilise those areas for non-foraging behaviours.

1566. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.

1567. In relation to this Conservation Objective attribute, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1568. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Rockabill SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is *de minimis*. This level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the common

tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1569. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1570. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1571. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI**.

Construction phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

1572. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the common tern SCI of Rockabill SPA.

1573. Common tern which breed within Rockabill SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

1574. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline
- Productivity rate – No significant decline

1575. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of common tern from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1576. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1577. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance or productivity rate of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1578. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1579. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1580. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI.**

Construction phase impact 3 – Changes in prey availability

OECC

Project-only assessment

1581. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the common tern SCI of Rockabill SPA.

1582. Common tern depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1583. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact common tern prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts reduce the availability of prey biomass, this may result in effects to the demographic parameters of the common tern SCI of Rockabill SPA, specifically reductions in energy intake or increased energetic cost to obtain prey items may result in reducing individual body condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the SCI conservation attribute targets of there being no significant declines in prey biomass availability, breeding population abundance and / or productivity rate.

1584. Of common tern's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1585. Although the by-sea separation distance between the SPA and OECC (29.80 km) is greater the foraging range of this SCI (mean–maximum + 1 SD = 26.9 km, Woodward et al., 2019), as suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions) and trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), there is potential for prey species within the southern most extent of the foraging range of this SCI to experience increased SSC effects in relation to construction phase activities within the northern most extent of the OECC. Should such effects occur, durations over which SSCs would be increased is estimated to be approximately 10 days and cumulative deposition levels in effected areas would be low (c. 1cm). As such, on account of their limited spatial and temporal extent, the potential for increased SSC levels from construction phase activities within the OECC to impact prey species availability for the common tern SCI of Rockabill SPA is considered to be negligible.

1586. As the by-sea separation distance between the SPA and OECC (29.80 km) is greater the foraging range of this SCI (mean–maximum + 1 SD = 26.9 km, Woodward et al., 2019), all temporarily disturbed areas of benthic habitat during construction phase activities within the OECC will be located beyond the foraging range of the common tern SCI of Rockabill SPA.

1587. Following consideration of the above potential pathways, impacts to prey species availability for the common tern SCI of Rockabill SPA from construction phase activities within the OECC are considered to be negligible.

1588. In particular, potential changes to prey availability resultant from construction phase activities within the OECC will not perceptibly decrease prey biomass availability in such a way as to lead to reductions in the breeding population size or productivity of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1589. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rockabill Head SPA.

Residual effect

1590. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1591. Common tern which breed within Rockabill SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to common tern is temporarily reduced within those areas.

1592. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1593. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect prey biomass availability in such a way as to impact demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1594. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Rockabill SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within or surrounding South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the

potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is *de minimis*. This level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1595. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1596. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1597. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

OECC intertidal landfall

Project-only assessment

1598. With regards to the OECC intertidal landfall, relevant operation and maintenance phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate required maintenance or repair of buried cables within intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the common tern SCI of Rockabill SPA.

1599. Common tern which breed within Rockabill SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily

unavailable to common tern connected with Rockabill SPA, which may otherwise utilise those areas for non-foraging behaviours.

1600. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.

1601. In relation to this Conservation Objective attribute, maintenance of the CWP Project OECC intertidal landfall may temporarily reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population

1602. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Rockabill SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is *de minimis*. This level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1603. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1604. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1605. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment

to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

OECC intertidal landfall

1606. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase activities at the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the common tern SCI of Rockabill SPA.

1607. Common tern which breed within Rockabill SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

1608. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

1609. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of common tern from ex situ intertidal habitats around operation and maintenance phase activity at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1610. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1611. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is de minimis. This level of impact is not considered capable of resulting in a significant decline in the breeding population abundance or productivity rate of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1612. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities at the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1613. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1614. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

OECC

1615. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the common tern SCI of Rockabill SPA.

1616. Common tern depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1617. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact common tern prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts reduce the availability of prey biomass, this may result in effects to the demographic parameters of the common tern SCI of Rockabill SPA, specifically reductions in energy intake or increased energetic cost to obtain prey items may result in reducing individual body condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the SCI conservation attribute targets of there being no significant declines in prey biomass availability, breeding population abundance and / or productivity rate.

1618. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and

maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1619. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI

1620. As the by-sea separation distance between the SPA and OECC (29.80 km) is greater the foraging range of this SCI (mean–maximum + 1 SD = 26.9 km, Woodward et al., 2019), all temporarily disturbed areas of benthic habitat during operation and maintenance phase activities within the OECC will be located beyond the foraging range of the common tern SCI of Rockabill SPA.

1621. Following consideration of the above potential pathways, impacts to prey species availability for the common tern SCI of Rockabill SPA from construction operation and maintenance phase activities within the OECC are considered to be negligible.

1622. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC will not perceptibly decrease prey biomass availability in such a way as to lead to reductions in the breeding population size or productivity of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1623. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1624. As per project-only assessment, above

OECC intertidal landfall

1625. Common tern which breed within Rockabill SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to common tern is temporarily reduced within those areas.

1626. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

- Prey biomass available – No significant decline.

1627. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may temporarily reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1628. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Rockabill SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km) and the foraging range of common tern (mean–maximum + 1 SD = 26.90 km; Woodward et al., 2019), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Rockabill SPA common tern population is *de minimis*. This level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the common tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the common tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1629. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1630. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1631. The Conservation Objective and its attributes and targets for the common tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA common tern SCI.**

4.8.2 Receptor 2: Arctic tern

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

OECC intertidal landfall

Project-only assessment

1632. With regards to the OECC intertidal landfall, relevant construction phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate laying of buried export cables through intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1633. Arctic tern which breed within Rockabill SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to Arctic tern connected with Rockabill SPA, which may otherwise utilise those areas for non-foraging behaviours.

1634. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.

1635. In relation to this Conservation Objective attribute, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1636. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Rockabill SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Rockabill SPA Arctic tern population is *de minimis*. This level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining

the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1637. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1638. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1639. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI**.

Construction phase impact 2 – Disturbance and displacement

OECC intertidal landfall

Project-only assessment

1640. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1641. Arctic tern which breed within Rockabill SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

1642. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

1643. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of Arctic tern from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1644. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1645. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Rockabill SPA Arctic tern population is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline in the breeding population abundance or productivity rate of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1646. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1647. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1648. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI.**

Construction phase impact 3 – Changes in prey availability

OECC

Project-only assessment

1649. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1650. Arctic tern depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1651. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact Arctic tern prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts reduce the availability of prey biomass, this may result in effects to the demographic parameters of the Arctic tern SCI of Rockabill SPA, specifically reductions in energy intake or increased energetic cost to obtain prey items may result in reducing individual body condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the SCI conservation attribute targets of there being no significant declines in prey biomass availability, breeding population abundance and / or productivity rate.

1652. Of Arctic tern's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1653. As the by-sea separation distance between the SPA and OECC (29.80 km) is less than the foraging range of this SCI (mean–maximum + 1 SD = 40.5 km, Woodward et al., 2019) and suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions) and trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), there is potential for prey species within southern areas of the foraging range of this SCI to experience increased SSC effects in relation to construction phase activities within northern areas of the OECC. Should such effects occur, durations over which SSCs would be increased is estimated to be approximately 10 days and cumulative deposition levels in effected areas would be low (c. 1cm). On account of their limited spatial and temporal extent, the potential for increased SSC levels from construction phase activities within the OECC to impact prey species availability for the Arctic tern SCI of Rockabill SPA is considered to be negligible.

1654. As the by-sea separation distance between the SPA and OECC (29.80 km) is less than the foraging range of this SCI (mean–maximum + 1 SD = 40.5 km, Woodward et al., 2019), a limited are of benthic habitat within the foraging range of this SCI from Rockabill SPA will experience temporary disturbance during construction phase activities within northern areas of the OECC. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1655. Following consideration of the above potential pathways, impacts to prey species availability for the Arctic tern SCI of Rockabill SPA from construction phase activities within the OECC are considered to be negligible.

1656. In particular, potential changes to prey availability resultant from construction phase activities within the OECC will not perceptibly decrease prey biomass availability in such a way as to lead to reductions in the breeding population size or productivity of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of

the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1657. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rockabill Head SPA.

Residual effect

1658. As per project-only assessment, above

OECC intertidal landfall

Project-only assessment

1659. Arctic tern which breed within Rockabill SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to common tern is temporarily reduced within those areas.

1660. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the common tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1661. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect prey biomass availability in such a way as to impact demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1662. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Rockabill SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within or surrounding South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Rockabill

SPA Arctic tern population is *de minimis*. This level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1663. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1664. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1665. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

OECC intertidal landfall

Project-only assessment

1666. With regards to the OECC intertidal landfall, relevant operation and maintenance phase direct effects on habitat relate to the temporary alteration of intertidal areas as they excavated and reinstated to facilitate required maintenance or repair of buried cables within intertidal areas and temporarily unavailable for use by intertidal SCIs to undertake non-foraging behaviours. As the OECC intertidal landfall does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1667. Arctic tern which breed within Rockabill SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to Arctic tern connected with Rockabill SPA, which may otherwise utilise those areas for non-foraging behaviours.

1668. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.

1669. In relation to this Conservation Objective attribute, maintenance of the CWP Project OECC intertidal landfall may temporarily reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population

1670. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Rockabill SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Rockabill SPA Arctic tern population is *de minimis*. This level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1671. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1672. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1673. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

OECC intertidal landfall

1674. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding operation and maintenance phase activities at the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1675. Arctic tern which breed within Rockabill SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to operation and maintenance phase activities at the OECC intertidal landfall within South Dublin Bay.

1676. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

1677. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of Arctic tern from ex situ intertidal habitats around operation and maintenance phase activity at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

1678. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1679. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting the Rockabill SPA Arctic tern population is de minimis. This level of impact is not considered capable of resulting in a significant decline in the breeding population abundance or productivity rate of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1680. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities at the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1681. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1682. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37,** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

OECC

1683. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Arctic tern SCI of Rockabill SPA.

1684. Arctic tern depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1685. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact Arctic tern prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts reduce the availability of prey biomass, this may result in effects to the demographic parameters of the Arctic tern SCI of Rockabill SPA, specifically reductions in energy intake or increased energetic cost to obtain prey items may result in reducing individual body condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the SCI conservation attribute targets of there being no significant declines in prey biomass availability, breeding population abundance and / or productivity rate.

1686. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1687. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1688. As the by-sea separation distance between the SPA and OECC (29.80 km) is less than the foraging range of this SCI (mean–maximum + 1 SD = 40.5 km, Woodward et al., 2019), an extremely limited area of benthic habitat used by prey species within the foraging range of Arctic tern from Rockabill SPA may be occupied by export cable infrastructure during the operational phase. This would represent a loss of less than 0.11 km^2 of previously available benthic prey species habitat, which is considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1689. Following consideration of the above potential pathways, impacts to prey species availability for the Arctic tern SCI of Rockabill SPA from construction phase activities within the OECC are considered to be negligible.

1690. In particular, potential changes to prey availability resultant from construction phase activities within the OECC will not perceptibly decrease prey biomass availability in such a way as to lead to reductions in the breeding population size or productivity of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1691. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1692. As per project-only assessment, above

OECC intertidal landfall

1693. Arctic tern which breed within Rockabill SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to Arctic tern is temporarily reduced within those areas.

1694. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the Arctic tern SCI of Rockabill SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1695. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may temporarily reduce the intertidal areas within South Dublin Bay in which individuals connected with Rockabill SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through

increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1696. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Rockabill SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.39 km and 'by-sea' distance of 31.32 km), only a minimal number of individuals connected with Rockabill SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Rockabill SPA Arctic tern population is *de minimis*. This level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the Arctic tern SCI of Rockabill SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Arctic tern SCI of Rockabill SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rockabill SPA.

Proposed mitigation

1697. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Rockabill SPA.

Residual effect

1698. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1699. The Conservation Objective and its attributes and targets for the Arctic tern SCI of Rockabill SPA are presented in **Table 4-37**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Rockabill SPA Arctic tern SCI.**

4.8.3 Receptor 3: Purple sandpiper

1700. Assessment provided in **Section 4.39** – Distant SPAs designated in relation to migratory wildfowl and waders.

4.9 Skerries Islands SPA (IE004122)

1701. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: herring gull, light-bellied brent goose, purple sandpiper and turnstone.

1702. The minimum separation distance between SPA and the array site is 49.82 km.

1703. The minimum separation distance between SPA and the OECC is 26.12 km (with a 'by-sea' separation distance of 30.20 km).

1704. The minimum separation distance between SPA and the OECC intertidal landfall is 26.12 km (with a 'by-sea' separation distance of 31.72 km).

Table 4-38: Assessment of adverse effects on site integrity (project alone) – Skerries Island SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Herring gull [A184]				
	Direct effects on habitat [1,3]	**Section 4.9.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Light-bellied brent goose [A046] – See **Section 4.39** Purple sandpiper [A148] – See **Section 4.39** Turnstone [A169] – See **Section 4.39**				

4.9.1 Receptor 1: Herring gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1705. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site

does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1706. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1707. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1708. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Skerries Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1709. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1710. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1711. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1712. Herring gull which breed within Skerries Islands SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Skerries Islands SPA, which may otherwise utilise those areas for non-foraging behaviours.

1713. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1714. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skerries Islands SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1715. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Skerries Islands SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.12 km and 'by-sea' distance of 31.72 km), only a minimal number of individuals connected with Skerries Islands SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Skerries Islands SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1716. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1717. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1718. The Conservation Objective and its attributes and targets for the herring gull SCI of Skerries Islands SPA are presented in **Table 4-38**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skerries Islands SPA herring gull SCI**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

1719. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1720. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1721. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1722. As herring gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in

population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI.

1723. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1724. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1725. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Skerries Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1726. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1727. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Skerries Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA

Proposed mitigation

1728. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1729. As per project-only assessment, above.

OECC

Project-only assessment

1730. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1731. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect herring gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1732. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1733. As herring gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

1734. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 85.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1735. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1736. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of herring gull breeding within Skerries Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1737. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by herring gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1738. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the herring gull SCI of Skerries Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA

Proposed mitigation

1739. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1740. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1741. Herring gull which breed within Skerries Islands SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

1742. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1743. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1744. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Skerries Islands SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 23.12 km and 'by-sea' distance of 31.72 km), only a minimal number of individuals connected with Skerries Islands SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Skerries Islands SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1745. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1746. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1747. The Conservation Objective and its attributes and targets for the herring gull SCI of Skerries Islands SPA are presented in **Table 4-38**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skerries Islands SPA herring gull SCI**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

1748. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1749. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the herring gull SCI of Skerries Islands SPA: the array site

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1750. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1751. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) of herring gull breeding within Skerries Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1752. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1753. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skerries Islands SPA.

Residual effect

1754. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1755. Herring gull which breed within Skerries Islands SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to herring gull connected with Skerries Islands SPA, which may otherwise utilise those areas for non-foraging behaviours.

1756. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1757. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skerries Islands SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1758. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Skerries Islands SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.12 km and 'by-sea' distance of 31.72 km), only a minimal number of individuals connected with Skerries Islands SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Skerries Islands SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in

the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1759. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1760. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1761. The Conservation Objective and its attributes and targets for the herring gull SCI of Skerries Islands SPA are presented in **Table 4-38**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skerries Islands SPA herring gull SCI**.

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

1762. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1763. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1764. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for herring gull prey species, or electromagnetic field effects affecting prey species

distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1765. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1766. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1767. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1768. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1769. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Skerries Islands SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1770. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1771. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Skerries Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant

decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1772. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skerries Islands SPA.

Residual effect

1773. As per project-only assessment, above.

OECC

Project-only assessment

1774. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the herring gull SCI of Skerries Islands SPA.

1775. Herring gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1776. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact herring gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging herring gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1777. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and

maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1778. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1779. As herring gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to herring gull prey species are not considered to have potential to result in population level consequences to herring gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1780. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1781. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of herring gull breeding within Skerries Islands SPA (mean–maximum + 1 SD = 85.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1782. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1783. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the herring gull SCI of Skerries Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of herring gull prey species in such a way as to result in a significant decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1784. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skerries Islands SPA.

Residual effect

1785. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

1786. Herring gull which breed within Skerries Islands SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to herring gull is temporarily reduced within those areas.

1787. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

1788. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skerries Islands SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

1789. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Skerries Islands SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 26.12 km and 'by-sea' distance of 31.72 km), only a minimal number of individuals connected with Skerries Islands SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Skerries Islands SPA herring gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant

decline in the breeding population abundance of the herring gull SCI of Skerries Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1790. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skerries Islands SPA.

Residual effect

1791. As per project-only assessment, above.

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

1792. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of herring gull from Skerries Islands SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the herring gull SCI of Skerries Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

1793. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Skerries Islands SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Skerries Islands SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

1794. Total bio-seasonal and total annual estimated herring gull collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-39**. These values are apportioned to Skerries Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-39**.

1795. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase

1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-39: Total bio-seasonal and annual collision mortalities to herring gull and mortalities apportioned to Skerries Islands SPA

	Design option	CRM Band Option	Bio-season		Annual
			Breeding (Apr–Aug)	Non-breeding (Sep–Mar)	
Total impact	A	**1**	**25.018**	**2.393**	**27.411**
		2	18.76	1.876	20.636
	B	**1**	**21.178**	**2.105**	**23.283**
		2	15.724	1.596	17.320
Percentage of impact apportioned to SPA			0.05%	0.01%	
Impact to SPA	A	**1**	**0.013**	**0.000**	**0.013**
		2	0.010	0.000	0.010
	B	**1**	**0.011**	**0.000**	**0.011**
		2	0.008	0.000	0.008

1796. **Table 4-39**, above, outlines that, when using Band Option 1 CRM, total annual predicted herring gull collision mortality is calculated as 27.411 individuals in relation to Representative scenario A and 23.283 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Skerries Islands SPA for each bio-season it is estimated, for example, that 0.05% of total predicted collision mortality during the breeding bio-season (which, for herring gull, is considered as the April to August period) relates to breeding adults from Skerries Islands SPA; this equates to 0.013 and 0.011 individuals from the SPA per breeding bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to the other (non-breeding) bio-season and both apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Skerries Islands SPA and, from this, when using Band Option 1 CRM, annual predicted herring gull collision mortality to Skerries Islands SPA is calculated as 0.013 individuals in relation to Representative scenario A and 0.011 individuals in relation to Representative scenario B.

1797. Increases to SPA herring gull mortality rates resultant from apportioned annual impacts are presented in **Table 4-40**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus herring gull adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-40: Increase to annual mortality rates resulting from collision mortalities apportioned to Skerries Islands SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	1	0.013	20	16.60%	3.320	0.400%
	2	0.010				0.300%
B	1	0.011				0.339%
	2	0.008				0.252%

1798. As additional mortality to the herring gull SCI of Skerries Islands SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the herring gull SCI of Skerries Islands SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skerries Islands SPA.

Proposed mitigation

1799. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skerries Islands SPA.

Residual effect

1800. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1801. The Conservation Objective and its attributes and targets for the herring gull SCI of Skerries Islands SPA are presented in **Table 4-38**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skerries Islands SPA herring gull SCI.**

4.9.2 Receptors 2–4: Light-bellied brent goose, purple sandpiper and turnstone.

1802. Assessments provided in **Section 4.39** – Distant SPAs designated in relation to migratory wildfowl and waders.

4.10 Aberdaron Coast and Bardsey Island SPA (Wales – UK9013121)

1803. SPA is designated in relation to the following feature which has been screened in for consideration within the NIS: Manx shearwater.

1804. The minimum separation distance between SPA and the array site is 57.68 km.

1805. The minimum separation distance between SPA and the OECC is 67.87 km.

1806. The minimum separation distance between SPA and the OECC intertidal landfall is 101.81 km.

Table 4-41: Assessment of adverse effects on site integrity (project alone) – Aberdaron Coast and Bardsey Island SPA (Wales – U9013121)

Objective	Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Manx shearwater [A013]						
The vision for this feature is for it to be in a favourable conservation status	1. Breeding population: stable or increasing 2. Productivity rate: stable 3. Deaths from the lighthouse attractions, fencing and other infrastructure: minimal 4. Ground predators: none introduced 5. No disturbance to nesting birds by restoration works on boundary walls or recreational activities	Direct effects on habitat [1]	**Section 4.10.1**	None	No change	No AESI
		Disturbance and displacement [1,2]		None	No change	No AESI
		Changes in prey availability [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,4]	See high-level assessment in **Section 4**			No AESI

4.10.1 Receptor 1: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

1807. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1808. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1809. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

1810. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1811. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1812. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Aberdaron Coast and Bardsey Island SPA.

Residual effect

1813. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1814. The Conservation Objectives and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41** above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

1815. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1816. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1817. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Aberdaron Coast and Bardsey Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population: stable or increasing; and
- Productivity rate: stable.

1818. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e.

indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1819. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

1820. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-42**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Aberdaron Coast and Bardsey Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-42**.

1821. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

1822. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-42: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Aberdaron Coast and Bardsey Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post-breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		3.12%	1.02%	1.02%	
Impact to SPA	15% / 1%	0.008	0.017	0.012	0.038
	25% / 1%	**0.014**	**0.029**	**0.020**	**0.063**
	35% / 1%	0.020	0.040	0.028	0.088

1823. **Table 4-42**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Aberdaron Coast and Bardsey Island SPA for each bio-season it is estimated that, for example, 3.12% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Aberdaron Coast and Bardsey Island SPA; this equates to 0.014 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Aberdaron Coast and Bardsey Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Aberdaron Coast and Bardsey Island SPA is calculated as 0.063 individuals per annum.

1824. Increases to Aberdaron Coast and Bardsey Island SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-43**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-43: Increase to annual mortality rates resulting from displacement mortalities apportioned to Aberdaron Coast and Bardsey Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.038	16183	13.00%	2103.79	0.002%
25% / 1%	**0.063**				**0.003%**
35%/ 1%	0.088				0.004%

1825. As additional mortality to the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in instability to the breeding population or productivity rate. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1826. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Aberdaron Coast and Bardsey Island SPA.

Residual effect

1827. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1828. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1829. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1830. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1831. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

1832. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this feature.

1833. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

1834. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1835. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1836. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1837. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact will not result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1838. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Aberdaron Coast and Bardsey Island SPA.

Residual effect

1839. As per project-only assessment, above.

OECC

Project-only assessment

1840. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1841. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1842. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

1843. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile-driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

1844. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

1845. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1846. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1847. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1848. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact will not result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA

Proposed mitigation

1849. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Aberdaron Coast and Bardsey Island SPA.

Residual effect

1850. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1851. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

1852. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1853. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1854. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

1855. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1856. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1857. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Aberdaron Coast and Bardsey Island SPA.

Residual effect

1858. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1859. The Conservation Objectives and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater feature.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

1860. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

1861. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1862. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Aberdaron Coast and Bardsey Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population: stable or increasing; and
- Productivity rate: stable.

1863. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and

maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

1864. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

1865. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-44**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Aberdaron Coast and Bardsey Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-44**.

1866. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-44: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Aberdaron Coast and Bardsey Island SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post-breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		3.12%	1.02%	1.02%	
Impact to SPA	30% / 1%	0.017	0.034	0.024	0.075
	50% / 1%	**0.028**	**0.057**	**0.040**	**0.125**
	70% / 1%	0.039	0.080	0.056	0.175

1867. **Table 4-44**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Aberdaron Coast and Bardsey Island SPA for each bio-season it is estimated that, for example, 3.12% of total predicted displacement mortality during the

migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Aberdaron Coast and Bardsey Island SPA; this equates to 0.028 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Aberdaron Coast and Bardsey Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Aberdaron Coast and Bardsey Island SPA is calculated as 0.125 individuals per annum.

1868. Increases to Aberdaron Coast and Bardsey Island SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-45**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-45: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Aberdaron Coast and Bardsey Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.075	16183	13.00%	2103.79	0.004%
50% / 1%	**0.125**				**0.006%**
70% / 1%	0.175				0.008%

1869. As additional mortality to the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in instability to the breeding population or productivity rate. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1870. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Aberdaron Coast and Bardsey Island SPA.

Residual effect

1871. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1872. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

1873. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1874. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1875. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

1876. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

1877. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

1878. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

1879. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

1880. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1881. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1882. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact will not result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1883. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Aberdaron Coast and Bardsey Island SPA.

Residual effect

1884. As per project-only assessment, above.

OECC

Project-only assessment

1885. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA.

1886. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA:

- Breeding population (stable or increasing); and
- Productivity rate (stable).

1887. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

1888. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1889. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

1890. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1891. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

1892. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Aberdaron Coast and Bardsey Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1893. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1894. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact will not result in an impact on the breeding population size or the productivity rate of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Aberdaron Coast and Bardsey Island SPA.

Proposed mitigation

1895. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Aberdaron Coast and Bardsey Island SPA.

Residual effect

1896. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

The Conservation Objectives and its attributes and targets for the Manx shearwater feature of Aberdaron Coast and Bardsey Island SPA are presented in **Table 4-41**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for this feature and, in turn, that there is **no project-only AESI for the Aberdaron Coast and Bardsey Island SPA Manx shearwater feature.**

4.11 Saltee Islands SPA (IE004002)

1897. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: kittiwake, fulmar, lesser black-backed gull, guillemot, razorbill, puffin, gannet.

1898. The minimum separation distance between SPA and the array site is 107.06 km (with a 'by-sea' separation distance of 113.58 km).

1899. The minimum separation distance between SPA and the OECC is 114.10 km (with a 'by-sea' separation distance of 121.73 km).

1900. The minimum separation distance between SPA and the OECC intertidal landfall is 133.87 km (with a 'by-sea' separation distance of 149.80 km).

Table 4-46: Assessment of adverse effects on site integrity (project alone) – Saltee Islands SPA

Objective	Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Kittiwake [A188]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase	Direct effects on habitat [1]	**Section 4.11.1**	None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Fulmar [A009]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase 7. Disturbance at marine areas immediately adjacent to the colony – No significant increase	Direct effects on habitat [1]	**Section 4.11.2**	None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Lesser black-backed gull [A183]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase	Direct effects on habitat [1]	**Section 4.11.3**	None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Guillemot [A199]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase	Direct effects on habitat [1]	**Section 4.11.4**	None	No change	No AESI
		Disturbance and displacement (including barrier effects) [1,2,5]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI

Objective	Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	7. Disturbance at marine areas immediately adjacent to the colony – No significant increase	Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Razorbill [A200]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase 7. Disturbance at marine areas immediately adjacent to the colony – No significant increase	Direct effects on habitat [1]	**Section 4.11.5**	None	No change	No AESI
		Disturbance and displacement (including barrier effects) [1,2,5]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Puffin [A204]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase 7. Disturbance at marine areas immediately adjacent to the colony – No significant increase	Direct effects on habitat [1]	**Section 4.11.6**	None	No change	No AESI
		Disturbance and displacement (including barrier effects) [1,2,5]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI
Gannet [A016]						
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population abundance – No significant decline 2. Productivity rate – No significant decline 3. Distribution: breeding colonies – No significant decline 4. Prey biomass available – No significant decline 5. Barriers to connectivity – No significant increase 6. Disturbance at the breeding site – No significant increase 7. Disturbance at marine areas immediately adjacent to the colony – No significant increase	Direct effects on habitat [1]	**Section 4.11.7**	None	No change	No AESI
		Disturbance and displacement (including barrier effects) [1,2,5]		None	No change	No AESI
		Changes in prey availability [1,2,4]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3,4]	See high-level assessment in **Section 4**			No AESI

4.11.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

1901. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Saltee Islands SPA.

1902. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

1903. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1904. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1905. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Saltee Islands SPA. The CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1906. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1907. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1908. The Conservation Objective and its attributes and targets for the kittiwake SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

1909. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Saltee Islands SPA.

1910. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1911. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. This potential reduction in prey biomass availability, if significant, may compromise the ability of the SCI to maintain its population or productivity rate.

1912. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader

construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population or productivity declines to their seabird predators.

1913. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

1914. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1915. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1916. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1917. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly decrease kittiwake prey species biomass or increase the energetic costs of foraging for the kittiwake SCI of Saltee Islands SPA in such a way as to affect population decline or reductions in breeding population abundance, productivity rate or prey biomass availability. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1918. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1919. As per project-only assessment, above.

OECC

Project-only assessment

1920. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Salee Islands SPA.

1921. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1922. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. This potential reduction in prey biomass availability, if significant, may compromise the ability of the SCI to maintain its population or productivity rate.

1923. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

1924. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

1925. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

1926. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1927. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

1928. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly decrease kittiwake prey species biomass or increase the energetic costs of foraging for the kittiwake SCI of Saltee Islands SPA, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Saltee Islands SPA in such a way as to affect population decline or reductions in breeding population abundance, productivity rate or prey biomass availability. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1929. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1930. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1931. The Conservation Objective and its attributes and targets for the kittiwake SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

1932. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Saltee Islands SPA.

1933. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

1934. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of the spatial footprint of operational infrastructure within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1935. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1936. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1937. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1938. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1939. The Conservation Objective and its attributes and targets for the kittiwake SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment

to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

1940. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Saltee Islands SPA.

1941. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1942. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. This potential reduction in prey biomass availability, if significant, may compromise the ability of the SCI to maintain its population or productivity rate.

1943. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1944. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1945. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1946. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1947. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Saltee Islands SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1948. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

1949. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly decrease kittiwake prey species biomass or increase the energetic costs of foraging for the kittiwake SCI of Saltee Islands SPA in such a way as to affect reductions in breeding population abundance, productivity rate or prey biomass availability. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1950. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase for the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1951. As per project-only assessment, above.

OECC

Project-only assessment

1952. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Saltee Islands SPA.

1953. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1954. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. This potential reduction in prey biomass availability, if significant, may compromise the ability of the SCI to maintain its population or productivity rate.

1955. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

1956. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

1957. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1958. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

1959. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Saltee Islands SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1960. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators,

the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

1961. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly decrease kittiwake prey species biomass or increase the energetic costs of foraging for the kittiwake SCI of Saltee Islands SPA in such a way as to affect population decline or reductions in breeding population abundance, productivity rate or prey biomass availability. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1962. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase for the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1963. As per project-only assessment, above.

1964. The Conservation Objective and its attributes and targets for the kittiwake SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

1965. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Saltee Islands SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

1966. In relation to these Conservation Objective attributes, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate and associated breeding population abundance of this SCI at Saltee Islands SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SPA, through reductions to offspring provisioning rates and other parental care metrics where parent birds experience collision mortality.

1967. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-47**. These values are

apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-47**.

1968. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-47: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Saltee Islands SPA

	Representative scenario	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.29%	0.37%	0.22%	
Impact to SPA	A	**1**	**0.012**	**0.016**	**0.022**	**0.050**
		2	0.028	0.036	0.050	0.113
	B	**1**	**0.011**	**0.014**	**0.019**	**0.043**
		2	0.024	0.032	0.043	0.099

1969. **Table 4-47**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. **Table 4-47**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated, for example, that 0.29% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Saltee Islands SPA; this equates to 0.012 and 0.011 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Saltee Islands SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Saltee Islands SPA is calculated as 0.050 individuals in relation to Representative scenario A and 0.043 individuals in relation to Representative scenario B.

1970. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-48**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is

used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-48: Increase to annual mortality rates resulting from collision mortalities apportioned to Saltee Islands SPA

Representative scenario	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.050**	**2076**	**14.60%**	**303.096**	**0.016%**
	2	0.113				0.037%
B	**1**	**0.043**				**0.014%**
	2	0.099				0.033%

1971. As additional mortality to the kittiwake SCI of Saltee Islands SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the kittiwake SCI of Saltee Islands SPA. Specifically, collision mortality will not result in significant decline to the breeding population abundance or productivity of this SCI at Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1972. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

1973. As per project-only assessment, above.

1974. The Conservation Objective and its attributes and targets for the kittiwake SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA kittiwake SCI.**

4.11.2 Receptor 2: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

1975. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

1976. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

1977. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

1978. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1979. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1980. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1981. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

1982. The Conservation Objective and its attributes and targets for the fulmar SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA fulmar SCI**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

1983. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

1984. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1985. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1986. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not

considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

1987. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1988. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

1989. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

1990. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

1991. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

1992. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

1993. As per project-only assessment, above.

OECC

Project-only assessment

1994. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

1995. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

1996. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

1997. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

1998. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

1999. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2000. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2001. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2002. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2003. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2004. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2005. The Conservation Objective and its attributes and targets for the fulmar SCI of Saltee Islands SPA are presented in **Table 4-46,** above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

2006. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

2007. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2008. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2009. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2010. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2011. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2012. As per project-only assessment, above.

2013. The Conservation Objective and its attributes and targets for the fulmar SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2014. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

2015. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2016. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2017. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and

maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2018. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2019. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2020. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2021. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Saltee Islands SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2022. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2023. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass available to the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2024. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2025. As per project-only assessment, above.

OECC

Project-only assessment

2026. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Saltee Islands SPA.

2027. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2028. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2029. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2030. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2031. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2032. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2033. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Saltee Islands SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2034. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2035. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the fulmar SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2036. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2037. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2038. The Conservation Objective and its attributes and targets for the fulmar SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA fulmar SCI.**

4.11.3 Receptor 3: Lesser black-backed gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2039. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull SCI of Saltee Islands SPA.

2040. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2041. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2042. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2043. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2044. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2045. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2046. Lesser black-backed gull which breed within Saltee Islands SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Saltee Islands SPA, which may otherwise utilise those areas for non-foraging behaviours.

2047. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2048. In relation to this Conservation Objective attribute, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Saltee Islands SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2049. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Saltee Islands SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 114.10 km and 'by-sea' distance of 133.87 km), only a minimal number of individuals connected with Saltee Islands SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Saltee Islands SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2050. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2051. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2052. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA lesser black-backed gull SCI**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2053. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Saltee Islands SPA.

2054. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2055. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced

provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2056. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI.

2057. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

2058. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2059. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2060. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2061. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA

Proposed mitigation

2062. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2063. As per project-only assessment, above.

OECC

Project-only assessment

2064. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Saltee Islands SPA.

2065. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2066. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2067. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

2068. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal

conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

2069. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2070. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2071. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2072. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2073. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2074. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2075. Lesser black-backed gull which breed within Saltee Islands SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

2076. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.;
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2077. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

2078. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Saltee Islands SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 133.87 km and 'by-sea' distance of 149.80 km), only a minimal number of individuals connected with Saltee Islands SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Saltee Islands SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2079. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2080. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2081. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA lesser black-backed gull SCI**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

2082. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Lesser black-backed gull SCI of Saltee Islands SPA.

2083. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2084. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2085. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2086. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2087. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2088. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2089. Lesser black-backed gull which breed within Saltee Islands SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this SCI. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Saltee Islands SPA, which may otherwise utilise those areas for non-foraging behaviours.

2090. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline

2091. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Saltee Islands SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2092. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Saltee Islands SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 133.87 km and 'by-sea' distance of 149.80 km), only a minimal number of individuals connected with Saltee Islands SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Saltee Islands SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2093. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2094. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2095. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA lesser black-backed gull SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2096. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Saltee Islands SPA.

2097. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2098. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2099. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2100. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2101. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2102. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2103. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the

foraging range of lesser black-backed gull breeding within Saltee Islands SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2104. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2105. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2106. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2107. As per project-only assessment, above.

OECC

Project-only assessment

2108. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull SCI of Saltee Islands SPA.

2109. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2110. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2111. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2112. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2113. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2114. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2115. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Saltee Islands SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2116. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2117. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2118. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2119. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2120. Lesser black-backed gull which breed within Saltee Islands SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

2121. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2122. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Saltee Islands SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their

consequent survival and / or productivity rates), and thereby compromise the ability of the SCI to maintain its population.

2123. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Saltee Islands SPA (and hence do not affect the distribution of foraging habitat of this SCI within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 133.87 km and 'by-sea' distance of 149.80 km), only a minimal number of individuals connected with Saltee Islands SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Saltee Islands SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of prey availability in such a way as to result in a significant decline in the breeding population abundance and productivity rate of, or prey biomass availability to, the lesser black-backed gull SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2124. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2125. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2126. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA lesser black-backed gull SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

2127. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Saltee Islands SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact

on the following Conservation Objective attribute and target for the lesser black-backed gull SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

2128. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Saltee Islands SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Saltee Islands SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

2129. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this SCI would be negligible.

2130. As additional mortality to the lesser black-backed gull SCI of Saltee Islands SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull SCI of Saltee Islands SPA. Specifically, collision mortality will not affect the breeding population abundance or productivity rate of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2131. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2132. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2133. The Conservation Objective and its attributes and targets for the lesser black-backed gull SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA lesser black-backed gull SCI**.

4.11.4 Receptor 4: Guillemot

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2134. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2135. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2136. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2137. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2138. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2139. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2140. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2141. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI**.

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2142. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2143. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2144. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2145. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, guillemots which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG

infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2146. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2147. Total bio-seasonal and total annual estimated construction phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-49**. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-49**.

2148. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2149. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-49: Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Saltee Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**		**Annual**
		Breeding (Mar–Jul)	**Non-breeding (Aug–Feb)**	
Total impact	15% / 1%	5.436	20.010	25.446
	25% / 1%	**9.060**	**33.351**	**42.410**
	35% / 1%	12.684	46.691	59.374
	25% / 2%	18.119	66.701	84.820
	35% / 2%	25.367	93.381	118.748
Percentage of impact apportioned to SPA		1.76%	1.94%	
Impact to SPA	15% / 1%	0.095	0.388	0.484
	25% / 1%	**0.159**	**0.647**	**0.806**
	35% / 1%	0.223	0.906	1.128

	25% / 2%	0.318	1.294	1.612
	35% / 2%	0.445	1.811	2.257

2150. **Table 4-49**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 42.410 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 1.76% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Saltee Islands SPA; this equates to 0.159 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Saltee Islands SPA is calculated as 0.806 individuals per annum.

2151. Increases to Saltee Islands SPA guillemot mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-50**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-50: Increase to annual mortality rates resulting from displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.484	25851	6.10%	1576.911	0.013%
25% / 1%	0.806				0.022%
35% / 1%	1.128				0.031%
25% / 2%	1.612				0.044%
35% / 2%	2.257				0.062%

2152. As additional mortality to the guillemot SCI of Saltee Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. Specifically, construction phase displacement mortality will not affect the breeding population abundance or productivity rate, or increase in barriers to connectivity for the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2153. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2154. As per project-only assessment, above.

OECC

Project-only assessment

2155. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2156. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2157. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2158. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2159. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to

approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

2160. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance or productivity rate, or increase in barriers to connectivity for the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2161. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2162. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2163. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2164. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2165. Guillemot depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2166. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2167. Of guillemot's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase.

2168. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical guillemot breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2169. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2170. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2171. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2172. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird

predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2173. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2174. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2175. As per project-only assessment, above.

OECC

Project-only assessment

2176. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2177. Guillemot depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2178. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2179. Of guillemot's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high-energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2180. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 153.7 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2181. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2182. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of guillemot breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2183. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2184. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2185. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2186. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2187. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2188. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2189. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2190. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2191. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) of guillemot breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2192. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a

significant decline in the breeding population abundance of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2193. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2194. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2195. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2196. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for guillemot this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2197. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2198. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of guillemot which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2199. In relation to these Conservation Objective attributes, disturbance leading to displacement of guillemot from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, guillemots which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2200. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2201. Total bio-seasonal and total annual estimated operation and maintenance phase guillemot displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-51**.

2202. Note that for seabird receptors such as guillemot, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-51**.

2203. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-51:Total bio-seasonal and annual displacement mortalities to guillemot and mortalities apportioned to Saltee Islands SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Total impact	30% / 1%	10.871	40.02	50.891
	50% / 1%	**18.119**	**66.701**	**84.820**
	70% / 1%	25.367	93.381	118.748
	50% / 2%	36.238	133.402	169.640
	70% / 2%	50.733	186.762	237.495
Percentage of impact apportioned to SPA		1.76%	1.94%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season		Annual
		Breeding (Mar–Jul)	Non-breeding (Aug–Feb)	
Impact to SPA	30% / 1%	0.191	0.776	0.967
	50% / 1%	**0.318**	**1.294**	**1.612**
	70% / 1%	0.445	1.811	2.257
	50% / 2%	0.636	2.588	3.224
	70% / 2%	0.890	3.623	4.513

2204. **Table 4-51**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted guillemot displacement mortality is calculated as 84.820 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 1.76% of total predicted displacement mortality during the breeding bio-season (which, for guillemot, is considered as the March to July period) relates to breeding adults from Saltee Islands SPA; this equates to 0.318 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted guillemot displacement mortality to Saltee Islands SPA is calculated as 1.612 individuals per annum.

2205. Increases to Saltee Islands SPA guillemot mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-52**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus guillemot adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-52: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.967	25851	6.10%	1576.911	0.026%
50% / 1%	**1.612**				**0.044%**
70% / 1%	2.257				0.062%
50% / 2%	3.224				0.088%
70% / 2%	4.513				0.123%

2206. As additional mortality to the guillemot SCI of Saltee Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. Specifically, operation and maintenance phase displacement mortality will not affect the breeding population abundance or productivity rate, or increase barriers to connectivity for the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2207. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2208. As per project-only assessment, above.

OECC

Project-only assessment

2209. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2210. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

2211. Guillemot are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low/moderate [6.5/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of guillemot which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2212. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of guillemot from locations around vessel activity within the OECC and surrounding areas may lead to

the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2213. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2214. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for guillemot. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of guillemot breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 153.7 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 37% of guillemot were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 127 m; an area of approximately 0.051 km^2 around each vessel, which equates to 0.13% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

2215. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance or productivity rate, or increase in barriers to connectivity for the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2216. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2217. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2218. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2219. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2220. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2221. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2222. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2223. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2224. Key fish species, upon which guillemot predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2225. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2226. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Saltee Islands SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2227. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2228. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2229. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2230. As per project-only assessment, above.

OECC

Project-only assessment

2231. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the guillemot SCI of Saltee Islands SPA.

2232. Guillemot depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the guillemot SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2233. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact guillemot prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging guillemot, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2234. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2235. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2236. Key fish species, upon which guillemot predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2237. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not

considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2238. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of guillemot breeding within Saltee Islands SPA (mean–maximum + 1 SD = 153.7 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2239. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2240. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the guillemot SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of guillemot prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the guillemot SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the guillemot SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2241. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2242. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2243. The Conservation Objective and its attributes and targets for the guillemot SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA guillemot SCI.**

4.11.5 Receptor 5: Razorbill

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2244. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2245. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2246. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2247. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2248. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2249. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2250. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2251. The Conservation Objective and its attributes and targets for the razorbill SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA razorbill SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2252. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2253. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2254. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2255. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, razorbills which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG

infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2256. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2257. Total bio-seasonal and total annual estimated construction phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-53**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-53**.

2258. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2259. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-53: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Saltee Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (Apr–Jul)	**Post-breeding migration (Aug–Oct)**	**Migration free non-breeding (Nov–Dec)**	**Return migration (Jan–Mar)**	
Total impact	15% / 1%	1.01	6.54	0.96	0.61	9.126
	25% / 1%	**1.69**	**10.90**	**1.60**	**1.02**	**15.211**
	35% / 1%	2.36	15.26	2.24	1.43	21.295
	25% / 2%	3.37	21.80	3.20	2.05	30.421
	35% / 2%	4.72	30.52	4.48	2.86	42.590
Percentage of impact apportioned to SPA		2.54%	1.03%	1.78%	1.03%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr–Jul)	Post-breeding migration (Aug–Oct)	Migration free non-breeding (Nov–Dec)	Return migration (Jan–Mar)	
Impact to SPA	15% / 1%	0.026	0.067	0.017	0.006	0.116
	25% / 1%	**0.043**	**0.112**	**0.028**	**0.011**	**0.194**
	35% / 1%	0.060	0.157	0.040	0.015	0.272
	25% / 2%	0.086	0.225	0.057	0.021	0.388
	35% / 2%	0.120	0.315	0.080	0.030	0.544

2260. **Table 4-53**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 15.211 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 2.54% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Saltee Islands SPA; this equates to 0.043 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Saltee Islands SPA is calculated as 0.194 individuals per annum.

2261. Increases to Saltee Islands SPA razorbill mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-54**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-54: Increase to annual mortality rates resulting from displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.116	6519	10.50%	684.495	0.017%
25% / 1%	0.194				0.028%

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
35% / 1%	0.272				0.040%
25% / 2%	0.388				0.057%
35% / 2%	0.544				0.079%

2262. As additional mortality to the razorbill SCI of Saltee Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. Specifically, construction phase displacement mortality will not affect the breeding population abundance or productivity rate, or increase barriers to connectivity for the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2263. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2264. As per project-only assessment, above.

OECC

Project-only assessment

2265. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2266. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2267. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2268. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2269. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 164.6 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

2270. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Specifically, construction phase displacement mortality will not affect the breeding population abundance or productivity rate, or increase barriers to connectivity for the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2271. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2272. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2273. The Conservation Objective and its attributes and targets for the razorbill SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA razorbill SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2274. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2275. Razorbill depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2276. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2277. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical razorbill

breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2278. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2279. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2280. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2281. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2282. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance or productivity of the razorbill SCI of Saltee Islands SPA, nor will there be any significant increase in barriers to connectivity for this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2283. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2284. As per project-only assessment, above.

OECC

Project-only assessment

2285. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2286. Razorbill depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2287. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact razorbill prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging razorbill, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2288. Of razorbill's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2289. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 164.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2290. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

2291. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of razorbill breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2292. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2293. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the razorbill SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of razorbill prey species in such a way as to result in a significant decline in the breeding population abundance or productivity of the razorbill SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2294. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2295. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2296. The Conservation Objective and its attributes and targets for the razorbill SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA razorbill SCI**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2297. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2298. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2299. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2300. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 164.6 km, Woodward et al., 2019) of razorbill breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2301. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the razorbill SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2302. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2303. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2304. The Conservation Objective and its attributes and targets for the razorbill SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment

to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA razorbill SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2305. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for razorbill this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2306. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2307. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of razorbill which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2308. In relation to these Conservation Objective attributes, disturbance leading to displacement of razorbill from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, razorbills which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2309. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2310. Total bio-seasonal and total annual estimated operation and maintenance phase razorbill displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-55**. Note that for seabird receptors such as razorbill, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee

Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-55**.

2311. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-55: Total bio-seasonal and annual displacement mortalities to razorbill and mortalities apportioned to Saltee Islands SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (Apr–Jul)	Post-breeding migration (Aug–Oct)	Migration free non-breeding (Nov–Dec)	Return migration (Jan – Mar)	
Total impact	30% / 1%	2.024	13.08	1.921	1.227	18.252
	50% / 1%	**3.373**	**21.801**	**3.202**	**2.046**	**30.422**
	70%/ 1%	4.722	30.521	4.483	2.864	42.590
	50%/2%	6.746	43.601	6.404	4.091	60.842
	70%/2%	9.444	61.042	8.965	5.728	85.179
Percentage of impact apportioned to SPA		2.54%	1.03%	1.78%	1.03%	
Impact to SPA	30% / 1%	0.051	0.135	0.034	0.013	0.233
	50% / 1%	**0.086**	**0.225**	**0.057**	**0.021**	**0.388**
	70%/ 1%	0.120	0.315	0.080	0.030	0.544
	50%/2%	0.171	0.449	0.114	0.042	0.777
	70%/2%	0.240	0.629	0.159	0.059	1.087

2312. **Table 4-55**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted razorbill displacement mortality is calculated as 30.422 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 2.54% of total predicted displacement mortality during the migration-free breeding bio-season (which, for razorbill, is considered as the April to June period) relates to breeding adults from Saltee Islands SPA; this equates to 0.86 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the non-breeding bio-season and totals of both bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted razorbill displacement mortality to Saltee Islands SPA is calculated as 0.388 individuals per annum.

2313. Increases to Saltee Islands SPA razorbill mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-56**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus razorbill adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-56: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.233	6519	10.50%	684.495	0.034%
50% / 1%	**0.388**				**0.057%**
70% / 1%	0.544				0.079%
50% / 2%	0.777				0.113%
70% / 2%	1.087				0.159%

2314. As additional mortality to the razorbill SCI of Saltee Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to this species' breeding population abundance or productivity rate, nor will disturbance and displacement significantly increase barriers to movement within its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2315. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2316. As per project-only assessment, above.

OECC

Project-only assessment

2317. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the razorbill SCI of Saltee Islands SPA.

2318. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

2319. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of razorbill which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the razorbill SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2320. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of razorbill from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2321. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2322. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for razorbill. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of razorbill breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 164.6 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Maintenance and repair activities within the OECC will likely occur infrequently, and involve only a small number of vessels operating in close proximity to accomplish specific maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

2323. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering habitat availability to razorbill in such a way as to result in a significant decline in the breeding population abundance or productivity of the razorbill SCI of Saltee Islands SPA, nor will there be any significant increase in barriers to connectivity for this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the razorbill SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2324. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2325. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2326. The Conservation Objective and its attributes and targets for the razorbill SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA razorbill SCI.**

4.11.6 Receptor 6: Puffin

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2327. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2328. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2329. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2330. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2331. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2332. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2333. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2334. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2335. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2336. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2337. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of puffin which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2338. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, puffins which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2339. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2340. Total bio-seasonal and total annual estimated construction phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-57**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and

barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-57**.

2341. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2342. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-57: Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Saltee Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (May–Jul)	**Post-breeding migration (Aug)**	**Migration free non-breeding (Sep–Feb)**	**Return migration (Mar–Apr)**	
Total impact	15% / 1%	0.141	0.083	0.067	0.010	0.300
	25% / 1%	**0.235**	**0.139**	**0.112**	**0.016**	**0.501**
	35% / 1%	0.328	0.194	0.156	0.023	0.700
	25% / 2%	0.469	0.277	0.223	0.032	1.000
	35% / 2%	0.656	0.387	0.312	0.045	1.400
Percentage of impact apportioned to SPA		1.84%	0.55%	0.55%	0.55%	
Impact to SPA	15% / 1%	0.003	0.000	0.000	0.000	0.003
	25% / 1%	**0.004**	**0.001**	**0.001**	**0.000**	**0.006**
	35% / 1%	0.006	0.001	0.001	0.000	0.008
	25% / 2%	0.009	0.002	0.001	0.000	0.012
	35% / 2%	0.012	0.002	0.002	0.000	0.016

2343. **Table 4-57**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 0.501 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example,

3.51% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Saltee Islands SPA; this equates to 0.008 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Saltee Islands SPA is calculated as 0.008 individuals per annum.

2344. Increases to Saltee Islands SPA puffin mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-58**. In this table, the most recent colony count from the SPA (2016 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-58: Increase to annual mortality rates resulting from displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.003	1638	9.40%	153.972	0.002%
25% / 1%	**0.006**				**0.004%**
35% / 1%	0.008				0.005%
25% / 2%	0.012				0.007%
35% / 2%	0.016				0.010%

2345. As additional mortality to the puffin SCI of Saltee Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to this species' breeding population abundance or productivity rate, nor will disturbance and displacement significantly increase barriers to movement within its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2346. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2347. As per project-only assessment, above.

OECC

Project-only assessment

2348. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2349. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2350. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2351. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2352. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity

to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

2353. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering puffin mortality in such a way as to result in a significant decline in the breeding population abundance or productivity of the puffin SCI of Saltee Islands SPA, nor will there be any significant increase in barriers to connectivity for this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2354. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2355. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2356. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2357. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2358. Puffin depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2359. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2360. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical puffin breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2361. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2362. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2363. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2364. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2365. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance or productivity of the puffin SCI of Saltee Islands SPA, nor will there be any

significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2366. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2367. As per project-only assessment, above.

OECC

Project-only assessment

2368. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2369. Puffin depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline;
- Productivity rate – No significant decline; and
- Prey biomass available – No significant decline.

2370. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2371. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2372. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range +

1 SD = 265.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2373. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

2374. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2375. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2376. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance or productivity of the puffin SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2377. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2378. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2379. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being **met** for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2380. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2381. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2382. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2383. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2384. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the puffin SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2385. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2386. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2387. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2388. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2389. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2390. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of puffin which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2391. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from

areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, puffins which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2392. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2393. Total bio-seasonal and total annual estimated operation and maintenance phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-59**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-59**.

2394. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-59: Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Saltee Islands SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**				**Annual**
		Migration free breeding (May–Jul)	**Post-breeding migration (Aug)**	**Migration free non-breeding (Sep–Feb)**	**Return migration (Mar–Apr)**	
Total impact	30% / 1%	0.281	0.166	0.134	0.019	0.600
	50% / 1%	**0.469**	**0.277**	**0.223**	**0.032**	**1.001**
	70% / 1%	0.656	0.387	0.312	0.045	1.400
	50% / 2%	0.937	0.553	0.446	0.064	2.000
	70% / 2%	1.312	0.774	0.624	0.09	2.800
Percentage of impact apportioned to SPA		1.84%	0.55%	0.55%	0.55%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (May–Jul)	Post-breeding migration (Aug)	Migration free non-breeding (Sep–Feb)	Return migration (Mar–Apr)	
Impact to SPA	30% / 1%	0.005	0.001	0.001	0.000	0.007
	50% / 1%	**0.009**	**0.002**	**0.001**	**0.000**	**0.012**
	70% / 1%	0.012	0.002	0.002	0.000	0.016
	50% / 2%	0.017	0.003	0.002	0.000	0.023
	70% / 2%	0.024	0.004	0.003	0.000	0.032

2395. **Table 4-59**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 1.001 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 1.84% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Saltee Islands SPA; this equates to 0.009 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Saltee Islands SPA is calculated as 0.012 individuals per annum.

2396. Increases to Saltee Islands SPA puffin mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-60**. In this table, the most recent colony count from the SPA (2016 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-60: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.007	1638	9.40%	153.972	0.004%

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
50% / 1%	**0.012**				**0.007%**
70% / 1%	0.016				0.010%
50% / 2%	0.023				0.015%
70% / 2%	0.032				0.021%

2397. As additional mortality to the puffin SCI of Saltee Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. Accordingly, the level of impact during the operation and maintenance phase is not considered capable of altering habitat availability to razorbill in such a way as to result in a significant decline in the breeding population abundance or productivity of the puffin SCI of Saltee Islands SPA, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2398. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2399. As per project-only assessment, above.

OECC

Project-only assessment

2400. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2401. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

2402. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this SCI. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Saltee Islands SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2403. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2404. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2405. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Saltee Islands SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Operation and maintenance phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific operation and maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

2406. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering habitat availability to puffin in such a way as to result in a significant decline in the breeding population abundance or productivity of the razorbill SCI of Saltee Islands SPA, nor will there be any significant increase in barriers to connectivity for this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it

can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2407. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2408. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2409. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2410. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2411. Puffin depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline;
- Productivity rate – No significant decline; and
- Prey biomass available – No significant decline.

2412. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of

the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2413. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2414. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2415. Key fish species, upon which puffin predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2416. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2417. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Saltee Islands SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2418. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2419. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the puffin SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2420. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2421. As per project-only assessment, above.

OECC

Project-only assessment

2422. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin SCI of Saltee Islands SPA.

2423. Puffin depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline;
- Productivity rate – No significant decline; and
- Prey biomass available – No significant decline.

2424. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2425. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2426. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2427. Key fish species, upon which puffin predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2428. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2429. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Saltee Islands SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2430. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2431. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of puffin prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the puffin SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2432. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2433. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2434. The Conservation Objective and its attributes and targets for the puffin SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA puffin SCI.**

4.11.7 Receptor 7: Gannet

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2435. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2436. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2437. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2438. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2439. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way

as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2440. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2441. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2442. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2443. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

2444. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2445. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline;
- Productivity rate – No significant decline; and
- Barriers to connectivity – No significant increase.

2446. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2447. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2448. Total bio-seasonal and total annual estimated construction phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-61**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-61**.

2449. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2450. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-61: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Saltee Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration-Free Breeding (Apr–Aug)	Post-Breeding Migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	30% / 1%	0.315	0.166	0.315	0.795
	35% / 1%	**0.367**	**0.194**	**0.367**	**0.928**
	40% / 1%	0.420	0.222	0.420	1.061
Percentage of impact apportioned to SPA		3.98%	1.77%	1.47%	

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration-Free Breeding (Apr–Aug)	Post-Breeding Migration (Sep–Nov)	Return migration (Dec–Mar)	
Impact to SPA	30% / 1%	0.013	0.003	0.005	0.020
	35% / 1%	**0.015**	**0.003**	**0.005**	**0.023**
	40% / 1%	0.017	0.004	0.006	0.027

2451. **Table 4-61**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 0.928 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 3.98% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Saltee Islands SPA; this equates to 0.015 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Saltee Islands SPA is calculated as 0.023 individuals per annum.

2452. Increases to Saltee Islands SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-62**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-62: Increase to annual mortality rates resulting from displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.020	9444	10.50%	991.62	0.002%
35% / 1%	0.023				0.002%
40% / 1%	0.027				0.003%

2453. As additional mortality to the gannet SCI of Saltee Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenario presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the gannet SCI of Saltee Islands SPA. Specifically, construction

phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2454. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2455. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2456. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2457. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2458. Gannet depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2459. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual

condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2460. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical gannet breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2461. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2462. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2463. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2464. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2465. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2466. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2467. As per project-only assessment, above.

OECC

Project-only assessment

2468. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2469. Gannet depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2470. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2471. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2472. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 509.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to

enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2473. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2474. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2475. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2476. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2477. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2478. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2479. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2480. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2481. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.

2482. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2483. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Saltee Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2484. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Saltee Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2485. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2486. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2487. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

2488. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

2489. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2490. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Saltee Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Barriers to connectivity – No significant increase.

2491. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance

phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2492. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

2493. Total bio-seasonal and total annual estimated operation and maintenance phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-63**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-63**.

2494. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-63:Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Saltee Islands SPA for a range of operation and maintenance phase displacement rates and proportion of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration-Free Breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	60% / 1%	0.629	0.332	0.629	1.590
	70% / 1%	**0.734**	**0.387**	**0.734**	**1.855**
	80% / 1%	0.839	0.443	0.839	2.121
Percentage of impact apportioned to SPA		3.98%	1.77%	1.47%	
Impact to SPA	60% / 1%	0.025	0.006	0.009	0.040
	70% / 1%	**0.029**	**0.007**	**0.011**	**0.047**
	80% / 1%	0.033	0.008	0.012	0.054

2495. **Table 4-63**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 1.855 individuals. When predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated that, for example, 3.98% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from

Saltee Islands SPA; this equates to 0.029 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Saltee Islands SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Saltee Islands SPA is calculated as 0.047 individuals per annum.

2496. Increases to Saltee Islands SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-64**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-64: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Saltee Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
60% / 1%	0.040	9444	10.50%	991.62	0.004%
70% / 1%	**0.047**				**0.005%**
80%/ 1%	0.054				0.005%

2497. As additional mortality to the gannet SCI of Saltee Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2498. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2499. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2500. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2501. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2502. Gannet depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2503. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2504. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2505. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2506. Key fish species, upon which gannet predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2507. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2508. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Saltee Islands SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2509. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2510. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2511. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2512. As per project-only assessment, above.

OECC

Project-only assessment

2513. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Saltee Islands SPA.

2514. Gannet depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.
- Prey biomass available – No significant decline.

2515. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

2516. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

2517. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2518. Key fish species, upon which gannet predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2519. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not

considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

2520. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Saltee Islands SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2521. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2522. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Saltee Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of Saltee Islands SPA, nor will there be any significant decline in prey biomass available to this SCI. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Saltee Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2523. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Saltee Islands SPA.

Residual effect

2524. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2525. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

2526. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of gannet from Saltee Islands SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Saltee Islands SPA:

- Breeding population abundance – No significant decline.
- Productivity rate – No significant decline.

2527. In relation to these Conservation Objective attributes, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Saltee Islands SPA and thereby potentially contribute to declines in the breeding population abundance of the SCI. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Saltee Islands SPA, through reductions to offspring provisioning rates and other parental care metrics (should parents experience collision mortality).

2528. Total bio-seasonal and total annual estimated gannet collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-65**. These values are apportioned to Saltee Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-65**.

Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are considered sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-65: Total bio-seasonal and annual collision mortalities to gannet and mortalities apportioned to Saltee Islands SPA.

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Total impact	A	**1**	**0.326**	**0.432**	**0.136**	**0.894**
		2	0.932	1.222	0.406	2.560
	B	**1**	**0.274**	**0.372**	**0.116**	**0.762**

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
		2	0.830	1.065	0.338	2.233
Impact accounting for 70% macro-avoidance	A	**1**	**0.098**	**0.130**	**0.041**	**0.268**
		2	0.280	0.367	0.122	0.768
	B	**1**	**0.082**	**0.112**	**0.035**	**0.229**
		2	0.249	0.320	0.101	0.670
Percentage of impact apportioned to SPA (inclusive of 70% macro-avoidance)			1.47%	3.98%	1.77%	
Impact to SPA	A	**1**	**0.001**	**0.005**	**0.001**	**0.007**
		2	0.004	0.015	0.002	0.021
	B	**1**	**0.001**	**0.004**	**0.001**	**0.006**
		2	0.004	0.013	0.002	0.018

2529. **Table 4-65**, above, outlines that, when using Band Option 1 CRM, total annual predicted gannet collision mortality is calculated as 0.894 individuals in relation to Representative scenario A and 0.762 individuals in relation to Representative scenario B. When a 70% rate of macro-avoidance by this species to the presence of OWF infrastructure is applied, total annual predicted gannet collision mortality is calculated as 0.268 individuals in relation to Representative scenario A and 0.229 individuals in relation to Representative scenario B under Band Option 1. When these predicted mortalities are apportioned to Saltee Islands SPA for each bio-season it is estimated, for example, that 1.47% of total predicted collision mortality during the return migration bio-season (which, for gannet, is considered as the December to March period) relates to breeding adults from Saltee Islands SPA; this equates to 0.001 individuals from the SPA per return migration bio-season for both Representative scenarios A and B (accounting for macro-avoidance). Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Saltee Islands SPA and, from this, when using Band Option 1 CRM, annual predicted gannet collision mortality to Saltee Islands SPA is calculated as 0.007 individuals in relation to Representative scenario A and 0.006 individuals in relation to Representative scenario B (accounting for macro-avoidance).

2530. Increases to SPA gannet mortality rates resultant from apportioned annual impacts are presented in **Table 4-66**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023), is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project for Representative scenarios A and B (accounting for macro-avoidance).

Table 4-66: Increase to annual mortality rates resulting from collision mortalities apportioned to Saltee Islands SPA (accounting for 70% macro-avoidance by this species)

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.007**	9,444	8.10%	764.964	**0.001%**
	2	0.021				0.003%
B	**1**	**0.006**				**0.001%**
	2	0.018				0.002%

2531. As additional mortality to the gannet SCI of Saltee Islands SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not capable of altering gannet mortality rates in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of Saltee Islands SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Saltee Islands SPA.

Proposed mitigation

2532. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Saltee Islands SPA.

Residual effect

2533. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2534. The Conservation Objective and its attributes and targets for the gannet SCI of Saltee Islands SPA are presented in **Table 4-46**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Saltee Islands SPA gannet SCI.**

4.12 Skomer, Skokholm and the seas off Pembrokeshire SPA (Wales – UK9015051)

2535. SPA is designated in relation to the following features, which have been screened in for consideration within the NIS: lesser black-backed gull, puffin, Manx shearwater and European storm petrel.

2536. The minimum separation distance between SPA and the array site is 137.98 km (with a 'by-sea' separation distance of 138.01km).

2537. The minimum separation distance between SPA and the OECC is 147.65 km (with a 'by-sea' separation distance of 147.68 km).

2538. The minimum separation distance between SPA and the OECC intertidal landfall is 180.81 km (with a 'by-sea' separation distance of 181.56 km).

Table 4-67: Assessment of adverse effects on site integrity (project alone) – Skomer, Skokholm and the Seas of Pembrokeshire SPA (Wales – UK9015051)

Objectives: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Lesser black-backed gull [A183]					
1. The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term: The breeding population size of lesser black-backed gull should be stable or increasing, aiming for at least 20,300, with a breeding productivity rate and an adult survival rate that allows this number to be maintained / increased. Colonies of this species must not be lost as a result of anthropogenic influence. 2. The distribution of the population should be being maintained, or where appropriate increasing: The distribution of this species within the site should not be constrained by anthropogenic factors. Reductions in the range of this species can only be acceptable if there is significant risk of detriment, to the FCS of priority Features of this SPA.	Direct effects on habitat [1,3]	**Section 4.12.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

Objectives: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
3. There should be sufficient habitat, of sufficient quality, to support the population in the long term: The breeding and foraging habitat of this species should be stable or increasing in terms of its area, and its quality should remain unaffected by anthropogenic factors. 4. Factors affecting the population or its habitat should be under appropriate control: There should be no mammalian land predators present in the SPA, and control measures should be in place to ensure that accidental introduction does not take place. Access beyond designated footpaths, should be under appropriate control. Factors affecting the species within the site should be under control.					
Puffin [A204]					
1. The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term: The breeding population of puffin should be stable or increasing with an aim of 9500 individuals being achieved. 2. The distribution of the population should be being maintained, or where appropriate increasing: The distribution of this species within the site should not be constrained by anthropogenic factors. There should be no contraction of the distribution of nesting sites as a result of anthropogenic factors. 3. There should be sufficient habitat, of sufficient quality, to support the population in the long term: The breeding and foraging habitat of this species should be stable or increasing in terms of its area, and its quality should remain unaffected by anthropogenic factors. 4. Factors affecting the population or its habitat should be under appropriate control: There should be no mammalian land predators	Direct effects on habitat [1, 3]	**Section 4.12.2**	None	No change	No AESI
	Disturbance and displacement [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI

Objectives: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
present in the SPA, and control measures should be in place to ensure that accidental introduction does not take place. Access beyond designated footpaths, should be under appropriate control.					
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
Manx shearwater [A013]					
1. The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term: The breeding population of Manx shearwater should be stable or increasing with no measured decrease in numbers (based on a population count of 150,968), based on annual study plots. 2. The distribution of the population should be being maintained, or where appropriate increasing: The distribution of this species within the site should not be constrained by anthropogenic factors, including disturbance of nesting sites by the public and activities leading to possible loss of suitable nesting sites. 3. There should be sufficient habitat, of sufficient quality, to support the population in the long term: The breeding and foraging habitat of this species should be stable or increasing in terms of its area, and its quality should remain unaffected by anthropogenic factors. 4. Factors affecting the population or its habitat should be under appropriate control: Rafting birds should remain unaffected by boat use and other anthropogenic factors; appropriate codes of conduct must be followed by all visitors and craft surrounding the islands. Factors affecting the species within the site should be under control.	Direct effects on habitat [1,3]	**Section 4.12.3**	None	No change	No AESI
	Disturbance and displacement [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI

Objectives: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
European storm petrel [A014]					
1. The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term: The breeding population of European storm petrel should be stable or increasing. The aim, across the two islands is for at least 3,500 pairs, with this number to be stable or increasing. 2. The distribution of the population should be being maintained, or where appropriate increasing: The distribution of this species within the site should not be constrained by anthropogenic factors, including disturbance by the public and activities leading to possible loss of suitable nesting sites. 3. There should be sufficient habitat, of sufficient quality, to support the population in the long term: The foraging habitat of this species should be stable or increasing in terms of its area, and its quality should remain unaffected by anthropogenic factors. There should be no contraction of the distribution of nesting sites as a result of anthropogenic factors. 4. Factors affecting the population or its habitat should be under appropriate control: Breeding success of this species should remain unaffected by negative human influence. Factors affecting the species within the site should be under control.	Direct effects on habitat [1,3]	**Section 4.12.4**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.12.1 Receptor 1: Lesser black-backed gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2539. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2540. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term; and
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2541. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2542. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2543. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-

backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2544. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2545. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2546. Lesser black-backed gull which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by this feature. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Skomer, Skokholm and the seas off Pembrokeshire SPA, which may otherwise utilise those areas for non-foraging behaviours.

2547. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term; and
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2548. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2549. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Skomer, Skokholm and the seas off Pembrokeshire SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 180.81 km and 'by-sea' distance of 181.56 km), only a minimal number of individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA are likely to be using impacted areas within South

Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2550. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual impacts

2551. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2552. The Conservation Objectives and its attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull feature**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2553. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2554. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the

following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term; and
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2555. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2556. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature 's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature.

2557. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2558. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2559. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2560. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2561. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2562. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual

2563. As per project-only assessment, above.

OECC

Project-only assessment

2564. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2565. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

2566. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced

provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2567. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

2568. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2569. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2570. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2571. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2572. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2573. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual

2574. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2575. Lesser black-backed gull which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

2576. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the populations on a long-term basis.

2577. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the feature to maintain its population.

2578. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Skomer, Skokholm and the seas off Pembrokeshire SPA (and hence do not affect the distribution of foraging habitat of this feature within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 180.81 km and 'by-sea' distance of 181.56 km), only a minimal number of individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals

expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2579. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual impacts

2580. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2581. The Conservation Objectives and its attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented **Table 4-67**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

2582. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2583. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2584. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2585. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2586. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2587. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual

2588. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2589. Lesser black-backed gull which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of maintenance activities which temporarily remove or alter areas of intertidal habitat which are utilised by this feature. Cable landfall duct maintenance activities during the operation and maintenance phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable to lesser black-backed gull connected with Skomer, Skokholm and the seas off Pembrokeshire SPA, which may otherwise utilise those areas for non-foraging behaviours.

2590. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the populations on a long-term basis.

2591. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative roosting areas may increase vulnerability to predation and reduce survival rates), or may affect the energetic costs of non-foraging behaviours through increased occupancy of sub-optimal area and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2592. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within Skomer, Skokholm and the seas off Pembrokeshire SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 180.81 km and 'by-sea' distance of 181.56 km), only a minimal number of individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull population is *de minimis.* Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.. feature The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2593. No specific mitigation is proposed or required in respect of direct effects on habitat during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual

2594. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2595. The Conservation Objective and its attributes and targets for the kittiwake feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull feature.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2596. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2597. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2598. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual

condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2599. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2600. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2601. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature 's breeding and non-breeding season range extents.

2602. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2603. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2604. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2605. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer,

Skokholm and the seas off Pembrokeshire SPA. Accordingly, the level of impact is not considered capable of altering the. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2606. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual impacts

2607. As per project-only assessment, above.

OECC

Project-only assessment

2608. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2609. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the populations on a long-term basis.

2610. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2611. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2612. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2613. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2614. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2615. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2616. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2617. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond

reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2618. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual impacts

2619. As per project-only assessment, above.

OECC intertidal landfall

Project-only assessment

2620. Lesser black-backed gull which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA may utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which temporarily remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct maintenance and other activities which may require localised excavations during the operation and maintenance phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to lesser black-backed gull is temporarily reduced within those areas.

2621. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature 's populations on a long-term basis.

2622. In relation to these Conservation Objective attributes, operation and maintenance of the CWP Project OECC intertidal landfall may reduce the intertidal areas within South Dublin Bay in which individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA can undertake foraging behaviours or require individuals to use alternative areas for foraging. These potential consequences of operation and maintenance phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of the feature to maintain its population.

2623. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within Skomer, Skokholm and the seas off Pembrokeshire SPA (and hence do not affect the distribution of foraging habitat of this feature within the SPA). Furthermore, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 180.81 km and 'by-sea' distance of 181.56 km), only a minimal number of individuals connected with Skomer, Skokholm and the seas off Pembrokeshire SPA are likely to be using impacted areas within South

Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull population is *de minimis*. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in an impact on the breeding population size, nor the availability of sufficient habitat and habitat quality to lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2624. No specific mitigation is proposed or required in respect of changes in prey availability during operation and maintenance within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual impacts

2625. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2626. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull feature.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

2627. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Skomer, Skokholm and the seas off Pembrokeshire SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.

2628. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Skomer, Skokholm and the seas off Pembrokeshire SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Skomer, Skokholm and the seas off Pembrokeshire SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

2629. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this feature would be negligible.

2630. As additional mortality to the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. Specifically, collision mortality will not affect the population size of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2631. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2632. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2633. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA lesser black-backed gull feature**.

4.12.2 Receptor 2: Puffin

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2634. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2635. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2636. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2637. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2638. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be

concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2639. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2640. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2641. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2642. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2643. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this feature. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2644. As such, during the construction phase of the CWP Project, vessel traffic and, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of puffin which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2645. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, puffins which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2646. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2647. Total bio-seasonal and total annual estimated construction phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-68**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-68**.

2648. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2649. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-68:Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for a range of displacement

rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (May–Jun)	Post-breeding migration (Jul–Aug)	Migration free non-breeding (Sep–Feb)	Return migration (Mar–Apr)	
Total impact	15% / 1%	0.141	0.083	0.067	0.010	0.300
	25% / 1%	**0.235**	**0.139**	**0.112**	**0.016**	**0.501**
	35% / 1%	0.328	0.194	0.156	0.023	0.700
	25% / 2%	0.469	0.277	0.223	0.032	1.000
	35% / 2%	0.656	0.387	0.312	0.045	1.400
Percentage of impact apportioned to SPA		36.05%	16.15%	16.15%	16.15%	
Impact to SPA	15% / 1%	0.051	0.013	0.011	0.002	0.076
	25% / 1%	**0.085**	**0.022**	**0.018**	**0.003**	**0.127**
	35% / 1%	0.118	0.031	0.025	0.004	0.178
	25% / 2%	0.169	0.045	0.036	0.005	0.255
	35% / 2%	0.236	0.063	0.050	0.007	0.357

2650. **Table 4-68**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 0.501 individuals. When predicted mortalities are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for each bio-season it is estimated that, for example, 36.05% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Skomer, Skokholm and the seas off Pembrokeshire SPA; this equates to 0.085 individuals from the SPA per breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA is calculated as 0.127 individuals per annum.

2651. Increases to Skomer, Skokholm and the seas off Pembrokeshire SPA puffin mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-69**. In this table, the most recent colony count from the SPA (2022 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by

multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-69: Increase to annual mortality rates resulting from displacement mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.076	48528	9.40%	4561.632	0.002%
25% / 1%	0.127				0.003%
35% / 1%	0.178				0.004%
25% / 2%	0.255				0.006%
35% / 2%	0.357				0.008%

2652. As additional mortality to the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2653. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2654. As per project-only assessment, above.

OECC

Project-only assessment

2655. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2656. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this feature. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the construction phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2657. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2658. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2659. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Works within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by construction vessels, will cover only an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

2660. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from construction phase vessel activity

within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from construction phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2661. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2662. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2663. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2664. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2665. Puffin depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2666. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2667. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this feature 's breeding season foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical puffin breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2668. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this feature 's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2669. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2670. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2671. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2672. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact

the breeding population size, nor the distribution of the population, of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2673. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2674. As per project-only assessment, above.

OECC

Project-only assessment

2675. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2676. Puffin depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2677. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2678. Of puffin's key prey species groups, sand eels are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2679. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature 's breeding (mean–maximum foraging range + 1 SD = 265.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2680. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2681. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2682. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2683. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2684. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2685. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2686. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2687. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the puffins of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2688. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2689. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2690. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2691. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within

the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2692. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2693. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2694. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2695. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for puffin this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2696. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this feature. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019)) and in

relation to the presence of OWF infrastructure (specifically WTGs) (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2697. As such, during the operation and maintenance phase of the CWP Project, vessel traffic and installed WTG infrastructure may result in the disturbance and displacement of puffin which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2698. In relation to these Conservation Objective attributes, disturbance leading to displacement of puffin from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, due to the presence of operational WTGs within the array site, puffins which would otherwise pass through these areas, may avoid flying through, or close to, the operational array site and alter flightpaths so as to go round this area, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2699. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to areas in which operational WTGs are present, may affect the energetic costs of those behaviours and, in turn, the affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2700. Total bio-seasonal and total annual estimated operation and maintenance phase puffin displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-70**. Note that for seabird receptors such as puffin, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-70**.

2701. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-70:Total bio-seasonal and annual displacement mortalities to puffin and mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for a range of operation and

maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season				Annual
		Migration free breeding (May–Jun)	Post-breeding migration (Jul–Aug)	Migration free non-breeding (Sep–Feb)	Return migration (Mar–Apr)	
Total impact	30% / 1%	0.281	0.166	0.134	0.019	0.600
	50% / 1%	**0.469**	**0.277**	**0.223**	**0.032**	**1.001**
	70% / 1%	0.656	0.387	0.312	0.045	1.400
	50% / 2%	0.937	0.553	0.446	0.064	2.000
	70% / 2%	1.312	0.774	0.624	0.09	2.800
Percentage of impact apportioned to SPA		36.05%	16.15%	16.15%	16.15%	
Impact to SPA	30% / 1%	0.101	0.027	0.022	0.003	0.153
	50% / 1%	**0.169**	**0.045**	**0.036**	**0.005**	**0.255**
	70% / 1%	0.236	0.063	0.050	0.007	0.357
	50% / 2%	0.338	0.089	0.072	0.010	0.509
	70% / 2%	0.473	0.125	0.101	0.015	0.713

2702. **Table 4-70**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted puffin displacement mortality is calculated as 1.001 individuals. When predicted mortalities are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for each bio-season it is estimated that, for example, 36.05% of total predicted displacement mortality during the migration-free breeding bio-season (which, for puffin, is considered as the May to June period) relates to breeding adults from Skomer, Skokholm and the seas off Pembrokeshire SPA; this equates to 0.169 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration, migration-free non-breeding and return migration bio-seasons and totals of all four bio-seasons summed to estimate annual displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA. When considering the central displacement rate scenario, annual predicted puffin displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA is calculated as 0.255 individuals per annum.

2703. Increases to Skomer, Skokholm and the seas off Pembrokeshire SPA puffin mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-71**. In this table, the most recent colony count from the SPA (2022 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus puffin adult annual survival rate (taken from Horswill and Robinson,

2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-71:Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.153	48528	9.40%	4561.632	0.003%
50% / 1%	0.255				0.006%
70% / 1%	0.357				0.008%
50% / 2%	0.509				0.011%
70% / 2%	0.713				0.016%

2704. As additional mortality to the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2705. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2706. As per project-only assessment, above.

OECC

Project-only assessment

2707. As the OECC does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the OECC, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement

impacts assessed here relate to ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2708. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

2709. Due to a lack of evidence in relation to puffin behavioural sensitivity to vessel disturbance and responses to the presence of OWF infrastructure, razorbill is used as a proxy for this feature. Razorbill are considered to be somewhat sensitive to disturbance and displacement impacts around vessel traffic (i.e. moderate [3/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and moderate/high [16/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019). As such, during the operation and maintenance phase of the CWP Project, vessel traffic may result in the disturbance and displacement of puffin which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and immediately surrounding the OECC. Disturbance and displacement effects have the potential to impact the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2710. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of puffin from locations around vessel activity within the OECC and surrounding areas may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

2711. Temporary localised reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, may affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2712. Visual aerial surveys of the western Irish Sea (ObSERVE data – Jessopp et al., 2018) indicate that the OECC lies within an area of regionally relatively high importance regionally (inferred from relatively high observed counts within area) for puffin. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the receptor may experience potential disturbance or displacement by vessels during the operation and maintenance phase, will cover only, at most, an extremely small proportion of the overall OECC area and a much smaller still proportion the area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum foraging range (+ 1 SD) = 265.4 km, Woodward et al., 2019). From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 78% of razorbill (used as a proxy species for puffin) were observed to demonstrate escape responses (either in the form of diving or taking off) in response to approaching vessels. The mean distance at which these responses occurred was 395 m; an area of approximately 0.490 km^2 around each vessel, which equates to 1.28% of the total OECC area. Operation and maintenance phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific operation and maintenance activities and therefore have overlapping areas in which they may be causing disturbance.

2713. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion that will experience potential disturbance impacts from operation and maintenance phase vessel activity within the OECC, and the temporary nature of such disturbance, the scale of disturbance and displacement impacts from operation and maintenance phase activities within the OECC is considered to be negligible. In particular, any temporary localised exclusion from areas within or

immediately surrounding the OECC is not expected to affect the energetic costs to individuals in such a way as to reduce the condition of individuals and their consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2714. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2715. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2716. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented **Table 4-67** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2717. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2718. Puffin depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2719. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2720. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2721. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2722. Key fish species, upon which puffin predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2723. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2724. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2725. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2726. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin feature of Skomer, Skokholm and the

seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2727. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2728. As per project-only assessment, above.

OECC

Project-only assessment

2729. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2730. Puffin depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term feature.

2731. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact puffin prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging puffin, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2732. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2733. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2734. Key fish species, upon which puffin predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2735. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2736. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of puffin breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 265.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2737. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2738. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2739. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2740. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2741. The Conservation Objective and its attributes and targets for the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA puffin feature.**

4.12.3 Receptor 3: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

2742. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2743. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2744. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging

behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2745. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2746. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the puffin feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2747. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2748. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2749. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2750. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered to be sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2751. As the array site does not overlap this SPA, and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater, this is regarded as a 2 km buffer), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2752. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term; and
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2753. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2754. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2755. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-72**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-72**.

2756. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2757. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-72: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun – Jul)	Post-breeding migration (Aug – Oct)	Return migration (Mar-May)	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		41.47%	57.42%	57.42%	
Impact to SPA	15% / 1%	0.112	0.969	0.672	1.753
	25% / 1%	**0.187**	**1.615**	**1.120**	**2.922**
	35% / 1%	0.261	2.261	1.568	4.091

2758. **Table 4-72**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for each bio-season it is estimated that, for example, 41.47% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Skomer, Skokholm and the seas off Pembrokeshire SPA; this equates to 0.187 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA is calculated as 2.922 individuals per annum.

2759. Increases to Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-73**. In this table, the most recent colony count from the SPA (2018 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual

mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-73: Increase to annual mortality rates resulting from displacement mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	1.753	910312	13.00%	118340.6	0.001%
25% / 1%	**2.922**				**0.002%**
35% / 1%	4.091				0.003%

2760. As additional mortality to the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2761. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2762. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2763. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented **Table 4-67**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2764. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2765. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term; and
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2766. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2767. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this feature.

2768. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2769. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2770. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2771. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2772. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2773. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2774. As per project-only assessment, above.

OECC

Project-only assessment

2775. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2776. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey

species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

2777. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2778. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

2779. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2780. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2781. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2782. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes

in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2783. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2784. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2785. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2786. The Conservation Objective and its attributes and targets for the gannet SCI of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

2787. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2788. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site

(i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2789. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2790. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2791. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2792. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2793. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2794. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

2795. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

2796. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2797. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Skomer, Skokholm and the seas off Pembrokeshire SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2798. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2799. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of

individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2800. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-74**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-74**.

2801. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-74: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post-breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		41.47%	57.42%	57.42%	
Impact to SPA	30% / 1%	0.224	1.938	1.344	3.506
	50% / 1%	**0.374**	**3.230**	**2.240**	**5.844**
	70% / 1%	0.523	4.521	3.137	8.181

2802. **Table 4-74**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA for each bio-season it is estimated that, for example, 41.47% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Skomer, Skokholm and the seas off

Pembrokeshire SPA; this equates to 0.374 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Skomer, Skokholm and the seas off Pembrokeshire SPA is calculated as 5.844 individuals per annum.

2803. Increases to Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-75**. In this table, the most recent colony count from the SPA (2018 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-75: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Skomer, Skokholm and the seas off Pembrokeshire SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	3.506	910312	13.00%	118340.6	0.003%
50% / 1%	**5.844**				**0.005%**
70% / 1%	8.181				0.007%

2804. As additional mortality to the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2805. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2806. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2807. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67** above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2808. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2809. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2810. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the population on a long-term basis.

2811. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and

maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2812. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2813. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2814. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2815. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2816. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2817. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2818. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2819. As per project-only assessment, above.

OECC

Project-only assessment

2820. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2821. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2822. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2823. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2824. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this

impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2825. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2826. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2827. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2828. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2829. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2830. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2831. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2832. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA Manx shearwater feature.**

4.12.4 Receptor 4: European storm petrel

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

2833. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2834. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2835. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2836. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum = 336 km, Woodward et al., 2019) of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2837. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which

to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2838. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2839. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2840. The Conservation Objective and its attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA European storm petrel feature.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2841. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2842. European storm petrel forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect European storm petrel prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2843. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2844. As European storm petrel is a generalist forager, although fish species (including sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to European storm petrel on account of the high level of dietary flexibility demonstrated by this feature.

2845. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2846. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2847. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2848. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by European storm petrel and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2849. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly,

the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2850. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2851. As per project-only assessment, above.

OECC

Project-only assessment

2852. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2853. European storm petrel forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect European storm petrel prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

2854. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2855. As European storm petrel is a generalist forager, and underwater noise impacts to prey fish species (including sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

2856. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range. = 336 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

2857. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2858. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2859. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by European storm petrel and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2860. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of European storm petrel prey species in such a way as to result in a significant decline in the breeding population abundance of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA

Proposed mitigation

2861. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2862. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2863. The Conservation Objective and its attributes and targets for the European storm petrel SCI of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA European storm petrel SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

2864. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2865. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2866. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2867. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum 336 km, Woodward et al., 2019) of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2868. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2869. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2870. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2871. The Conservation Objective and its attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA European storm petrel feature.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

2872. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2873. European storm petrel forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of European storm petrel have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

2874. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2875. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2876. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2877. Key fish species, upon which European storm petrel predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature 's breeding and non-breeding season range extents.

2878. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2879. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum 336 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2880. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2881. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2882. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2883. As per project-only assessment, above.

OECC

Project-only assessment

2884. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel of Skomer, Skokholm and the seas off Pembrokeshire SPA.

2885. European storm petrel forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

2886. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2887. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2888. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2889. Key fish species, upon which European storm petrel predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2890. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2891. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of European storm petrel breeding within Skomer, Skokholm and the seas off Pembrokeshire SPA (mean–maximum 336 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2892. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2893. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of European storm petrel prey species in such a way as to result in a significant decline in the breeding population abundance of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skomer, Skokholm and the seas off Pembrokeshire SPA.

Proposed mitigation

2894. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skomer, Skokholm and the seas off Pembrokeshire SPA.

Residual effect

2895. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

The Conservation Objective and its attributes and targets for the European storm petrel feature of Skomer, Skokholm and the seas off Pembrokeshire SPA are presented in **Table 4-67**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Skomer, Skokholm and the seas off Pembrokeshire SPA European storm petrel feature.**

4.13 Grassholm SPA (Wales – UK9014041)

2896. SPA is designated in relation to the following Feature which has been screened in for consideration within the NIS: gannet.

2897. The minimum separation distance between SPA and the array site is 139.88 km.

2898. The minimum separation distance between SPA and the OECC is 149.15 km.

2899. The minimum separation distance between SPA and the OECC intertidal landfall is 181.22 km (with a 'by-sea' separation distance of 182.20 km).

Table 4-76: Assessment of adverse effects on site integrity) project alone – Grassholm SPA (Wales – UK9014041)

Objective	Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Gannet [A016]						
To maintain the feature in a favourable conservation status	1. Breeding population – Will not fall below 30,000 pairs in three consecutive years. 2. Breeding population – Will not drop by more than 25% of the previous year's figures in any one year. 3. Breeding population – There will be no decline in this population significantly greater than any decline in the North Atlantic population as a whole.	Direct effects on habitat [1,2,3]	**Section 4.13.1**	None	No change	No AESI
		Disturbance and displacement [1,2,3]		None	No change	No AESI
		Changes in prey availability [1,2,3]		None	No change	No AESI
		Collision [1,2,3]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3]	See high-level assessment in Section 4			No AESI

4.13.1 Receptor 1: Gannet

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2900. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet feature of Grassholm SPA.

2901. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2902. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2903. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Grassholm SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2904. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation

condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2905. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Grassholm SPA.

Residual effect

2906. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2907. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

2908. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

2909. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet feature of Grassholm SPA.

2910. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Grassholm SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years;
- The breeding population will not drop by more than 25% of the previous year's figures in any one year; and
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2911. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2912. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2913. Total bio-seasonal and total annual estimated construction phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-77**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Grassholm SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-77**.

2914. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

2915. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-77: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Grassholm SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Apr–Aug)	**Post-breeding migration (Sep–Nov)**	**Return migration (Dec–Mar)**	
Total impact	30% / 1%	0.315	0.166	0.315	0.795
	35% / 1%	**0.367**	**0.194**	**0.367**	**0.928**
	40% / 1%	0.420	0.222	0.420	1.061
Percentage of impact apportioned to SPA		24.74%	13.46%	11.19%	
Impact to SPA	30% / 1%	0.078	0.022	0.035	0.135
	35% / 1%	**0.091**	**0.026**	**0.041**	**0.158**

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
	40% / 1%	0.104	0.030	0.047	0.181

2916. **Table 4-77**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 0.928 individuals. When predicted mortalities are apportioned to Grassholm SPA for each bio-season it is estimated that, for example, 24.74% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Grassholm SPA; this equates to 0.091 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Grassholm SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Grassholm SPA is calculated as 0.158 individuals per annum.

2917. Increases to Grassholm SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4.78**. In this table, the most recent colony count from the SPA (2018 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4.78: Increase to annual mortality rates resulting from displacement mortalities apportioned to Grassholm SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.135	72022	10.50%	7562.31	0.002%
35% / 1%	**0.158**				**0.002%**
40% / 1%	0.181				0.002%

2918. As additional mortality to the gannet feature of Grassholm SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenario presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the gannet feature of Grassholm SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the gannet feature of Grassholm SPA. In light of these

factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2919. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Grassholm SPA.

Residual effect

2920. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2921. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2922. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Grassholm SPA.

2923. Gannet depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2924. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing

productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

2925. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical gannet breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

2926. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this feature 's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

2927. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

2928. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Grassholm SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2929. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

2930. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Grassholm SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to impact the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2931. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Grassholm SPA.

Residual effect

2932. As per project-only assessment, above.

OECC

Project-only assessment

2933. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Grassholm SPA.

2934. Gannet depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2935. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2936. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

2937. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 509.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

2938. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are

typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

2939. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Grassholm SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2940. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

2941. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Grassholm SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to impact the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2942. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Grassholm SPA.

Residual effect

2943. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2944. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

2945. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet feature of Grassholm SPA.

2946. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2947. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2948. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Grassholm SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2949. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to impact the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2950. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Grassholm SPA.

Residual effect

2951. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2952. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

2953. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

2954. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet feature of Grassholm SPA.

2955. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Grassholm SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2956. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from

areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

2957. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

2958. Total bio-seasonal and total annual estimated operation and maintenance phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-79**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Grassholm SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-79**.

2959. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions

Table 4-79: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Grassholm SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	60% / 1%	0.629	0.332	0.629	1.590
	70% / 1%	**0.734**	**0.387**	**0.734**	**1.855**
	80% / 1%	0.839	0.443	0.839	2.121
Percentage of impact apportioned to SPA		24.74%	13.46%	11.19%	
Impact to SPA	60% / 1%	0.156	0.045	0.070	0.271
	70% / 1%	**0.182**	**0.052**	**0.082**	**0.316**
	80% / 1%	0.208	0.060	0.094	0.361

2960. **Table 4-79**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 1.855 individuals. When predicted mortalities are apportioned to Grassholm SPA for each bio-season it is estimated that, for

example, 24.74% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Grassholm SPA; this equates to 0.182 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Grassholm SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Grassholm SPA is calculated as 0.316 individuals per annum.

2961. Increases to Grassholm SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-80**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-80: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Grassholm SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
60% / 1%	0.271	72022	10.50%	7562.31	0.004%
70% / 1%	**0.316**				**0.004%**
80% / 1%	0.361				0.005%

2962. As additional mortality to the gannet feature of Grassholm SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the Gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2963. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Grassholm SPA.

Residual effect

2964. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2965. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

2966. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Grassholm SPA.

2967. Gannet depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2968. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2969. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2970. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

2971. Key fish species, upon which gannet predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2972. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2973. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Grassholm SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2974. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

2975. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Grassholm SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to impact the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2976. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Grassholm SPA.

Residual effect

2977. As per project-only assessment, above.

OECC

Project-only assessment

2978. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Grassholm SPA.

2979. gannet depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2980. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

2981. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

2982. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

2983. Key fish species, upon which gannet predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

2984. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to

potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

2985. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Grassholm SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

2986. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

2987. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Grassholm SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population size of the gannet feature of Grassholm SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2988. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Grassholm SPA.

Residual effect

2989. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

2990. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

2991. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of gannet from Grassholm SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Grassholm SPA:

- The breeding population will not fall below 30,000 pairs in three consecutive years.
- The breeding population will not drop by more than 25% of the previous year's figures in any one year.
- There will be no decline in the breeding population significantly greater than any decline in the North Atlantic population as a whole.

2992. In relation to these Conservation Objective attributes, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Grassholm SPA and thereby potentially contribute to declines in the breeding population abundance of the feature. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Grassholm SPA, through reductions to offspring provisioning rates and other parental care metrics (should parents experience collision mortality).

2993. Total bio-seasonal and total annual estimated gannet collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-81**. These values are apportioned to Grassholm SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-81**.

2994. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this feature) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this feature are considered sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-81:Total bio-seasonal and annual collision mortalities to gannet and mortalities apportioned to Grassholm SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Total impact	A	**1**	**0.326**	**0.432**	**0.136**	**0.894**
		2	0.932	1.222	0.406	2.560

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
	B	**1**	**0.274**	**0.372**	**0.116**	**0.762**
		2	0.83	1.065	0.338	2.233
Impact accounting for 70% macro-avoidance	A	**1**	**0.098**	**0.130**	**0.041**	**0.268**
		2	0.280	0.367	0.122	0.768
	B	**1**	**0.082**	**0.112**	**0.035**	**0.229**
		2	0.249	0.320	0.101	0.670
Percentage of impact apportioned to SPA (inclusive of 70% macro-avoidance)			11.19%	24.74%	13.46%	
Impact to SPA	A	**1**	**0.011**	**0.032**	**0.005**	**0.048**
		2	0.031	0.091	0.016	0.138
	B	**1**	**0.009**	**0.028**	**0.005**	**0.041**
		2	0.028	0.079	0.014	0.121

2995. **Table 4-81**, above, outlines that, when using Band Option 1 CRM, total annual predicted gannet collision mortality is calculated as 0.894 individuals in relation to Representative scenario A and 0.762 individuals in relation to Representative scenario B. When a 70% rate of macro-avoidance by this species to the presence of OWF infrastructure is applied, total annual predicted gannet collision mortality is calculated as 0.268 individuals in relation to Representative scenario A and 0.229 individuals in relation to Representative scenario B under Band Option 1. When these predicted mortalities are apportioned to Grassholm SPA for each bio-season it is estimated, for example, that 11.19% of total predicted collision mortality during the return migration bio-season (which, for gannet, is considered as the December to March period) relates to breeding adults from Grassholm SPA; this equates to 0.011 individuals, and 0.009 individuals from the SPA per return migration bio-season for Representative scenarios A and B, respectively (accounting for macro-avoidance). Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Grassholm SPA and, from this, when using Band Option 1 CRM, annual predicted gannet collision mortality to Grassholm SPA is calculated as 0.048 individuals in relation to Representative scenario A and 0.041 individuals in relation to Representative scenario B (accounting for macro-avoidance).

2996. Increases to SPA gannet mortality rates resultant from apportioned annual impacts are presented in **Table 4-82**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023), is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project for Representative scenarios A and B (accounting for macro-avoidance).

Table 4-82: Increase to annual mortality rates resulting from collision mortalities apportioned to Grassholm SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.048**	72022	8.10%	5833.782	**0.001%**
	2	0.138				0.002%
B	**1**	**0.041**				**0.001%**
	2	0.121				0.002%

2997. As additional mortality to the gannet feature of Grassholm SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not capable of altering gannet mortality rates in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet feature I of Grassholm SPA. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet feature of Grassholm SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Grassholm SPA.

Proposed mitigation

2998. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Grassholm SPA.

Residual effect

2999. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3000. The Conservation Objective and its attributes and targets for the gannet feature of Grassholm SPA are presented in **Table 4-76**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Grassholm SPA gannet feature.**

4.14 Copeland Islands SPA (Northern Ireland – UK9020291)

3001. SPA is designated in relation to the following Feature which has been screened in for consideration within the NIS: Manx shearwater.

3002. The minimum separation distance between SPA and the array site is 170.51km (with a 'by-sea' separation distance of 172.55 km).

3003. The minimum separation distance between SPA and the OECC is 153.86 km (with a 'by-sea' separation distance of 160.15 km).

3004. The minimum separation distance between SPA and the OECC intertidal landfall is 153.86 km (with a 'by-sea' separation distance of 161.68 km).

Table 4-83: Assessment of adverse effects on site integrity (project alone) -– Copeland Islands SPA (Northern Ireland -– UK9020291)

Objective:	Attributes and Targets	Predicted Effect(s)	Link to Assessment	Mitigation	Residual Effect	Conclusion
Manx shearwater [A013]						
To maintain the favourable conservation condition of the feature in the SPA	1. Breeding population – No significant decrease in population against national trends.	Direct effects on habitat [1]	**Section 4.14.1**	None	No change	No AESI
		Disturbance and displacement [1]		None	No change	No AESI
		Changes in prey availability [1]		None	No change	No AESI
		Introduction or spread of INNS [1]	See high-level assessment in **Section 4**			No AESI

4.14.1 Receptor 1: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3005. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct

effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3006. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3007. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3008. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Copeland Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3009. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the Manx shearwater feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3010. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Copeland Islands SPA.

Residual effect

3011. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3012. The Conservation Objective and its attributes and targets for the Manx shearwater feature I of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no

impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

3013. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

3014. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3015. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Copeland Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3016. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

3017. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3018. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-84**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Copeland Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-84**.

3019. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

3020. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-84: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Copeland Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.29%	0.61%	0.61%	
Impact to SPA	15% / 1%	0.001	0.010	0.007	0.018
	25% / 1%	**0.001**	**0.017**	**0.012**	**0.030**
	35% / 1%	0.002	0.024	0.017	0.043

3021. **Table 4-84**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Copeland Islands SPA for each bio-season it is estimated that, for example, 0.29% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Copeland Islands SPA; this equates to 0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Copeland Islands SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Copeland Islands SPA is calculated as 0.030 individuals per annum.

3022. Increases to Copeland Islands SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-85**. In this table,

the most recent colony count from the SPA (2007 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-85: Increase to annual mortality rates resulting from displacement mortalities apportioned to Copeland Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.018	9700	13.00%	1261	0.001%
25% / 1%	**0.030**				**0.002%**
35% / 1%	0.043				0.003%

3023. As additional mortality to the Manx shearwater feature of Copeland Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3024. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Copeland Islands SPA.

Residual effect

3025. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3026. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

3027. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3028. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends..

3029. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3030. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this feature.

3031. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3032. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3033. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Copeland Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3034. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3035. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Copeland Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx Shearwater prey species in such a way as to impact the breeding population size of the Manx shearwater feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA

Proposed mitigation

3036. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Copeland Islands SPA.

Residual effect

3037. As per project-only assessment, above.

OECC

Project-only assessment

3038. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3039. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3040. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended

sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3041. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3042. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3043. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3044. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Copeland Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3045. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3046. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Copeland Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the

favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA

Proposed mitigation

3047. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Copeland Islands SPA.

Residual effect

3048. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3049. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

3050. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3051. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3052. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect

the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3053. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Copeland Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3054. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the availability of Manx Shearwater prey species in such a way as to impact the breeding population size of the gannet feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3055. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Copeland Islands SPA.

Residual effect

3056. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3057. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

3058. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

3059. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3060. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Copeland Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3061. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

3062. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3063. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-86**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Copeland Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-86**.

3064. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-86: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Copeland Islands SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.29%	0.61%	0.61%	
Impact to SPA	30% / 1%	0.002	0.021	0.014	0.037
	50% / 1%	**0.003**	**0.034**	**0.024**	**0.061**
	70% / 1%	0.004	0.048	0.033	0.085

3065. **Table 4-86**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Copeland Islands SPA for each bio-season it is estimated that, for example, 0.29% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Copeland Islands SPA; this equates to 0.003 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Copeland Islands SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Copeland Islands SPA is calculated as 0.061 individuals per annum.

3066. Increases to Copeland Islands SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-87**. In this table, the most recent colony count from the SPA (2007 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-87: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Copeland Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.037	9700	13.00%	1261	0.003%
50% / 1%	0.061				0.005%
70% / 1%	0.085				0.007%

3067. As additional mortality to the Manx shearwater feature of Copeland Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in an impact on the breeding population size of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3068. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Copeland Islands SPA.

Residual effect

3069. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3070. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

3071. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3072. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3073. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3074. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3075. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3076. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3077. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3078. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Copeland Islands SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3079. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3080. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Copeland Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx Shearwater prey species in such a way as to impact the breeding population size of the gannet feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3081. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Copeland Islands SPA.

Residual effect

3082. As per project-only assessment, above.

OECC

Project-only assessment

3083. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Copeland Islands SPA.

3084. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species

have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Copeland Islands SPA:

- Breeding population – No significant decrease in population against national trends.

3085. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3086. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3087. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3088. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3089. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3090. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Copeland Islands SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3091. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators,

the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3092. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Copeland Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater feature of Copeland Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Copeland Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Copeland Islands SPA.

Proposed mitigation

3093. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Copeland Islands SPA.

Residual effect

3094. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3095. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Copeland Islands SPA are presented in **Table 4-83**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Copeland Islands SPA Manx shearwater feature.**

4.15 Ribble and Alt Estuaries SPA (England UK9005103)

3096. SPA is designated in relation to the following feature which have been screened in for consideration within the NIS: lesser black-backed gull.

3097. The minimum separation distance between SPA and the array site is 177.24 km (with a 'by-sea' separation distance of 178.65 km).

3098. The minimum separation distance between SPA and the OECC is 185.31 km (with a 'by-sea' separation distance of 186.37 km).

3099. The minimum separation distance between SPA and the OECC intertidal landfall is 201.57 km

Table 4-88: Assessment of adverse effects on site integrity (project alone) – Ribble and Alt Estuaries SPA (England UK9005103)

Objective	Attributes	Targets	Predicted Effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Lesser black-backed gull [A183]							
Subject to natural change, maintain or restore the lesser black-backed gull population, distribution and its supporting habitats in favourable condition.	1. Breeding population: abundance	1. Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Direct effects on habitat [1]	Section 4.15.1	None	No change	No AESI
	2. Connectivity with supporting habitats	2. Maintain safe passage of birds moving between roosting and feeding areas.	Changes in prey availability [1,5,9]		None	No change	No AESI
	3. Disturbance caused by human activity	3. Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.	Collision [1,5]		None	No change	No AESI
	4. Predation – all habitats	4. Restrict predation and disturbance caused by native and non-native predators					
	5. Productivity	5. [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.					
	6. Supporting habitat: air quality	6. Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this Feature of the site on the Air Pollution Information System.					
	7. Supporting habitat: conservation measures	7. Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.					
	8. Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season	8. Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at: 45 ha (intertidal rock); 11,678 ha (intertidal sand and muddy sand); 672 ha (intertidal mud); 78 ha (intertidal mixed sediments); 2,292 ha (coastal saltmarshes and saline reedbeds); 191 ha (freshwater and coastal grazing marsh).					

Objective	Attributes	Targets	Predicted Effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	9. Supporting habitat: food availability (bird)	9. Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.					
	10. Supporting habitat: vegetation characteristics for nesting	10. Maintain the extent and distribution of predominantly medium to tall [i.e. 20–60 cm] grassland swards.					
	11. Supporting habitat: water quality – contaminants	11. Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					
	12. Supporting habitat: water quality – dissolved oxygen	12. Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					
	13. Supporting habitat: water quality – nutrients	13. Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					
	14. Supporting habitat: water quality – turbidity	14. Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.					
			Introduction or spread of INNS [1,5,9]	See high-level assessment in Section 4			No AESI

4.15.1 Receptor 1: Lesser black-backed gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3100. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3101. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Breeding population: abundance. Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3102. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3103. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3104. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of

Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA.

Proposed mitigation

3105. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ribble and Alt Estuaries SPA.

Residual effect

3106. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3107. The Conservation Objective and its attributes and targets for the gannet SCI of Ribble and Alt Estuaries SPA are presented in **Table 4-88**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ribble and Alt Estuaries SPA lesser black-backed gull feature**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3108. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3109. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site; and
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3110. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to

suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3111. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI.

3112. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3113. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3114. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3115. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3116. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining /

restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA

Proposed mitigation

3117. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ribble and Alt Estuaries SPA.

Residual effect

3118. As per project-only assessment, above.

OECC

Project-only assessment

3119. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3120. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site; and
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3121. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3122. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3123. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3124. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3125. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3126. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3127. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA

Proposed mitigation

3128. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ribble and Alt Estuaries SPA.

Residual effect

3129. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3130. The Conservation Objective and its attributes and targets for the gannet SCI of Ribble and Alt Estuaries SPA are presented in **Table 4-88**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ribble and Alt Estuaries SPA lesser black-backed gull feature**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

3131. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3132. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Breeding population: abundance. Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3133. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their

consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3134. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3135. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA.

Proposed mitigation

3136. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ribble and Alt Estuaries SPA.

Residual effect

3137. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3138. The Conservation Objective and its attributes and targets for the gannet SCI of Ribble and Alt Estuaries SPA are presented in **Table 4-88**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ribble and Alt Estuaries SPA lesser black-backed gull feature**.

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3139. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes

in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3140. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site; and
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3141. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3142. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3143. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3144. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3145. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3146. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3147. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3148. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA.

Proposed mitigation

3149. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ribble and Alt Estuaries SPA.

Residual effect

3150. As per project-only assessment, above.

OECC

Project-only assessment

3151. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ribble and Alt Estuaries SPA.

3152. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site; and
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3153. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3154. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3155. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3156. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3157. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not

considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3158. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ribble and Alt Estuaries SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3159. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3160. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA.

Proposed mitigation

3161. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ribble and Alt Estuaries SPA.

Residual effect

3162. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3163. The Conservation Objective and its attributes and targets for the gannet SCI of Ribble and Alt Estuaries SPA are presented in **Table 4-88**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ribble and Alt Estuaries SPA lesser black-backed gull feature**.

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3164. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Ribble and Alt Estuaries SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA:

- Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.

3165. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Ribble and Alt Estuaries SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Ribble and Alt Estuaries SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

3166. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this feature would be negligible.

3167. As additional mortality to the lesser black-backed gull feature of Ribble and Alt Estuaries SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ribble and Alt Estuaries SPA. Specifically, collision mortality will not affect the breeding population abundance or productivity rate of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ribble and Alt Estuaries SPA.

Proposed mitigation

3168. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Ribble and Alt Estuaries SPA.

Residual effect

3169. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3170. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Ribble and Alt Estuaries SPA are presented in **Table 4-88**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ribble and Alt Estuaries SPA lesser black-backed gull** feature.

4.16 Helvick Head to Ballyquin SPA (IE004192)

3171. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: kittiwake.

3172. The minimum separation distance between SPA and the array site is 155.23 km (with a 'by-sea' separation distance of 179.75 km).

3173. The minimum separation distance between SPA and the OECC is 158.32 km (with a 'by-sea' separation distance of 187.90 km).

3174. The minimum separation distance between SPA and the OECC intertidal landfall is 167.74 km (with a 'by-sea' separation distance of 215.97 km).

Table 4-89: Assessment of adverse effects on site integrity (project alone) – Helvick Head to Ballquin SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 4.16.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.16.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3175. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does

not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3176. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3177. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3178. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Helvick Head to Ballyquin SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3179. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3180. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Helvick Head to Ballyquin SPA.

Residual effect

3181. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3182. The Conservation Objective and its attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA are presented in **Table 4-89**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Helvick Head to Ballyquin SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3183. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3184. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3185. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3186. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

3187. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during

dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

3188. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3189. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Helvick Head to Ballyquin SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3190. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3191. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Helvick Head to Ballyquin SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3192. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Helvick Head to Ballyquin SPA.

Residual effect

3193. As per project-only assessment, above.

OECC

Project-only assessment

3194. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3195. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3196. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3197. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

3198. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

3199. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3200. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Helvick Head to Ballyquin SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3201. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3202. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Helvick Head to Ballyquin SPA in

such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3203. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Helvick Head to Ballyquin SPA.

Residual effect

3204. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3205. The Conservation Objective and its attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA are presented in **Table 4-89**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Helvick Head to Ballyquin SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3206. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3207. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3208. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3209. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Helvick Head to Ballyquin SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3210. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3211. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Helvick Head to Ballyquin SPA.

Residual effect

3212. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3213. The Conservation Objective and its attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA are presented in **Table 4-89**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Helvick Head to Ballyquin SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

3214. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3215. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3216. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3217. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3218. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3219. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3220. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3221. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Helvick Head to Ballyquin SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3222. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3223. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Helvick Head to Ballyquin SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3224. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Helvick Head to Ballyquin SPA.

Residual effect

3225. As per project-only assessment, above.

OECC

Project-only assessment

3226. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Helvick Head to Ballyquin SPA.

3227. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3228. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3229. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3230. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3231. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3232. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3233. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Helvick Head to Ballyquin SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3234. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3235. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Helvick Head to Ballyquin SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Helvick Head to Ballyquin SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3236. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Helvick Head to Ballyquin SPA.

Residual effect

3237. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3238. The Conservation Objective and its attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA are presented in **Table 4-89**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Helvick Head to Ballyquin SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3239. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Helvick Head to Ballyquin SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Helvick Head to Ballyquin SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

3240. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Helvick Head to Ballyquin SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Helvick Head to Ballyquin SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

3241. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-90**. These values are apportioned to Helvick Head to Ballyquin SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-90**.

3242. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-90: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Helvick Head to Ballyquin SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.01%	0.01%	0.02%	
Impact to SPA	A	**1**	**0.001**	**0.000**	**0.002**	**0.003**
		2	0.001	0.001	0.004	0.006
	B	**1**	**0.001**	**0.000**	**0.002**	**0.002**
		2	0.001	0.001	0.004	0.005

3243. **Table 4-90**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and

15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Helvick Head to Ballyquin SPA for each bio-season it is estimated, for example, that 0.01% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Helvick Head to Ballyquin SPA; this equates to 0.001 and 0.001 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Helvick Head to Ballyquin SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Helvick Head to Ballyquin SPA is calculated as 0.003 individuals in relation to Representative scenario A and 0.002 individuals in relation to Representative scenario B.

3244. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-91**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-91: Increase to annual mortality rates resulting from collision mortalities apportioned to Helvick Head to Ballyquin SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	1	0.003	13	14.60%	18.980	0.014%
	2	**0.006**				**0.033%**
B	1	0.002				0.013%
	2	**0.005**				**0.029%**

3245. As additional mortality to the kittiwake SCI of Helvick Head to Ballyquin SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Helvick Head to Ballyquin SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Helvick Head to Ballyquin SPA.

Proposed mitigation

3246. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Helvick Head to Ballyquin SPA.

Residual effect

3247. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3248. The Conservation Objective and its attributes and targets for the kittiwake SCI of Helvick Head to Ballyquin SPA are presented in **Table 4-89**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Helvick Head to Ballyquin SPA kittiwake SCI.**

4.17 Morecambe Bay and Duddon Estuary SPA (England UK9005103)

3249. SPA is designated in relation to the following features, which have been screened in for consideration within the NIS: lesser black-backed gull and Mediterranean gull

3250. The minimum separation distance between SPA and the array site is 190.70 km.

3251. The minimum separation distance between SPA and the OECC is 197.67 km.

3252. The minimum separation distance between SPA and the OECC intertidal landfall is 202.67 km.

Table 4-92: Assessment of adverse effects on site integrity (project alone) – Morecambe Bay and Duddon Estuary SPA (England UK9005103)

Objective	Attributes	Targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Lesser black-backed gull [A183] (breeding)							
Subject to natural change, maintain or restore the lesser black-backed gull population, distribution and its supporting habitats in favourable condition.	1. Breeding population: abundance	1. Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Direct effects on habitat [1]	**Section 4.17.1**	None	No change	No AESI
	2. Connectivity with supporting habitats	2. Maintain safe passage of birds moving between roosting and feeding areas.	Changes in prey availability [1,5,9]		None	No change	No AESI
	3. Disturbance caused by human activity	3. Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.	Collision [1,5]		None	No change	No AESI
	4. Predation – all habitats	4. Restrict predation and disturbance caused by native and non-native predators					
	5. Productivity	5. [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.					
	6. Supporting habitat: air quality	6. Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this Feature of the site on the Air Pollution Information System.					
	7. Supporting habitat: conservation measures	7. Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.					
	8. Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season	8. Restore the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of its breeding cycle (courtship, nesting, feeding). Freshwater and coastal grazing marsh (unknown), water column (unknown), large shallow inlets and bays as well as mudflats and sandflats not covered by seawater at low tide (31,000 ha) including; Intertidal coarse sediment, Intertidal stony reef, sand and muddy sand, Intertidal seagrass beds (41 ha), Intertidal rock, Intertidal biogenic reef: mussel beds, Intertidal mud, Intertidal mixed sediments, Atlantic salt meadows (*Glauco-puccinellietalia maritimae*) and *Salicornia* and other annuals colonising mud and sand under the umbrella of Saltmarsh (3744 ha) and Coastal lagoons (195 ha).					
	9. Supporting habitat: food availability (bird)	9. Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.					
	10. Supporting habitat: vegetation characteristics for nesting	10. Maintain the extent and distribution of predominantly medium to tall [i.e. 20–60 cm] grassland swards.					
	11. Supporting habitat: water quality – contaminants	11. Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					

Objective	Attributes	Targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	12. Supporting habitat: water quality – dissolved oxygen 13. Supporting habitat: water quality – nutrients 14. Supporting habitat: water quality – turbidity	12. Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data. 13. Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data. 14. Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.					
			Introduction or spread of INNS [1,5,9]	See high-level assessment in **Section 4**			No AESI

4.17.1 Receptor 1: Lesser black-backed gull (breeding)

3253. [For assessment relating to non-breeding lesser black-backed gull designated Feature of this SPA, see **Section 4.41**– Distant SPAs designated in relation to non-breeding seabirds.]

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3254. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3255. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent features.

3256. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3257. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3258. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact

is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA.

Proposed mitigation

3259. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Morecambe Bay and Duddon Estuary SPA.

Residual effect

3260. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3261. The Conservation Objective and its attributes and targets for the gannet SCI of Morecambe Bay and Duddon Estuary SPA are presented in **Table 4-92**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Morecambe Bay and Duddon Estuary SPA lesser black-backed gull feature**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3262. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3263. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.

- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

3264. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3265. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature.

3266. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3267. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3268. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3269. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3270. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA

Proposed mitigation

3271. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Morecambe Bay and Duddon Estuary SPA.

Residual effect

3272. As per project-only assessment, above.

OECC

Project-only assessment

3273. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3274. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3275. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to

foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3276. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3277. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3278. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3279. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3280. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3281. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Morecambe Bay

and Duddon Estuary SPA. feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA

Proposed mitigation

3282. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Morecambe Bay and Duddon Estuary SPA.

Residual effect

3283. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3284. The Conservation Objective and its attributes and targets for the gannet SCI of Morecambe Bay and Duddon Estuary SPA are presented in **Table 4-92**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Morecambe Bay and Duddon Estuary SPA lesser black-backed gull feature**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

3285. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3286. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3287. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3288. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3289. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA.

Proposed mitigation

3290. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Morecambe Bay and Duddon Estuary SPA.

Residual effect

3291. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3292. The Conservation Objective and its attributes and targets for the gannet SCI of Morecambe Bay and Duddon Estuary SPA are presented in **Table 4-92**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Morecambe Bay and Duddon Estuary SPA lesser black-backed gull feature**.

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3293. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3294. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3295. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3296. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3297. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3298. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a

result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3299. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3300. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3301. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3302. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA.

Proposed mitigation

3303. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Morecambe Bay and Duddon Estuary SPA.

Residual effect

3304. As per project-only assessment, above.

OECC

Project-only assessment

3305. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA.

3306. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.
- Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

3307. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3308. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3309. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3310. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser

black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3311. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), increased SSC levels, which occur during construction phase activities are not considered to occur during the operational phase and there is no pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3312. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3313. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Morecambe Bay and Duddon Estuary SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3314. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3315. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of lesser black-backed gull prey species in such a way as to result in a significant decline in the breeding population abundance, productivity rate or food availability within the supporting habitats of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA feature. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA.

Proposed mitigation

3316. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Morecambe Bay and Duddon Estuary SPA.

Residual effect

3317. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3318. The Conservation Objective and its attributes and targets for the gannet SCI of Morecambe Bay and Duddon Estuary SPA are presented in **Table 4-92**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Morecambe Bay and Duddon Estuary SPA lesser black-backed gull feature**.

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3319. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Morecambe Bay and Duddon Estuary SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA:

- Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.

3320. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Morecambe Bay and Duddon Estuary SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Morecambe Bay and Duddon Estuary SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

3321. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this feature would be negligible.

3322. As additional mortality to the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA. Specifically, collision mortality will not affect the breeding population abundance or productivity rate of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of

these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Morecambe Bay and Duddon Estuary SPA.

Proposed mitigation

3323. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Morecambe Bay and Duddon Estuary SPA.

Residual effect

3324. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3325. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Morecambe Bay and Duddon Estuary SPA are presented in **Table 4-92**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Morecambe Bay and Duddon Estuary SPA lesser black-backed gull feature**.

4.17.2 Receptor 2: Mediterranean gull

3326. Assessment provided in **Section 4.41**– Distant SPAs designated in relation to non-breeding seabirds.

4.18 Ailsa Craig SPA (Scotland – UK9003091)

3327. SPA is designated in relation to the following features, which have been screened in for consideration within the NIS: kittiwake, lesser black-backed gull, gannet.

3328. The minimum separation distance between SPA and the array site is 235.67 km.

3329. The minimum separation distance between SPA and the OECC is 220.55 km (with a 'by-sea' separation distance of 223.37 km).

3330. The minimum separation distance between SPA and the OECC intertidal landfall is 220.55 km (with a 'by-sea' separation distance of 224.90 km).

Table 4-93: Assessment of adverse effects on site integrity (project alone) – Ailsa Craig SPA (Scotland – UK9003091)

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. To ensure for the qualifying species that the following are maintained in the long term: 1. Population of the species as a viable component of the site 2. Distribution of the species within site distribution and extent of habitats supporting the species 3. Structure, function and supporting processes of habitats supporting the species 4. No significant disturbance of the species	Kittiwake [A188]				
	Direct effects on habitat [1,3,4]	**Section 4.18.1**	None	No change	No AESI
	Changes in prey availability [1,3,4]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,4]	See high-level assessment in **Section 4**			No AESI
	Lesser black-backed gull [A183]				
	Direct effects on habitat [1,3,4]	**Section 4.18.2**	None	No change	No AESI
	Changes in prey availability [1,3,4]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,4]	See high-level assessment in **Section 4**			No AESI
	Gannet [A016]				

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Direct effects on habitat [1,3,4]	**Section 4.18.3**	None	No change	No AESI
	Disturbance and displacement [1,3,5]		None	No change	No AESI
	Changes in prey availability [1,3,4]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,4]	See high-level assessment in **Section 4**			No AESI

4.18.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3331. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3332. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3333. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3334. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3335. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3336. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3337. As per CWP project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3338. The Conservation Objective and its attributes and targets for the kittiwake feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA kittiwake feature.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3339. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3340. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site;
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3341. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3342. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this feature's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

3343. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

3344. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3345. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3346. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3347. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3348. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3349. As per project-only assessment, above.

OECC

Project-only assessment

3350. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3351. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3352. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment

concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI feature's population on a long-term basis.

3353. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

3354. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI feature's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

3355. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3356. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3357. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3358. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3359. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3360. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3361. The Conservation Objective and its attributes and targets for the kittiwake feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA kittiwake feature.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3362. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3363. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3364. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their

consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3365. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3366. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3367. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3368. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3369. The Conservation Objective and its attributes and targets for the kittiwake feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA kittiwake feature.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

3370. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes

in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3371. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3372. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI feature's population on a long-term basis.

3373. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3374. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3375. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI feature's breeding and non-breeding season range extents.

3376. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3377. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 300.6 km,

Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3378. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3379. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3380. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3381. As per project-only assessment, above.

OECC

Project-only assessment

3382. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Ailsa Craig SPA.

3383. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3384. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around

electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI feature's population on a long-term basis.

3385. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3386. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3387. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI feature's breeding and non-breeding season range extents.

3388. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3389. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3390. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3391. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3392. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3393. As per project-only assessment, above.

3394. The Conservation Objective and its attributes and targets for the kittiwake feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA kittiwake feature.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3395. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Ailsa Craig SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.

3396. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Ailsa Craig SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Ailsa Craig SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

3397. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-94**. These values are apportioned to Ailsa Craig SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-94**.

3398. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site specific flight height data for this feature) are considered most appropriate and associated values highlighted in bold. Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-94: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Ailsa Craig SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.14%	0.06%	0.11%	
Impact to SPA	A	**1**	**0.006**	**0.002**	**0.010**	**0.018**
		2	0.013	0.005	0.023	0.042
	B	**1**	**0.005**	**0.002**	**0.009**	**0.016**
		2	0.011	0.005	0.020	0.037

3399. **Table 4-94**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Ailsa Craig SPA for each bio-season it is estimated, for example, that 0.14% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Ailsa Craig SPA; this equates to 0.006 and 0.005 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Ailsa Craig SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Ailsa Craig SPA is calculated as 0.018 individuals in relation to Representative scenario A and 0.016 individuals in relation to Representative scenario B.

3400. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-95**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-95: Increase to annual mortality rates resulting from collision mortalities apportioned to Ailsa Craig SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.018**	980	14.60%	143.080	**0.013%**
	2	0.042				0.029%
B	**1**	**0.016**				**0.011%**
	2	0.037				0.026%

3401. As additional mortality to the kittiwake feature of Ailsa Craig SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Ailsa Craig SPA. Specifically, collision mortality will not affect the population dynamics of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of the Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3402. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3403. As per project-only assessment, above.

3404. The Conservation Objective and its attributes and targets for the kittiwake feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA kittiwake feature.**

4.18.2 Receptor 2: Lesser black-backed gull

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3405. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the lesser black-backed gull feature of Ailsa Craig SPA.

3406. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3407. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3408. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3409. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig

SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3410. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3411. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3412. The Conservation Objective and its attributes and targets for the gannet SCI of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA lesser black-backed gull feature**.

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3413. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ailsa Craig SPA.

3414. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the array site which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3415. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may

compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3416. As lesser black-backed gull is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature.

3417. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3418. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3419. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3420. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3421. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3422. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3423. As per project-only assessment, above.

OECC

Project-only assessment

3424. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ailsa Craig SPA.

3425. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Construction phase activities within the OECC which may affect lesser black-backed gull prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.

3426. Structure, function and supporting processes of habitats supporting the species. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3427. As lesser black-backed gull is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3428. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 236 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal

conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3429. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature 's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3430. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3431. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by lesser black-backed gull and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3432. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3433. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3434. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3435. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA lesser black-backed gull feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

3436. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Lesser black-backed gull feature of Ailsa Craig SPA.

3437. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3438. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3439. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) of lesser black-backed gull breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3440. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging

behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3441. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3442. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3443. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA lesser black-backed gull feature.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3444. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ailsa Craig SPA.

3445. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3446. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for lesser black-backed gull prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3447. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3448. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3449. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population-level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this SCI. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3450. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3451. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3452. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3453. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3454. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3455. As per project-only assessment, above.

OECC

Project-only assessment

3456. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the lesser black-backed gull feature of Ailsa Craig SPA.

3457. Lesser black-backed gull is a generalist and opportunist forager, whose diet comprises a range of fish and invertebrate species, as well as carrion and refuse. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.

3458. Structure, function and supporting processes of habitats supporting the species. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact lesser black-backed gull prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging lesser black-backed gull, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced

provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3459. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3460. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3461. As lesser black-backed gull is a generalist forager, although potential prey species are anticipated to experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project, the loss of previously available benthic habitat impacts to lesser black-backed gull prey species are not considered to have potential to result in population level consequences to lesser black-backed gull on account of the high level of dietary flexibility demonstrated by this feature. The spatial extent of such prey species habitat loss is, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3462. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), increased SSC levels, which occur during construction phase activities are not considered to occur during the operational phase and there is no pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3463. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3464. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of lesser black-backed gull breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 236 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3465. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3466. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the lesser black-backed gull feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the structure, function and supporting process of supporting habitat, in such a way as to result in a significant decline in the breeding population abundance, productivity rate or prey biomass availability of the lesser black-backed gull feature of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3467. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3468. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3469. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA lesser black-backed gull feature.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3470. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of lesser black-backed gull from Ailsa Craig SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the lesser black-backed gull feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Population of the species as a viable component of the site.

3471. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Ailsa Craig

SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this Ailsa Craig Islands SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

3472. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (only ten lesser black-backed gull was recorded in flight within the array site during baseline digital aerial surveys; see **Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that flight densities within the array site are extremely low and that resultant mortality rates to this feature would be negligible.

3473. As additional mortality to the lesser black-backed gull feature of Ailsa Craig SPA resulting from collision with operational WTGs is estimated to represent-only a negligible potential increase to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the lesser black-backed gull feature of Ailsa Craig SPA. Specifically, collision mortality will not affect the population dynamics of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of the Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3474. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3475. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3476. The Conservation Objective and its attributes and targets for the lesser black-backed gull feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA lesser black-backed gull** feature.

4.18.3 Receptor 3: Gannet

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3477. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3478. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3479. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3480. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3481. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the

gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3482. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3483. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3484. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

3485. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

3486. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3487. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Ailsa Craig SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- No significant disturbance of the species.

3488. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from

areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

3489. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3490. Total bio-seasonal and total annual estimated construction phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-96**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ailsa Craig SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-96**.

3491. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

3492. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-96: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Ailsa Craig SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Apr–Aug)	**Post-breeding migration (Sep–Nov)**	**Return migration (Dec–Mar)**	
Total impact	30% / 1%	0.315	0.166	0.315	0.795
	35% / 1%	**0.367**	**0.194**	**0.367**	**0.928**
	40% / 1%	0.420	0.222	0.420	1.061
Percentage of impact apportioned to SPA		7.48%	12.42%	10.32%	
Impact to SPA	30% / 1%	0.024	0.021	0.032	0.077
	35% / 1%	**0.027**	**0.024**	**0.038**	**0.089**
	40% / 1%	0.031	0.028	0.043	0.102

3493. **Table 4-96**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 0.928 individuals. When predicted mortalities are apportioned to Ailsa Craig SPA for each bio-season it is estimated that, for example, 7.48% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Ailsa Craig SPA; this equates to 0.027 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Ailsa Craig SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Ailsa Craig SPA is calculated as 0.089 individuals per annum.

3494. Increases to Ailsa Craig SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-97**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-97: Increase to annual mortality rates resulting from displacement mortalities apportioned to Ailsa Craig SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.077	66452	10.50%	6977.46	0.001%
35% / 1%	**0.089**				**0.001**%
40% / 1%	0.102				0.001%

3495. As additional mortality to the gannet feature of Ailsa Craig SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenario presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the gannet feature of Ailsa Craig SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant disturbance to this feature. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3496. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3497. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3498. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

3499. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3500. Gannet depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3501. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3502. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this feature's breeding season foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to sand eels are predicted to occur to a larger, although still very small, proportion of theoretical gannet

breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

3503. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

3504. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3505. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3506. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3507. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3508. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3509. As per project-only assessment, above.

OECC

Project-only assessment

3510. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3511. Gannet depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site;
- Distribution and extent of habitats supporting the species; and
- Structure, function and supporting processes of habitats supporting the species.

3512. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3513. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

3514. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 509.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

3515. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3516. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Gannet breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3517. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3518. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3519. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3520. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3521. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

3522. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct

effects assessed here relate to ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3523. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3524. In relation to this Conservation Objective attribute, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3525. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Ailsa Craig SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3526. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3527. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3528. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3529. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

3530. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

3531. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3532. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Ailsa Craig SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- No significant disturbance of the species.

3533. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

3534. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3535. Total bio-seasonal and total annual estimated operation and maintenance phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of

displacement scenarios in **Table 4-98**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Ailsa Craig SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-98**.

3536. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-98: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Ailsa Craig SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	60% / 1%	0.629	0.332	0.629	1.590
	70% / 1%	**0.734**	**0.387**	**0.734**	**1.855**
	80% / 1%	0.839	0.443	0.839	2.121
Percentage of impact apportioned to SPA		7.48%	12.42%	10.32%	
Impact to SPA	60% / 1%	0.047	0.041	0.065	0.153
	70% / 1%	**0.055**	**0.048**	**0.076**	**0.179**
	80% / 1%	0.063	0.055	0.087	0.204

3537. **Table 4-98**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 1.855 individuals. When predicted mortalities are apportioned to Ailsa Craig SPA for each bio-season it is estimated that, for example, 7.48% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Ailsa Craig SPA; this equates to 0.055 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Ailsa Craig SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Ailsa Craig SPA is calculated as 0.179 individuals per annum.

3538. Increases to Ailsa Craig SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-99**. In this table, the most recent colony count from the SPA (2015 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase

to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-99: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Ailsa Craig SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
60% / 1%	0.153	66452	10.50%	6977.46	0.002%
70% / 1%	**0.179**				**0.003%**
80% / 1%	0.204				0.003%

3539. As additional mortality to the gannet feature of Ailsa Craig SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant disturbance to this feature. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3540. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3541. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3542. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

3543. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3544. Gannet depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3545. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3546. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3547. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3548. Key fish species, upon which gannet predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3549. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to

background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3550. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3551. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3552. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3553. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3554. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3555. The Conservation Objective and its attributes and targets for the gannet SCI of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature**.

OECC

Project-only assessment

3556. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet feature of Ailsa Craig SPA.

3557. Gannet depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

3558. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3559. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3560. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3561. Key fish species, upon which gannet predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3562. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not

considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3563. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Ailsa Craig SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3564. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3565. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet feature of Ailsa Craig SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in gannet no longer being a viable component of Ailsa Craig SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet feature of Ailsa Craig SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3566. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Ailsa Craig SPA.

Residual effect

3567. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3568. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

3569. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of gannet from Ailsa Craig SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attributes and targets for the gannet feature of Ailsa Craig SPA:

- Population of the species as a viable component of the site is maintained.

3570. In relation to these Conservation Objective attributes, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Ailsa Craig SPA and thereby potentially contribute to declines in the breeding population abundance of the feature. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Ailsa Craig SPA, through reductions to offspring provisioning rates and other parental care metrics (should parents experience collision mortality).

3571. Total bio-seasonal and total annual estimated gannet collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-100**. These values are apportioned to Ailsa Craig SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-100**.

3572. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this feature) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this feature, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this feature are considered sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-100: Total bio-seasonal and annual collision mortalities to gannet and mortalities apportioned to Ailsa Craig SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Total impact	A	**1**	**0.326**	**0.432**	**0.136**	**0.894**
		2	0.932	1.222	0.406	2.560
	B	**1**	**0.274**	**0.372**	**0.116**	**0.762**
		2	0.83	1.065	0.338	2.233

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Impact accounting for 70% macro-avoidance	A	**1**	**0.098**	**0.130**	**0.041**	**0.268**
		2	0.280	0.367	0.122	0.768
	B	**1**	**0.082**	**0.112**	**0.035**	**0.229**
		2	0.249	0.320	0.101	0.670
Percentage of impact apportioned to SPA (inclusive of 70% macro-avoidance)			10.32%	7.48%	12.42%	
Impact to SPA	A	**1**	**0.010**	**0.010**	**0.005**	**0.025**
		2	0.029	0.027	0.015	0.071
	B	**1**	**0.008**	**0.008**	**0.004**	**0.021**
		2	0.026	0.024	0.013	0.062

3573. **Table 4-100**, above, outlines that, when using Band Option 1 CRM, total annual predicted gannet collision mortality is calculated as 0.894 individuals in relation to Representative scenario A and 0.762 individuals in relation to Representative scenario B. When a 70% rate of macro-avoidance by this species to the presence of OWF infrastructure is applied, total annual predicted gannet collision mortality is calculated as 0.268 individuals in relation to Representative scenario A and 0.229 individuals in relation to Representative scenario B under Band Option 1. When these predicted mortalities are apportioned to Ailsa Craig SPA for each bio-season it is estimated, for example, that 10.32% of total predicted collision mortality during the return migration bio-season (which, for gannet, is considered as the December to March period) relates to breeding adults from Ailsa Craig SPA; this equates to 0.010 individuals, and 0.008 individuals from the SPA per return migration bio-season for Representative scenarios A and B, respectively (accounting for macro-avoidance). Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Ailsa Craig SPA and, from this, when using Band Option 1 CRM, annual predicted gannet collision mortality to Ailsa Craig SPA is calculated as 0.025 individuals in relation to Representative scenario A and 0.021 individuals in relation to Representative scenario B (accounting for macro-avoidance).

3574. Increases to SPA gannet mortality rates resultant from apportioned annual impacts are presented in. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023), is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project for Representative scenarios A and B (accounting for macro-avoidance).

Table 4-101: Increase to annual mortality rates resulting from collision mortalities apportioned to Ailsa Craig SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.025**	66452	8.10%	5382.612	**0.000%**
	2	0.071				0.001%
B	**1**	**0.021**				**0.000%**
	2	0.062				0.001%

3575. As additional mortality to the gannet feature of Ailsa Craig SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not capable of altering gannet mortality rates in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet feature of Ailsa Craig SPA. Specifically, collision mortality will not affect the population dynamics of the feature in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Ailsa Craig SPA.

Proposed mitigation

3576. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to Ailsa Craig SPA.

Residual effect

3577. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3578. The Conservation Objective and its attributes and targets for the gannet feature of Ailsa Craig SPA are presented in **Table 4-93**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Ailsa Craig SPA gannet feature.**

4.19 Rathlin Island SPA (Northern Ireland – UK9020011)

3579. SPA is designated in relation to the following feature which has been screened in for consideration within the NIS: kittiwake.

3580. The minimum separation distance between SPA and the array site is 235.82 km (with a 'by-sea' separation distance of 249.51 km).

3581. The minimum separation distance between SPA and the OECC is 213.12 km (with a 'by-sea' separation distance of 237.11 km).

3582. The minimum separation distance between SPA and the OECC intertidal landfall is 213.12 km (with a 'by-sea' separation distance of 238.64 km).

Table 4-102: Assessment of adverse effects on site integrity (project alone) – Rathlin Island SPA (Northern Ireland – UK9020011)

Objective:	Attributes and Targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Kittiwake [A188]						
To maintain the favourable conservation condition of the Feature in the SPA	1. Breeding population – Maintain or enhance. 2. Productivity – Fledging success sufficient to maintain or enhance population. 3. Supporting habitats – Maintain or enhance. 4. Disturbance – Ensure no significant disturbance to qualifying feature. 5. Distribution of the species within site – Maintain in the long-term.	Direct effects on habitat [1,2,3]	**Section 4.19.1**	None	No change	No AESI
		Changes in prey availability [1,2,3]		None	No change	No AESI
		Collision [1,2]		None	No change	No AESI
		Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI

4.19.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3583. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3584. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3585. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3586. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Rathlin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3587. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3588. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Rathlin Island SPA.

Residual effect

3589. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Rathlin Island SPA.

Residual effect

3590. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3591. The Conservation Objective and its attributes and targets for the kittiwake feature of Rathlin Island SPA are presented in **Table 4-102**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rathlin Island SPA kittiwake feature.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3592. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3593. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3594. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this

may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3595. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

3596. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

3597. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3598. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Rathin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3599. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3600. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Rathin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathin Island SPA.

Proposed mitigation

3601. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Rathin Island SPA.

Residual effect

3602. As per project-only assessment, above.

OECC

Project-only assessment

3603. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3604. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3605. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3606. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

3607. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature 's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to

enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

3608. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3609. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Rathlin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3610. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3611. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Rathlin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3612. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rathlin Island SPA.

Residual effect

3613. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3614. The Conservation Objective and its attributes and targets for the kittiwake feature of Rathlin Island SPA are presented in **Table 4-102**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rathlin Island SPA kittiwake feature.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3615. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3616. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3617. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3618. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Rathlin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3619. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3620. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rathlin Island SPA.

Residual effect

3621. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3622. The Conservation Objective and its attributes and targets for the kittiwake feature of Rathlin Island SPA are presented in **Table 4-102**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rathlin Island SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

3623. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3624. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3625. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

3626. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3627. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3628. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3629. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3630. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Rathlin Island SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3631. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3632. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Rathlin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3633. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rathlin Island SPA.

Residual effect

3634. As per project-only assessment, above.

OECC

Project-only assessment

3635. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake feature of Rathlin Island SPA.

3636. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.
- Supporting habitats – Maintain or enhance.

3637. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

3638. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3639. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3640. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature 's breeding and non-breeding season range extents.

3641. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3642. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Rathlin Island SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3643. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3644. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake feature of Rathlin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of impacting the supporting habitat in such a way as to impact the breeding population size or productivity rate of the kittiwake feature of Rathlin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3645. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Rathlin Island SPA.

Residual effect

3646. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3647. The Conservation Objective and its attributes and targets for the kittiwake feature of Rathlin Island SPA are presented in **Table 4-102**, above. With regards to changes in prey availability impacts during

the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rathlin Island SPA kittiwake feature.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3648. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Rathlin Island SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake feature of Rathlin Island SPA:

- Breeding population – Maintain or enhance.
- Productivity – Fledging success sufficient to maintain or enhance population.

3649. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this feature at Rathlin Island SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this feature at Rathlin Island SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the feature to maintain its population on a long-term basis.

3650. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-103**. These values are apportioned to Rathlin Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-103**.

3651. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described **in Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this feature) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this feature, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this feature are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-103: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Rathlin Island SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	**1**	**4.183**	**4.249**	**9.85**	**18.282**
		2	9.536	9.716	22.298	41.550
	B	**1**	**3.639**	**3.699**	**8.575**	**15.913**
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			3.84%	1.30%	2.94%	
Impact to SPA	A	**1**	**0.161**	**0.055**	**0.289**	**0.506**
		2	0.367	0.127	0.655	1.148
	B	**1**	**0.140**	**0.048**	**0.252**	**0.440**
		2	0.321	0.111	0.572	1.005

3652. **Table 4-103**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Rathlin Island SPA for each bio-season it is estimated, for example, that 3.84% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Rathlin Island SPA; this equates to 0.161 and 0.14 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Rathlin Island SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Rathlin Island SPA is calculated as 0.506 individuals in relation to Representative scenario A and 0.44 individuals in relation to Representative scenario B.

3653. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-104**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-104: Increase to annual mortality rates resulting from collision mortalities apportioned to Rathlin Island SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.506**	27412	14.60%	4002.152	**0.013%**
	2	1.148				0.029%
B	**1**	**0.440**				**0.011%**
	2	1.005				0.025%

3654. As additional mortality to the kittiwake feature of Rathlin Island SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake feature of Rathlin Island SPA. Specifically, collision mortality will not affect the breeding population size or fledging rate in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rathlin Island SPA.

Proposed mitigation

3655. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rathlin Island SPA.

Residual effect

3656. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3657. The Conservation Objective and its attributes and targets for the kittiwake feature of Rathlin Island SPA are presented in **Table 4-102**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rathlin Island SPA kittiwake feature.**

4.20 Old Head of Kinsale SPA (IE004021)

3658. SPA is designated in relation to the following SCs which has been screened in for consideration within the NIS: kittiwake.

3659. The minimum separation distance between SPA and the array site is 239.97 km (with a 'by-sea' separation distance of 262.53 km).

3660. The minimum separation distance between SPA and the OECC is 242.28 km (with a 'by-sea' separation distance of 270.68 km).

3661. The minimum separation distance between SPA and the OECC intertidal landfall is 248.23 km (with a 'by-sea' separation distance of 298.75 km).

Table 4-105: Assessment of adverse effects on site integrity (project alone) – Old Head of Kinsale SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Kittiwake [A188]				
	Direct effects on habitat [1,3]	**Section 4.20.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.20.1 Receptor 1: Kittiwake

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3662. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3663. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3664. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3665. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Old Head of Kinsale SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3666. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3667. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Old Head of Kinsale SPA.

Residual effect

3668. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3669. The Conservation Objective and its attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA are presented in **Table 4-105**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Old Head of Kinsale SPA kittiwake SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3670. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3671. Kittiwake depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3672. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3673. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical kittiwake breeding season foraging areas (up to 3,500 $km^{2)}$, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

3674. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during

dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

3675. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3676. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Old Head of Kinsale SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3677. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3678. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Old Head of Kinsale SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3679. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Old Head of Kinsale SPA.

Residual effect

3680. As per project-only assessment, above.

OECC

Project-only assessment

3681. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3682. Kittiwake depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3683. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3684. Of kittiwake's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

3685. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 300.6 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

3686. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3687. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of kittiwake breeding within Old Head of Kinsale SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3688. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3689. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Old Head of Kinsale SPA in such a

way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3690. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Old Head of Kinsale SPA.

Residual effect

3691. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3692. The Conservation Objective and its attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA are presented in **Table 4-105**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Old Head of Kinsale SPA kittiwake SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

3693. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3694. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3695. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3696. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) of kittiwake breeding within Old Head of Kinsale SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3697. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3698. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Old Head of Kinsale SPA.

Residual effect

3699. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3700. The Conservation Objective and its attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA are presented in **Table 4-105**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Old Head of Kinsale SPA kittiwake SCI.**

Operation and maintenance impact 2 – Changes in prey availability

Array site

Project-only assessment

3701. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3702. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3703. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3704. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3705. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3706. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3707. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3708. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Old Head of Kinsale SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3709. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3710. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Old Head of Kinsale SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3711. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Old Head of Kinsale SPA.

Residual effect

3712. As per project-only assessment, above.

OECC

Project-only assessment

3713. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the kittiwake SCI of Old Head of Kinsale SPA.

3714. Kittiwake depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3715. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact kittiwake prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging kittiwake, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3716. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3717. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3718. Key fish species, upon which kittiwake predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3719. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3720. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of kittiwake breeding within Old Head of Kinsale SPA (mean–maximum + 1 SD = 300.6 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3721. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3722. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the kittiwake SCI of Old Head of Kinsale SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of kittiwake prey species in such a way as to result in a significant decline in the breeding population abundance of the kittiwake SCI of Old Head of Kinsale SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3723. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Old Head of Kinsale SPA.

Residual effect

3724. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3725. The Conservation Objective and its attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA are presented in **Table 4-105**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Old Head of Kinsale SPA kittiwake SCI.**

Operation and maintenance impact 3 – Collision

Array site

Project-only assessment

3726. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of kittiwake from Old Head of Kinsale SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the kittiwake SCI of Old Head of Kinsale SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

3727. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Old Head of Kinsale SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Old Head of Kinsale SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

3728. Total bio-seasonal and total annual estimated kittiwake collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-106**. These values are apportioned to Old Head of Kinsale SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-106**.

3729. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-106: Total bio-seasonal and annual collision mortalities to kittiwake and mortalities apportioned to Old Head of Kinsale SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Jan–Apr)	Migration free breeding (May–Jul)	Post-breeding migration (Aug–Dec)	
Total impact	A	1	4.183	4.249	9.85	18.282
		2	9.536	9.716	22.298	41.550
	B	1	3.639	3.699	8.575	15.913
		2	8.358	8.546	19.48	36.384
Percentage of impact apportioned to SPA			0.20%	0.04%	0.16%	
Impact to SPA Total impact	A	**1**	**0.008**	**0.002**	**0.015**	**0.026**
		2	0.019	0.004	0.035	0.058
	B	**1**	**0.007**	**0.002**	**0.013**	**0.022**
		2	0.017	0.004	0.030	0.051

3730. **Table 4-106**, above, outlines that, when using Band Option 1 CRM, total annual predicted kittiwake collision mortality is calculated as 18.282 individuals in relation to Representative scenario A and 15.913 individuals in relation to Representative scenario B. When these predicted mortalities are

apportioned to Old Head of Kinsale SPA for each bio-season it is estimated, for example, that 0.20% of total predicted collision mortality during the return migration bio-season (which, for kittiwake, is considered as the January to April period) relates to breeding adults from Old Head of Kinsale SPA; this equates to 0.008 and 0.007 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Old Head of Kinsale SPA and, from this, when using Band Option 1 CRM, annual predicted kittiwake collision mortality to Old Head of Kinsale SPA is calculated as 0.026 individuals in relation to Representative scenario A and 0.022 individuals in relation to Representative scenario B.

3731. Increases to SPA kittiwake mortality rates resultant from apportioned annual impacts are presented in **Table 4-107**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus kittiwake adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project.

Table 4-107: Increase to annual mortality rates resulting from collision mortalities apportioned to Old Head of Kinsale SPA

Design option	CRM Band Option	Annual impact to SPA (breeding adults)	SPA population (breeding adults)	Adult annual mortality rate (Horswill and Robinson, 2015)	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.026**	1422	14.60%	207.612	**0.012%**
	2	0.058				0.028%
B	**1**	**0.022**				**0.011%**
	2	0.051				0.024%

3732. As additional mortality to the kittiwake SCI of Old Head of Kinsale SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the kittiwake SCI of Old Head of Kinsale SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Old Head of Kinsale SPA.

Proposed mitigation

3733. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Old Head of Kinsale SPA.

Residual effect

3734. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3735. The Conservation Objective and its attributes and targets for the kittiwake SCI of Old Head of Kinsale SPA are presented in **Table 4-105**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Old Head of Kinsale SPA kittiwake SCI.**

4.21 Isles of Scilly SPA (England – UK9020288)

3736. SPA is designated in relation to the following feature which have been screened in for consideration within the NIS: European storm petrel.

3737. The minimum separation distance between SPA and the array site is 336.87 km.

3738. The minimum separation distance between SPA and the OECC is 345.36 km.

3739. The minimum separation distance between SPA and the OECC intertidal landfall is 371.72 km (with a 'by-sea' separation distance of 375.20 km).

Table 4-108: Assessment of adverse effects on site integrity (project alone) -– Isles of Scilly SPA (England -– UK9020288)

Objective	Attributes	Targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
European storm petrel [A014]							
Subject to natural change, maintain or restore the European storm petrel population, distribution and its supporting habitats in favourable condition.	1. Breeding population: abundance	1. Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Direct effects on habitat [1]	**Section 4.21.1**	None	No change	No AESI
	2. Connectivity with supporting habitats	2. Maintain safe passage of birds moving between roosting and feeding areas.	Changes in prey availability [1,5,9]		None	No change	No AESI
	3. Disturbance caused by human activity	3. Restrict the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.					
	4. Predation – all habitats	4. Restrict predation and disturbance caused by native and non-native predators					
	5. Productivity	5. [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.					
	6. Supporting habitat: air quality	6. Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this Feature of the site on the Air Pollution Information System.					
	7. Supporting habitat: conservation measures	7. Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.					
	8. Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season	8. Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).					
	9. Supporting habitat: food availability (bird)	9. Maintain the distribution, abundance and availability of key food and prey items (e.g. herring, sprat, gobies, jellyfish, ichthyoplankton, microzooplankton) at preferred sizes					
	10. Supporting habitat: water quality – contaminants	10. Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					
	11. Supporting habitat: water quality – dissolved oxygen	11. Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					

Objective	Attributes	Targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	12. Supporting habitat: water quality – nutrients	12. Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.					
	13. Supporting habitat: water quality – turbidity	13. Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.					
	14. Predation – burrow-nesting seabirds	14. Eradicate the occurrence of introduced predators, e.g. rats					
			Introduction or spread of INNS [1,5,9]]	See high-level assessment in Section 4			No AESI

4.21.1 Receptor 1: European storm petrel

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

3740. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the European storm petrel feature of Isles of Scilly SPA.

3741. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3742. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3743. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum = 336 km, Woodward et al., 2019) of European storm petrel breeding within Isles of Scilly SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3744. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the availability or quality of supporting habitats of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA.

Proposed mitigation

3745. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Isles of Scilly SPA.

Residual effect

3746. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3747. The Conservation Objective and its attributes and targets for the European storm petrel feature of Isles of Scilly SPA are presented in **Table 4-108**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Isles of Scilly SPA European storm petrel feature.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3748. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Isles of Scilly SPA.

3749. European storm petrel forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect European storm petrel prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.
- Maintain the distribution, abundance and availability of key food and prey items (e.g. herring, sprat, gobies, jellyfish, ichthyoplankton, microzooplankton) at preferred sizes.

3750. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of

the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3751. As European storm petrel is a generalist forager, although fish species (including sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the feature's diet. Underwater noise impacts to sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to European storm petrel on account of the high level of dietary flexibility demonstrated by this feature.

3752. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3753. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3754. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of European storm petrel breeding within Isles of Scilly SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3755. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by European storm petrel and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3756. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Isles of Scilly SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA

Proposed mitigation

3757. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Isles of Scilly SPA.

Residual effect

3758. As per project-only assessment, above.

OECC

Project-only assessment

3759. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Isles of Scilly SPA.

3760. European storm petrel forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect European storm petrel prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent;
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site; and
- Maintain the distribution, abundance and availability of key food and prey items (e.g. herring, sprat, gobies, jellyfish, ichthyoplankton, microzooplankton) at preferred sizes.

3761. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3762. As European storm petrel is a generalist forager, and underwater noise impacts to prey fish species (including sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3763. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range.

= 336 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

3764. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3765. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of European storm petrel breeding within Isles of Scilly SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3766. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by European storm petrel and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3767. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the European storm petrel feature of Isles of Scilly SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of European storm petrel prey species in such a way as to result in a significant decline in the breeding population abundance of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA

Proposed mitigation

3768. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Isles of Scilly SPA.

Residual effect

3769. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3770. The Conservation Objective and its attributes and targets for the European storm petrel SCI of Isles of Scilly SPA are presented **Table 4-108**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Isles of Scilly SPA European storm petrel SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

3771. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird features to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the European storm petrel feature of Isles of Scilly SPA.

3772. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

3773. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

3774. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum 336 km, Woodward et al., 2019) of European storm petrel breeding within Isles of Scilly SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3775. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the

breeding population size, nor the distribution of the population, of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA.

Proposed mitigation

3776. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Isles of Scilly SPA.

Residual effect

3777. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3778. The Conservation Objective and its attributes and targets for the European storm petrel feature of Isles of Scilly SPA are presented in **Table 4-108**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Isles of Scilly SPA European storm petrel feature.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3779. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel feature of Isles of Scilly SPA.

3780. European storm petrel forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of European storm petrel have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Maintain the size of the breeding population at a level which is above 1,458 (Apparently Occupied Sites, equivalent to pairs), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
- [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.
- Maintain the distribution, abundance and availability of key food and prey items (e.g. herring, sprat, gobies, jellyfish, ichthyoplankton, microzooplankton) at preferred sizes.

3781. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

3782. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3783. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3784. Key fish species, upon which European storm petrel predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature 's breeding and non-breeding season range extents.

3785. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3786. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of European storm petrel breeding within Isles of Scilly SPA (mean–maximum 336 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3787. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3788. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Isles of

Scilly SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to impact the breeding population size, nor the distribution of the population, of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA.

Proposed mitigation

3789. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Isles of Scilly SPA.

Residual effect

3790. As per project-only assessment, above.

OECC

Project-only assessment

3791. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the European storm petrel of Isles of Scilly SPA.

3792. European storm petrel forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the European storm petrel feature of Isles of Scilly SPA:

- Population dynamics data on the feature indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's populations on a long-term basis.

3793. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact European storm petrel prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging European storm petrel, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

3794. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

3795. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

3796. Key fish species, upon which European storm petrel predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

3797. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

3798. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of European storm petrel breeding within Isles of Scilly SPA (mean–maximum 336 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3799. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3800. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the European storm petrel feature of Isles of Scilly SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of European storm petrel prey species in such a way as to result in a significant decline in the breeding population abundance of the European storm petrel feature of Isles of Scilly SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the European storm petrel feature of Isles of Scilly SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Isles of Scilly SPA.

Proposed mitigation

3801. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Isles of Scilly SPA.

Residual effect

3802. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3803. The Conservation Objective and its attributes and targets for the European storm petrel feature of Isles of Scilly SPA are presented **Table 4-108**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Isles of Scilly SPA European feature.**

4.22 Horn Head to Fanad Head SPA (IE004194)

3804. SPA is designated in relation to the following SCI which have been screened in for consideration within the NIS: fulmar.

3805. The minimum separation distance between SPA and the array site is 253.21 km (with a 'by-sea' separation distance of 347.24 km).

3806. The minimum separation distance between SPA and the OECC is 223.47 km (with a 'by-sea' separation distance of 334.85 km).

3807. The minimum separation distance between SPA and the OECC intertidal landfall is 223.47 km (with a 'by-sea' separation distance of 336.38 km).

Table 4-109: Assessment of adverse effects on site integrity (project alone) – Horn Head to Fanad Head SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCIs populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.22.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.22.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

3808. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3809. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3810. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3811. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Horn Head to Fanad Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3812. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA.

Proposed mitigation

3813. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Horn Head to Fanad Head SPA.

Residual effect

3814. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3815. The Conservation Objective and its attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA are presented in **Table 4-109**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Horn Head to Fanad Head SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3816. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3817. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3818. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3819. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

3820. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels

over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3821. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3822. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Horn Head to Fanad Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3823. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3824. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Horn Head to Fanad Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA

Proposed mitigation

3825. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Horn Head to Fanad Head SPA.

Residual effect

3826. As per project-only assessment, above.

OECC

Project-only assessment

3827. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3828. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3829. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3830. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile-driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3831. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3832. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3833. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Horn Head to Fanad Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3834. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3835. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Horn Head to Fanad Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA

Proposed mitigation

3836. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Horn Head to Fanad Head SPA.

Residual effect

3837. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3838. The Conservation Objective and its attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA are presented in **Table 4-109**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Horn Head to Fanad Head SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

3839. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3840. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3841. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3842. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Horn Head to Fanad Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3843. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA.

Proposed mitigation

3844. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Horn Head to Fanad Head SPA.

Residual effect

3845. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3846. The Conservation Objective and its attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA are presented in **Table 4-109**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Horn Head to Fanad Head SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3847. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3848. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3849. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3850. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3851. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this

impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3852. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3853. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3854. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Horn Head to Fanad Head SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3855. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3856. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Horn Head to Fanad Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA.

Proposed mitigation

3857. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Horn Head to Fanad Head SPA.

Residual effect

3858. As per project-only assessment.

OECC

Project-only assessment

3859. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Horn Head to Fanad Head SPA.

3860. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3861. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3862. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3863. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3864. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3865. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to

background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3866. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Horn Head to Fanad Head SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3867. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3868. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Horn Head to Fanad Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Horn Head to Fanad Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Horn Head to Fanad Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Horn Head to Fanad Head SPA.

Proposed mitigation

3869. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Horn Head to Fanad Head SPA.

Residual effect

3870. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3871. The Conservation Objective and its attributes and targets for the fulmar SCI of Horn Head to Fanad Head SPA are presented in **Table 4-109**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Horn Head to Fanad Head SPA fulmar SCI.**

4.23 Beara Peninsula SPA (IE004155)

3872. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: Fulmar

3873. The minimum separation distance between SPA and the array site is 311.42 km (with a 'by-sea' separation distance of 372.29 km).

3874. The minimum separation distance between SPA and the OECC is 310.17 km (with a 'by-sea' separation distance of 380.44 km).

3875. The minimum separation distance between SPA and the OECC intertidal landfall is 310.17 km (with a 'by-sea' separation distance of 408.51 km).

Table 4-110: Assessment of adverse effects on site integrity (project alone) – Beara Peninsula SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 2. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.23.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.23.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

3876. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3877. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3878. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3879. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Beara Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3880. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Beara Peninsula SPA.

Proposed mitigation

3881. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Beara Peninsula SPA.

Residual effect

3882. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3883. The Conservation Objective and its attributes and targets for the fulmar SCI of Beara Peninsula SPA are presented in **Table 4-110**, above. With regards to direct effects on habitat impacts during the

construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Beara Peninsula SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3884. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3885. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3886. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3887. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

3888. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than

underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3889. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3890. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Beara Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3891. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3892. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Beara Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Beara Peninsula SPA

Proposed mitigation

3893. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Beara Peninsula SPA.

Residual effect

3894. As per project-only assessment, above.

OECC

Project-only assessment

3895. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3896. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential

to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3897. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3898. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3899. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3900. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3901. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Beara Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3902. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey

availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3903. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Beara Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Beara Peninsula SPA

Proposed mitigation

3904. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Beara Peninsula SPA.

Residual effect

3905. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3906. The Conservation Objective and its attributes and targets for the fulmar SCI of Beara Peninsula SPA are presented in **Table 4-110**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Beara Peninsula SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

3907. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3908. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3909. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3910. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Beara Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3911. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Baera Peninsula SPA.

Proposed mitigation

3912. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Baera Peninsula SPA.

Residual effect

3913. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3914. The Conservation Objective and its attributes and targets for the fulmar SCI of Beara Peninsula SPA are presented in **Table 4-110**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Beara Peninsula SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3915. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3916. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3917. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3918. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3919. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3920. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3921. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3922. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Beara Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3923. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3924. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Beara Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Beara Peninsula SPA.

Proposed mitigation

3925. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Beara Peninsula SPA.

Residual effect

3926. As per project-only assessment, above.

OECC

Project-only assessment

3927. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Beara Peninsula SPA.

3928. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Beara Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3929. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3930. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3931. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3932. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3933. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3934. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Beara Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3935. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

3936. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Beara Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Beara Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Beara Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Beara Peninsula SPA.

Proposed mitigation

3937. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Beara Peninsula SPA.

Residual effect

3938. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3939. The Conservation Objective and its attributes and targets for the fulmar SCI of Beara Peninsula SPA are presented in **Table 4-110**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Beara Peninsula SPA fulmar SCI**.

4.24 Tory Island SPA (IE004073)

3940. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: fulmar

3941. The minimum separation distance between SPA and the array site is 280.39 km (with a 'by-sea' separation distance of 379.96 km).

3942. The minimum separation distance between SPA and the OECC is 249.27 km (with a 'by-sea' separation distance of 367.57 km).

3943. The minimum separation distance between SPA and the OECC intertidal landfall is 249.27 km (with a 'by-sea' separation distance of 369.10 km).

Table 4-111: Assessment of adverse effects on site integrity (project alone) – Tory Island SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Direct effects on habitat [1,3]	**Section 4.24.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.24.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

3944. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3945. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3946. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3947. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Tory Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3948. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA.

Proposed mitigation

3949. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Tory Island SPA.

Residual effect

3950. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3951. The Conservation Objective and its attributes and targets for the fulmar SCI of Tory Island SPA are presented in **Table 4-111**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Tory Island SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3952. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3953. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3954. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3955. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

3956. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels

over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3957. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3958. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Tory Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3959. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

3960. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Tory Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA

Proposed mitigation

3961. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Tory Island SPA.

Residual effect

As per project-only assessment, above.

OECC

Project-only assessment

3962. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3963. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3964. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3965. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

3966. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

3967. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

3968. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Tory Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3969. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of

limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

3970. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Tory Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA

Proposed mitigation

3971. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Tory Island SPA.

Residual effect

3972. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3973. The Conservation Objective and its attributes and targets for the fulmar SCI of Tory Island SPA are presented in **Table 4-111**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Tory Island SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

3974. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3975. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3976. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

3977. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Tory Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3978. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA.

Proposed mitigation

3979. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Tory Island SPA.

Residual effect

3980. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

3981. The Conservation Objective and its attributes and targets for the fulmar SCI of Tory Island SPA are presented in **Table 4-111**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Tory Island SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

3982. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3983. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3984. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3985. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3986. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3987. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

3988. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

3989. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Tory Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

3990. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

3991. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Tory Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA.

Proposed mitigation

3992. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Tory Island SPA.

Residual effect

3993. As per project-only assessment, above.

OECC

Project-only assessment

3994. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Tory Island SPA.

3995. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Tory Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

3996. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

3997. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

3998. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

3999. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4000. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4001. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Tory Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4002. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4003. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Tory Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Tory Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Tory Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Tory Island SPA.

Proposed mitigation

4004. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Tory Island SPA.

Residual effect

4005. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4006. The Conservation Objective and its attributes and targets for the fulmar SCI of Tory Island SPA are presented in **Table 4-111**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Tory Island SPA fulmar SCI**.

4.25 The Bull and the Cow Rocks SPA (IE004066)

4007. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: gannet.

4008. The minimum separation distance between SPA and the array site is 337.77 km (with a 'by-sea' separation distance of 385.59 km).

4009. The minimum separation distance between SPA and the OECC is 334.57 km (with a 'by-sea' separation distance of 393.74 km).

4010. The minimum separation distance between SPA and the OECC intertidal landfall is 334.57 km (with a 'by-sea' separation distance of 421.82 km).

Table 4-112: Assessment of adverse effects on site integrity (project alone) – The Bull and the Cow Rocks SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Gannet [A016]				
	Direct effects on habitat [1,3]	**Section 4.25.1**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.25.1 Receptor 1: Gannet

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

4011. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4012. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4013. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4014. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within The Bull and the Cow Rocks SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4015. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4016. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to The Bull and the Cow Rocks SPA.

Residual effect

4017. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4018. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for The Bull and the Cow Rocks SPA gannet SCI**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4019. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

4020. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4021. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within The Bull and the Cow Rocks SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4022. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4023. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4024. Total bio-seasonal and total annual estimated construction phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-113**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to The Bull and the Cow Rocks SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-113**.

4025. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4026. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-113: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to The Bull and the Cow Rocks SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	30% / 1%	0.315	0.166	0.315	0.795
	35% / 1%	**0.367**	**0.194**	**0.367**	**0.928**
	40% / 1%	0.420	0.222	0.420	1.061
Percentage of impact apportioned to SPA		0.42%	2.39%	1.98%	
Impact to SPA	30% / 1%	0.001	0.004	0.006	0.012
	35% / 1%	**0.002**	**0.005**	**0.007**	**0.013**
	40% / 1%	0.002	0.005	0.008	0.015

4027. **Table 4-113**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 0.928 individuals. When predicted mortalities are apportioned to The Bull and the Cow Rocks SPA for each bio-season it is estimated that, for example, 0.42% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from The Bull and the Cow Rocks SPA; this equates to 0.002 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to The Bull and the Cow Rocks SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to The Bull and the Cow Rocks SPA is calculated as 0.013 individuals per annum.

4028. Increases to The Bull and the Cow Rocks SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-114**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-114: Increase to annual mortality rates resulting from displacement mortalities apportioned to The Bull and the Cow Rocks SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.012	12776	10.50%	1341.48	0.001%
35% / 1%	**0.013**				**0.001%**
40% / 1%	0.015				0.001%

4029. As additional mortality to the gannet SCI of The Bull and the Cow Rocks SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenario presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4030. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Bull and the Cow Rocks SPA.

Residual effect

4031. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4032. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4033. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4034. Gannet depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4035. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4036. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical gannet breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

4037. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

4038. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4039. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within The Bull and the Cow Rocks SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4040. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4041. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of The Bull and the Cow Rocks SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4042. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to The Bull and the Cow Rocks SPA.

Residual effect

4043. As per project-only assessment, above.

OECC

Project-only assessment

4044. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4045. Gannet depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4046. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact Gannet prey species through underwater noise effects, increases to suspended sediment

concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4047. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

4048. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 509.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

4049. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

4050. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within The Bull and the Cow Rocks SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4051. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4052. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of The Bull and the Cow Rocks SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4053. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to The Bull and the Cow Rocks SPA.

Residual effect

4054. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4055. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

4056. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4057. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4058. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their

consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4059. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within The Bull and the Cow Rocks SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4060. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4061. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Bull and the Cow Rocks SPA.

Residual effect

4062. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4063. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4064. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural

sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

4065. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4066. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within The Bull and the Cow Rocks SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4067. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4068. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4069. Total bio-seasonal and total annual estimated operation and maintenance phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-115**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to The Bull and the Cow Rocks SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-115**.

4070. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-115: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to The Bull and the Cow Rocks SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	60% / 1%	0.629	0.332	0.629	1.590
	70% / 1%	**0.734**	**0.387**	**0.734**	**1.855**
	80% / 1%	0.839	0.443	0.839	2.121
Percentage of impact apportioned to SPA		0.42%	2.39%	1.98%	
Impact to SPA	60% / 1%	0.003	0.008	0.012	0.023
	70% / 1%	**0.003**	**0.009**	**0.015**	**0.027**
	80% / 1%	0.004	0.011	0.017	0.031

4071. **Table 4-115**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 1.855 individuals. When predicted mortalities are apportioned to The Bull and the Cow Rocks SPA for each bio-season it is estimated that, for example, 0.42% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from The Bull and the Cow Rocks SPA; this equates to 0.003 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to The Bull and the Cow Rocks SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to The Bull and the Cow Rocks SPA is calculated as 0.027 individuals per annum.

4072. Increases to The Bull and the Cow Rocks SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-116**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-116: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to The Bull and the Cow Rocks SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
60% / 1%	0.023054	12776	10.50%	1341.48	0.002%
70% / 1%	**0.026892**				**0.002%**
80% / 1%	0.030755				0.002%

4073. As additional mortality to the gannet SCI of The Bull and the Cow Rocks SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4074. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Bull and the Cow Rocks SPA.

Residual effect

4075. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4076. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4077. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4078. Gannet depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4079. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4080. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4081. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4082. Key fish species, upon which gannet predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4083. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4084. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within The Bull and the Cow Rocks SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4085. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4086. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of The Bull and the Cow Rocks SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4087. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Bull and the Cow Rocks SPA.

Residual effect

4088. As per project-only assessment, above.

OECC

Project-only assessment

4089. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of The Bull and the Cow Rocks SPA.

4090. Gannet depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4091. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4092. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4093. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4094. Key fish species, upon which gannet predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4095. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4096. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within The Bull and the Cow Rocks SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4097. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4098. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of The Bull and the Cow Rocks SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of The Bull and the Cow Rocks SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of The Bull and the Cow Rocks SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4099. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Bull and the Cow Rocks SPA.

Residual effect

4100. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4101. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

4102. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of gannet from The Bull and the Cow Rocks SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

4103. In relation to these Conservation Objective attributes, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at The Bull and the Cow Rocks SPA and thereby potentially contribute to declines in the breeding population abundance of the SCI. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at The Bull and the Cow Rocks SPA, through reductions to offspring provisioning rates and other parental care metrics (should parents experience collision mortality).

4104. Total bio-seasonal and total annual estimated gannet collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-117**. These values are apportioned to The Bull and the Cow Rocks SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-117**.

4105. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are considered sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-117: Total bio-seasonal and annual collision mortalities to gannet and mortalities apportioned to The Bull and the Cow Rocks SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Total impact	A	**1**	**0.326**	**0.432**	**0.136**	**0.894**
		2	0.932	1.222	0.406	2.560
	B	**1**	**0.274**	**0.372**	**0.116**	**0.762**
		2	0.83	1.065	0.338	2.233
Impact accounting for 70% macro-avoidance	A	**1**	**0.098**	**0.130**	**0.041**	**0.268**
		2	0.280	0.367	0.122	0.768
	B	**1**	**0.082**	**0.112**	**0.035**	**0.229**
		2	0.249	0.320	0.101	0.670
Percentage of impact apportioned to SPA (inclusive of 70% macro-avoidance)			1.99%	0.42%	2.39%	
Impact to SPA	A	**1**	**0.002**	**0.001**	**0.001**	**0.003**
		2	0.006	0.002	0.003	0.010

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
	B	**1**	**0.002**	**0.000**	**0.001**	**0.003**
		2	0.005	0.001	0.002	0.009

4106. **Table 4-117**, above, outlines that, when using Band Option 1 CRM, total annual predicted gannet collision mortality is calculated as 0.894 individuals in relation to Representative scenario A and 0.762 individuals in relation to Representative scenario B. When a 70% rate of macro-avoidance by this species to the presence of OWF infrastructure is applied, total annual predicted gannet collision mortality is calculated as 0.268 individuals in relation to Representative scenario A and 0.229 individuals in relation to Representative scenario B under Band Option 1. When these predicted mortalities are apportioned to The Bull and the Cow Rocks SPA for each bio-season it is estimated, for example, that 1.99% of total predicted collision mortality during the return migration bio-season (which, for gannet, is considered as the December to March period) relates to breeding adults from The Bull and the Cow Rocks SPA; this equates to 0.002 individuals from the SPA per return migration bio-season for both Representative scenarios A and B (accounting for macro-avoidance). Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to The Bull and the Cow Rocks SPA and, from this, when using Band Option 1 CRM, annual predicted gannet collision mortality to The Bull and the Cow Rocks SPA is calculated as 0.003 individuals in relation to Representative scenario A and 0.003 individuals in relation to Representative scenario B (accounting for macro-avoidance).

4107. Increases to SPA gannet mortality rates resultant from apportioned annual impacts are presented in **Table 4-118**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project for Representative scenarios A and B (accounting for macro-avoidance).

Table 4-118: Increase to annual mortality rates resulting from collision mortalities apportioned to The Bull and the Cow Rocks SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.003**	12766	8.10%	1034.046	**0.000%**
	2	0.010				0.001%
B	**1**	**0.003**				**0.000%**
	2	0.009				0.001%

4108. As additional mortality to the gannet SCI of The Bull and the Cow Rocks SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not capable of altering gannet mortality rates in such a way as to result in a significant decline in the breeding population abundance or productivity rate of the gannet SCI of The Bull and the Cow Rocks SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to The Bull and the Cow Rocks SPA.

Proposed mitigation

4109. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to The Bull and the Cow Rocks SPA.

Residual effect

4110. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4111. The Conservation Objective and its attributes and targets for the gannet SCI of The Bull and the Cow Rocks SPA are presented in **Table 4-112**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Bull and the Cow Rocks SPA gannet SCI.**

4.26 West Donegal Coast SPA (IE004150)

4112. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: fulmar

4113. The minimum separation distance between SPA and the array site is 243.06 km (with a 'by-sea' separation distance of 396.77 km).

4114. The minimum separation distance between SPA and the OECC is 210.47 km (with a 'by-sea' separation distance of 384.38 km).

4115. The minimum separation distance between SPA and the OECC intertidal landfall is 210.47 km (with a 'by-sea' separation distance of 385.90 km).

Table 4-119: Assessment of adverse effects on site integrity (project alone) – West Donegal Coast SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.26.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.26.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4116. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4117. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4118. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4119. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within West Donegal Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4120. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4121. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to West Donegal Coast SPA.

Residual effect

4122. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4123. The Conservation Objective and its attributes and targets for the fulmar SCI of West Donegal Coast SPA are presented in **Table 4-119**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the West Donegal Coast SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4124. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4125. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4126. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4127. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4128. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels

over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4129. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4130. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within West Donegal Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4131. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4132. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of West Donegal Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4133. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to West Donegal Coast SPA.

Residual effect

4134. As per project-only assessment, above.

OECC

Project-only assessment

4135. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4136. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4137. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4138. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4139. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4140. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

4141. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within West Donegal Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4142. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4143. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of West Donegal Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4144. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to West Donegal Coast SPA.

Residual effect

4145. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4146. The Conservation Objective and its attributes and targets for the fulmar SCI of West Donegal Coast SPA are presented in **Table 4-119**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the West Donegal Coast SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

4147. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4148. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4149. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4150. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within West Donegal Coast SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4151. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4152. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the West Donegal Coast SPA.

Residual effect

4153. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4154. The Conservation Objective and its attributes and targets for the fulmar SCI of West Donegal Coast SPA are presented in **Table 4-119**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the West Donegal Coast SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4155. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4156. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4157. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4158. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4159. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4160. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4161. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4162. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within West Donegal Coast SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4163. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4164. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of West Donegal Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4165. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the West Donegal Coast SPA.

Residual effect

4166. As per project-only assessment, above.

OECC

Project-only assessment

4167. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of West Donegal Coast SPA.

4168. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of West Donegal Coast SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4169. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4170. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4171. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4172. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4173. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to

potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4174. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within West Donegal Coast SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4175. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4176. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of West Donegal Coast SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of West Donegal Coast SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of West Donegal Coast SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to West Donegal Coast SPA.

Proposed mitigation

4177. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the West Donegal Coast SPA.

Residual effect

4178. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4179. The Conservation Objective and its attributes and targets for the fulmar SCI of West Donegal Coast SPA are presented in **Table 4-119**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the West Donegal Coast SPA fulmar SCI**.

4.27 Deenish Islands and Scariff Island SPA (IE004175)

4180. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: Fulmar and Manx shearwater

4181. The minimum separation distance between SPA and the array site is 328.71 km (with a 'by-sea' separation distance of 398.72 km).

4182. The minimum separation distance between SPA and the OECC is 323.98 km (with a 'by-sea' separation distance of 406.87 km).

4183. The minimum separation distance between SPA and the OECC intertidal landfall is 323.98 km (with a 'by-sea' separation distance of 434.94 km).

Table 4-120: Assessment of adverse effects on site integrity (project alone) – Deenish Islands and Scariff Island SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.27.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Manx shearwater [A013]				
	Direct effects on habitat [1,3]	**Section 4.27.2**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,2,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.27.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4184. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4185. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4186. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4187. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4188. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4189. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4190. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4191. The Conservation Objective and its attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4192. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4193. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4194. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4195. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4196. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4197. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4198. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4199. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4200. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4201. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4202. As per project-only assessment, above.

OECC

Project-only assessment

4203. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4204. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4205. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4206. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4207. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter

durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4208. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

4209. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4210. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4211. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4212. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4213. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4214. The Conservation Objective and its attributes and targets for the fulmar SCI of Deenish Island s and Scariff Island SPA are presented in **Table 4-120**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is no **project-only AESI for the Deenish Islands and Scariff Island fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

4215. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4216. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4217. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4218. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4219. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4220. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4221. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4222. The Conservation Objective and its attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120** above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4223. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4224. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4225. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of

the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4226. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4227. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4228. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4229. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4230. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Deenish Islands and Scariff Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4231. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4232. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4233. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4234. As per project-only assessment, above.

OECC

Project-only assessment

4235. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Deenish Islands and Scariff Island SPA.

4236. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4237. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4238. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4239. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this

impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4240. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4241. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4242. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Deenish Islands and Scariff Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4243. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4244. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4245. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4246. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4247. The Conservation Objective and its attributes and targets for the fulmar SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA fulmar SCI**.

4.27.2 Receptor 2: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4248. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4249. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4250. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4251. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4252. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging

behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4253. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4254. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4255. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4256. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4257. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4258. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Deenish Islands and Scariff Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following

Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4259. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4260. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4261. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-121**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Deenish Islands and Scariff Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-121**.

4262. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4263. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-121: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Deenish Islands and Scariff Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post-breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
	15% / 1%	0.270	1.688	1.171	3.128

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	**25% / 1%**	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.02%	0.29%	0.29%	
Impact to SPA	15% / 1%	0.000	0.005	0.003	0.008
	25% / 1%	**0.000**	**0.008**	**0.006**	**0.014**
	35% / 1%	0.000	0.011	0.008	0.020

4264. **Table 4-121**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Deenish Islands and Scariff Island SPA for each bio-season it is estimated that, for example, 0.02% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Deenish Islands and Scariff Island SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Deenish Islands and Scariff Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Deenish Islands and Scariff Island SPA is calculated as 0.014 individuals per annum.

4265. Increases to Deenish Islands and Scariff Island SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-122**. In this table, the most recent colony count from the SPA (2000 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-122: Increase to annual mortality rates resulting from displacement mortalities apportioned to Deenish Islands and Scariff Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.008	4622	13.00%	600.86	0.001%
25% / 1%	**0.014**				**0.002%**
35% / 1%	0.020				0.003%

4266. As additional mortality to the Manx shearwater SCI of Deenish Islands and Scariff Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4267. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4268. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4269. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4270. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4271. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4272. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4273. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this SCI.

4274. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4275. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4276. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4277. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4278. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Deenish Islands and Scariff

Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA

Proposed mitigation

4279. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4280. As per project-only assessment, above.

OECC

Project-only assessment

4281. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4282. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4283. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4284. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4285. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4286. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

4287. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4288. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4289. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA

Proposed mitigation

4290. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Deenish Islands and Scariff Island SPA.

Residual effect

4291. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4292. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI**.

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

4293. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4294. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4295. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4296. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Deenish Islands and Scariff Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4297. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4298. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4299. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4300. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120** above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4301. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however

considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4302. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4303. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Deenish Islands and Scariff Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4304. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, given the presence of WTGs within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4305. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4306. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-123**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Deenish Islands and Scariff Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-123**.

4307. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-123: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Deenish Islands and Scariff Island SPA for a range of operation and

maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.02%	0.29%	0.29%	
Impact to SPA	30% / 1%	0.000	0.010	0.007	0.017
	50% / 1%	**0.000**	**0.016**	**0.011**	**0.028**
	70% / 1%	0.000	0.023	0.016	0.039

4308. **Table 4-123**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Deenish Islands and Scariff Island SPA for each bio-season it is estimated that, for example, 0.02% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Deenish Islands and Scariff Island SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Deenish Islands and Scariff Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Deenish Islands and Scariff Island SPA is calculated as 0.028 individuals per annum.

4309. Increases to Deenish Islands and Scariff Island SPA Manx shearwater mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-124**. In this table, the most recent colony count from the SPA (2000 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-124: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Deenish Islands and Scariff Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.017	4622	13.00%	600.86	0.003%
50% / 1%	**0.028**				**0.005%**
70% / 1%	0.039				0.007%

4310. As additional mortality to the Manx shearwater SCI of Deenish Islands and Scariff Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4311. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4312. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4313. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4314. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4315. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4316. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4317. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4318. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4319. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4320. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4321. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Deenish Islands and Scariff Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4322. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4323. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4324. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4325. As per project-only assessment, above.

OECC

Project-only assessment

4326. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in

prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Deenish Islands and Scariff Island SPA.

4327. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4328. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4329. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4330. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4331. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4332. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4333. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the

foraging range of Manx shearwater breeding within Deenish Islands and Scariff Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4334. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4335. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Deenish Islands and Scariff Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Deenish Islands and Scariff Island SPA.

Proposed mitigation

4336. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Deenish Islands and Scariff Island SPA.

Residual effect

4337. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4338. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Deenish Islands and Scariff Island SPA are presented in **Table 4-120,** above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Deenish Islands and Scariff Island SPA Manx shearwater SCI.**

4.28 Iveragh Peninsula SPA (IE004154)

4339. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: fulmar

4340. The minimum separation distance between SPA and the array site is 300.42 km (with a 'by-sea' separation distance of 399.16 km).

4341. The minimum separation distance between SPA and the OECC is 292.53 km (with a 'by-sea' separation distance of 407.31 km).

4342. The minimum separation distance between SPA and the OECC intertidal landfall is 292.53 km (with a 'by-sea' separation distance of 435.38 km).

Table 4-125: Assessment of adverse effects on site integrity (project alone) – Iveragh Peninsula SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.28.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.28.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4343. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4344. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4345. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4346. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Iveragh Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4347. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4348. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Iveragh Peninsula SPA.

Residual effect

4349. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4350. The Conservation Objective and its attributes and targets for the fulmar SCI of Iveragh Peninsula SPA are presented in **Table 4-125**, above. With regards to direct effects on habitat impacts during the

construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Iveragh Peninsula SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4351. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4352. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4353. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4354. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4355. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than

underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4356. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4357. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Iveragh Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4358. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4359. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Iveragh Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4360. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Iveragh Peninsula SPA.

Residual effect

4361. As per project-only assessment, above.

OECC

Project-only assessment

4362. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4363. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential

to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4364. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4365. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4366. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4367. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

4368. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Iveragh Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4369. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey

availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4370. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Iveragh Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4371. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Iveragh Peninsula SPA.

Residual effect

4372. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4373. The Conservation Objective and its attributes and targets for the fulmar SCI of Iveragh Peninsula SPA are presented in **Table 4-125**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Iveragh Peninsula SPA fulmar SCI**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

4374. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4375. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4376. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4377. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Iveragh Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4378. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4379. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Iveragh Peninsula SPA.

Residual effect

4380. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4381. The Conservation Objective and its attributes and targets for the fulmar SCI of Iveragh Peninsula SPA are presented in **Table 4-125** above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Iveragh Peninsula SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4382. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4383. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4384. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4385. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4386. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4387. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4388. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4389. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Iveragh Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4390. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4391. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Iveragh Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4392. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Iveragh Peninsula SPA.

Residual effect

4393. As per project-only assessment, above.

OECC

Project-only assessment

4394. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Iveragh Peninsula SPA.

4395. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Iveragh Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4396. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4397. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4398. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4399. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4400. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4401. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Iveragh Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4402. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4403. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Iveragh Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Iveragh Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Iveragh Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Iveragh Peninsula SPA.

Proposed mitigation

4404. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Iveragh Peninsula SPA.

Residual effect

4405. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4406. The Conservation Objective and its attributes and targets for the fulmar SCI of Iveragh Peninsula SPA are presented in **Table 4-125**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Iveragh Peninsula SPA fulmar SCI**.

4.29 Puffin Island SPA (IE004003)

4407. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: fulmar and Manx shearwater

4408. The minimum separation distance between SPA and the array site is 335.54 km (with a 'by-sea' separation distance of 414.70 km).

4409. The minimum separation distance between SPA and the OECC is 328.67 km (with a 'by-sea' separation distance of 422.85 km).

4410. The minimum separation distance between SPA and the OECC intertidal landfall is 328.67 km (with a 'by-sea' separation distance of 450.93 km).

Table 4-126: Assessment of adverse effects on site integrity (project alone) – Puffin Island SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.29.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Manx shearwater [A013]				
	Direct effects on habitat [1,3]	**Section 4.29.2**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.29.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4411. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4412. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4413. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4414. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4415. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4416. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4417. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4418. The Conservation Objective and its attributes and targets for the fulmar SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4419. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4420. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4421. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4422. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4423. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4424. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4425. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4426. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4427. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA

Proposed mitigation

4428. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4429. As per project-only assessment, above.

OECC

Project-only assessment

4430. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4431. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4432. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4433. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4434. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter

durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4435. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4436. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4437. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4438. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4439. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4440. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4441. The Conservation Objective and its attributes and targets for the fulmar SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

4442. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4443. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4444. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4445. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4446. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4447. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4448. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4449. The Conservation Objective and its attributes and targets for the fulmar SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4450. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4451. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4452. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4453. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4454. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4455. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4456. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4457. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Puffin Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4458. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4459. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4460. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4461. As per project-only assessment, above.

OECC

Project-only assessment

4462. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Puffin Island SPA.

4463. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4464. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4465. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4466. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this

impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4467. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4468. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4469. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Puffin Island SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4470. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4471. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4472. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4473. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4474. The Conservation Objective and its attributes and targets for the fulmar SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA fulmar SCI.**

4.29.2 Receptor 2: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

4475. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4476. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4477. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4478. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4479. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat

within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4480. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4481. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4482. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4483. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4484. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4485. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Puffin Island SPA from areas within and surrounding the array site.

Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4486. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4487. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4488. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-127**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Puffin Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-127**.

4489. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4490. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-127: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Puffin Island SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.05%	0.80%	0.80%	
Impact to SPA	15% / 1%	0.000	0.013	0.009	0.023
	25% / 1%	**0.000**	**0.022**	**0.016**	**0.038**
	35% / 1%	0.000	0.031	0.022	0.054

4491. **Table 4-127**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Puffin Island SPA for each bio-season it is estimated that, for example, 0.05% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Puffin Island SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Puffin Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Puffin Island SPA is calculated as 0.038 individuals per annum.

4492. Increases to Puffin Island SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-128**. In this table, the most recent colony count from the SPA (2000 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-128: Increase to annual mortality rates resulting from displacement mortalities apportioned to Puffin Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.023	12658	13.00%	1645.54	0.001%
25% / 1%	**0.038**				**0.002%**
35% / 1%	0.054				0.003%

4493. As additional mortality to the Manx shearwater SCI of Puffin Island SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to

represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4494. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4495. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4496. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4497. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4498. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4499. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4500. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this SCI.

4501. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4502. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4503. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4504. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4505. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it

can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA

Proposed mitigation

4506. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4507. As per project-only assessment, above.

OECC

Project-only assessment

4508. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4509. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4510. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4511. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4512. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range +

1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4513. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4514. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4515. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4516. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA

Proposed mitigation

4517. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Puffin Island SPA.

Residual effect

4518. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4519. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

4520. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4521. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4522. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4523. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Puffin Island SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4524. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact

is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4525. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4526. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4527. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI**.

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4528. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4529. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4530. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Puffin Island SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4531. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, given the presence of WTGs within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4532. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4533. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-129**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Puffin Island SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-129**.

4534. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-129: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Puffin Island SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.05%	0.80%	0.80%	
	30% / 1%	0.000	0.027	0.019	0.046

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Impact to SPA	**50% / 1%**	**0.000**	**0.045**	**0.031**	**0.077**
	70% / 1%	0.001	0.063	0.044	0.107

4535. **Table 4-129**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Puffin Island SPA for each bio-season it is estimated that, for example, 0.05% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Puffin Island SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Puffin Island SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Puffin Island SPA is calculated as 0.077 individuals per annum.

4536. Increases to Puffin Island SPA Manx shearwater mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-130**. In this table, the most recent colony count from the SPA (2000 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-130: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Puffin Island SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.046	12658	13.00%	1645.54	0.003%
50% / 1%	0.077				0.005%
70% / 1%	0.107				0.007%

4537. As additional mortality to the Manx shearwater SCI of Puffin Island SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA.

Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4538. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4539. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4540. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4541. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4542. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4543. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important

benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4544. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4545. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4546. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4547. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4548. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Puffin Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4549. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4550. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island

SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4551. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4552. As per project-only assessment, above.

OECC

Project-only assessment

4553. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Puffin Island SPA.

4554. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Puffin Island SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4555. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4556. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4557. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4558. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4559. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4560. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Puffin Island SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4561. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4562. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Puffin Island SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Puffin Island SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Puffin Island SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Puffin Island SPA.

Proposed mitigation

4563. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Puffin Island SPA.

Residual effect

4564. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4565. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Puffin Island SPA are presented in **Table 4-126**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Puffin Island SPA Manx shearwater SCI.**

4.30 Skelligs SPA (IE004007)

4566. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: fulmar and gannet.

4567. The minimum separation distance between SPA and the array site is 344.91 km (with a 'by-sea' separation distance of 414.84 km).

4568. The minimum separation distance between SPA and the OECC is 338.34 km (with a 'by-sea' separation distance of 422.99 km).

4569. The minimum separation distance between SPA and the OECC intertidal landfall is 338.34 km (with a 'by-sea' separation distance of 451.06 km).

Table 4-131: Assessment of adverse effects on site integrity (project alone) – Skelligs SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.30.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Gannet [A016]				
	Direct effects on habitat [1,3]	**Section 4.30.2**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Collision [1]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
	Manx shearwater [A013]				
	Direct effects on habitat [1,3]	**Section 4.30.3**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,3]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.30.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4570. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4571. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4572. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4573. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4574. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4575. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4576. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4577. The Conservation Objective and its attributes and targets for the fulmar SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4578. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4579. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4580. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4581. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4582. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4583. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4584. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4585. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4586. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4587. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4588. As per project-only assessment, above.

OECC

Project-only assessment

4589. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4590. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4591. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4592. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4593. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4594. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4595. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4596. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4597. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4598. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4599. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4600. The Conservation Objective and its attributes and targets for the fulmar SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

4601. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4602. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4603. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4604. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4605. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4606. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4607. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4608. The Conservation Objective and its attributes and targets for the fulmar SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4609. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4610. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4611. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4612. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4613. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4614. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4615. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4616. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Skelligs SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4617. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4618. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4619. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4620. As per project-only assessment, above.

OECC

Project-only assessment

4621. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Skelligs SPA.

4622. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4623. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4624. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4625. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4626. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4627. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4628. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Skelligs SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4629. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4630. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4631. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4632. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4633. The Conservation Objective and its attributes and targets for the fulmar SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA fulmar SCI**.

4.30.2 Receptor 2: Gannet

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

4634. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all

direct effects assessed here relate to ex situ habitats which may support the gannet SCI of Skelligs SPA.

4635. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4636. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4637. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4638. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4639. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4640. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4641. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4642. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

4643. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of Skelligs SPA.

4644. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Skelligs SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4645. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4646. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4647. Total bio-seasonal and total annual estimated construction phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-132**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skelligs SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-132**.

4648. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4649. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-132: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Skelligs SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	30% / 1%	0.315	0.166	0.315	0.795
	35% / 1%	**0.367**	**0.194**	**0.367**	**0.928**
	40% / 1%	0.420	0.222	0.420	1.061
Percentage of impact apportioned to SPA		2.09%	13.19%	10.97%	
Impact to SPA	30% / 1%	0.007	0.022	0.034	0.063
	35% / 1%	**0.008**	**0.026**	**0.040**	**0.073**
	40% / 1%	0.009	0.029	0.046	0.084

4650. **Table 4-132**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 0.928 individuals. When predicted mortalities are apportioned to Skelligs SPA for each bio-season it is estimated that, for example, 2.09% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Skelligs SPA; this equates to 0.008 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skelligs SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Skelligs SPA is calculated as 0.073 individuals per annum.

4651. Increases to Skelligs SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-133**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-133: Increase to annual mortality rates resulting from displacement mortalities apportioned to Skelligs SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.063	70588	10.50%	7411.74	0.001%
35% / 1%	0.073				0.001%
40% / 1%	0.084				0.001%

4652. As additional mortality to the gannet SCI of Skelligs SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenario presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining the favourable conservation condition of the gannet SCI of Skelligs SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4653. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4654. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4655. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4656. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Skelligs SPA.

4657. Gannet depredates a range of fish species. Construction phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4658. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4659. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury-inducing underwater noise impacts to this group (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are, however, calculated to occur within only very small areas (up to 34 km^2 and 94 km^2, respectively) of this SCI's breeding season foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019). Although TTS inducing underwater noise impacts to gadoids are predicted to occur to a larger, although still very small, proportion of theoretical gannet breeding season foraging areas (up to 3,500 km^2), TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

4660. Areas affected by increased SSC levels during construction phase activities within the array site are also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

4661. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4662. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4663. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4664. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4665. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4666. As per project-only assessment, above.

OECC

Project-only assessment

4667. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Skellig's SPA.

4668. Gannet depredates a range of fish species. Construction phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4669. In relation to these Conservation Objective attributes, construction within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4670. Of gannet's key prey species groups, gadoids are anticipated to be most impacted by underwater noise during the construction phase. Mortality or injury inducing underwater noise impacts to this group (and to prey species more generally) are however anticipated to very limited, as no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

4671. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 509.4 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

4672. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4673. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of gannet breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4674. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4675. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4676. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4677. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4678. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

Project-only assessment

4679. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the gannet SCI of Skelligs SPA.

4680. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets to the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4681. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4682. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) of gannet breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4683. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4684. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4685. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4686. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4687. Although gannet are insensitive to disturbance and displacement from presence of vessels (i.e. low [2/5] disturbance reaction to vessels – Garthe and Hüppop, 2004; and low [4.7/25] behavioural sensitivity to vessel disturbance – Fliessbach et al., 2019), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Strong avoidance' – Dierschke et al., 2016).

4688. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for gannet this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the gannet SCI of Skelligs SPA.

4689. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of gannet which breed within Skelligs SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4690. In relation to these Conservation Objective attributes, disturbance leading to displacement of gannet from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, gannets which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4691. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4692. Total bio-seasonal and total annual estimated operation and maintenance phase gannet displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-134**. Note that for seabird receptors such as gannet, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skelligs SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-134**.

4693. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-134: Total bio-seasonal and annual displacement mortalities to gannet and mortalities apportioned to Skelligs SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	Return migration (Dec–Mar)	
Total impact	60% / 1%	0.629	0.332	0.629	1.590
	70% / 1%	**0.734**	**0.387**	**0.734**	**1.855**
	80% / 1%	0.839	0.443	0.839	2.121
Percentage of impact apportioned to SPA		2.09%	13.19%	10.97%	
Impact to SPA	60% / 1%	0.013	0.044	0.069	0.126
	70% / 1%	**0.015**	**0.051**	**0.080**	**0.147**
	80% / 1%	0.018	0.058	0.092	0.168

4694. **Table 4-134**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted gannet displacement mortality is calculated as 1.855 individuals. When predicted mortalities are apportioned to Skelligs SPA for each bio-season it is estimated that, for example, 2.09% of total predicted displacement mortality during the migration-free breeding bio-season (which, for gannet, is considered as the April to August period) relates to breeding adults from Skelligs SPA; this equates to 0.015 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skelligs SPA. When considering the central displacement rate scenario, annual predicted gannet displacement mortality to Skelligs SPA is calculated as 0.147 individuals per annum.

4695. Increases to Skelligs SPA gannet mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-135**. In this table, the most recent colony count from the SPA (2014 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-135: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Skelligs SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
60% / 1%	0.125942	70588	10.50%	7411.74	0.002%
70% / 1%	0.14691				0.002%
80% / 1%	0.16801				0.002%

4696. As additional mortality to the gannet SCI of Skelligs SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in significant declines to breeding population abundance or productivity rate, nor will there be any significant increase in barriers to connectivity for this SCI. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4697. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4698. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4699. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4700. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Skelligs SPA.

4701. Gannet depredates a range of fish species. Operation and maintenance phase activities within the array site which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4702. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4703. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4704. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4705. Key fish species, upon which gannet predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4706. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to

occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4707. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Skelligs SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4708. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4709. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4710. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4711. As per project-only assessment, above.

OECC

Project-only assessment

4712. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the gannet SCI of Skelligs SPA.

4713. Gannet depredates a range of fish species. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4714. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact gannet prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging gannet, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4715. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4716. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4717. Key fish species, upon which gannet predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4718. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4719. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of gannet breeding within Skelligs SPA (mean–maximum + 1 SD = 509.4 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4720. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4721. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the gannet SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of gannet prey species in such a way as to result in a significant decline in the breeding population abundance of the gannet SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4722. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4723. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4724. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

4725. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of gannet from Skelligs SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for the gannet SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

4726. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of this SCI at Skelligs SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of this SCI at Skelligs SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis.

4727. Total bio-seasonal and total annual estimated gannet collision mortalities, as derived in **Appendix 10.3: Collision Risk Modelling** of the EIAR, are presented in **Table 4-136**. These values are apportioned to Skelligs SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-136**.

4728. Collision mortalities are presented in relation to Representative scenarios A and B and CRM Band Option 1 and 2 models. As described in **Appendix 10.3: Collision Risk Modelling** of the EIAR, Band Option 1 CRMs (which utilise site-specific flight height data for this SCI) are considered most appropriate and associated values highlighted in bold. Detailed justification regarding why Band Option 1 models are considered most appropriate for this SCI, and the CRM parameters used, is presented in **Appendix 10.3: Collision Risk Modelling** of the EIAR. To summarise, baseline site-specific flight height data for this SCI are consider sufficiently robust to inform collision risk modelling and the use of site-specific data in assessment (alongside a generic Band Option 2 approach) was assessed to be 'an attractive option' in an NPWS review of ornithological assessment methods for east coast Phase 1 projects (ABPmer, 2023). Band Option 2 model outputs are also presented to facilitate comparison with the outputs of other projects (particularly other Irish OWFs with potentially concurrent construction and operational timelines).

Table 4-136: Total bio-seasonal and annual collision mortalities to gannet and mortalities apportioned to Skelligs SPA

	Design option	CRM Band Option	Bio-season			Annual
			Return migration (Dec–Mar)	Migration free breeding (Apr–Aug)	Post-breeding migration (Sep–Nov)	
Total impact	A	**1**	**0.326**	**0.432**	**0.136**	**0.894**
		2	0.932	1.222	0.406	2.560
	B	**1**	**0.274**	**0.372**	**0.116**	**0.762**
		2	0.83	1.065	0.338	2.233
Impact accounting for 70% macro-avoidance	A	**1**	**0.098**	**0.130**	**0.041**	**0.268**
		2	0.280	0.367	0.122	0.768
	B	**1**	**0.082**	**0.112**	**0.035**	**0.229**
		2	0.249	0.320	0.101	0.670
Percentage of impact apportioned to SPA (inclusive of 70% macro-avoidance)			10.97%	2.09%	13.20%	
Impact to SPA	A	**1**	**0.011**	**0.003**	**0.005**	**0.019**
		2	0.031	0.008	0.016	0.054
	B	**1**	**0.009**	**0.002**	**0.005**	**0.016**
		2	0.027	0.007	0.013	0.047

4729. **Table 4-136**, above, outlines that, when using Band Option 1 CRM, total annual predicted gannet collision mortality is calculated as 0.894 individuals in relation to Representative scenario A and 0.762 individuals in relation to Representative scenario B. When these predicted mortalities are apportioned to Skelligs SPA for each bio-season it is estimated, for example, that 10.97% of total predicted collision

mortality during the return migration bio-season (which, for gannet, is considered as the December to March period) relates to breeding adults from Skelligs SPA; this equates to 0.011 and 0.009 individuals from the SPA per return migration bio-season for Representative scenarios A and B respectively. Apportioning is similarly undertaken in relation to other bio-seasons and all apportioned bio-seasonal mortalities summed to estimate annual collision mortalities to Skelligs SPA and, from this, when using Band Option 1 CRM, annual predicted gannet collision mortality to Skelligs SPA is calculated as 0.019 individuals in relation to Representative scenario A and 0.016 individuals in relation to Representative scenario B.

4730. Increases to SPA gannet mortality rates resultant from apportioned annual impacts are presented in **Table 4-137**. In this table, the most recent colony count from the SPA (2023 count – Arklow Extension Survey Data, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus gannet adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional collision mortality associated with the CWP Project for Representative scenarios A and B (accounting for macro-avoidance).

Table 4-137: Increase to annual mortality rates resulting from collision mortalities apportioned to Skelligs SPA

Design option	CRM Band Option	Annual impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
A	**1**	**0.019**	70588	8.10%	5717.628	**0.000%**
	2	0.054				0.001%
B	**1**	**0.016**				**0.000%**
	2	0.047				0.001%

4731. As additional mortality to the gannet SCI of Skelligs SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the gannet SCI of Skelligs SPA. Specifically, collision mortality will not affect the population dynamics of the SCI in such a way as to compromise its ability to maintain itself on a long-term basis as a viable component of its natural habitats. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4732. No specific mitigation is proposed or required in respect of collision during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4733. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4734. The Conservation Objective and its attributes and targets for the gannet SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA gannet SCI.**

4.30.3 Receptor 3: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4735. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4736. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4737. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4738. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4739. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4740. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4741. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4742. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4743. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4744. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4745. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx

shearwater which breed within Skelligs SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4746. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4747. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4748. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-138**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skelligs SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-138**.

4749. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4750. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-138: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Skelligs SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.01%	0.09%	0.09%	
Impact to SPA	15% / 1%	0.000	0.002	0.001	0.003
	25% / 1%	**0.000**	**0.003**	**0.002**	**0.004**
	35% / 1%	0.000	0.004	0.003	0.006

4751. **Table 4-138**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Skelligs SPA for each bio-season it is estimated that, for example, 0.01% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Skelligs SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skelligs SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Skelligs SPA is calculated as 0.004 individuals per annum.

4752. Increases to Skelligs SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-139**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-139: Increase to annual mortality rates resulting from displacement mortalities apportioned to Skelligs SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.003	1476	13.00%	191.88	0.001%
25% / 1%	**0.004**				**0.002%**
35% / 1%	0.006				0.003%

4753. As additional mortality to the Manx shearwater SCI of Skelligs SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4754. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4755. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4756. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4757. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4758. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4759. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4760. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this SCI.

4761. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4762. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4763. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4764. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4765. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA

Proposed mitigation

4766. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4767. As per project-only assessment, above.

OECC

Project-only assessment

4768. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4769. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4770. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4771. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4772. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4773. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4774. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4775. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4776. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA

Proposed mitigation

4777. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Skelligs SPA.

Residual effect

4778. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4779. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

4780. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4781. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4782. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4783. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Skelligs SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4784. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4785. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4786. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4787. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4788. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4789. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4790. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Skelligs SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4791. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, given the presence of WTGs within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4792. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4793. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-140**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Skelligs SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-140**.

4794. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-140: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Skelligs SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.01%	0.09%	0.09%	
Impact to SPA	30% / 1%	0.000	0.003	0.002	0.005
	50% / 1%	**0.000**	**0.005**	**0.004**	**0.009**
	70% / 1%	0.000	0.007	0.005	0.012

4795. **Table 4-140**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Skelligs SPA for each bio-season it is estimated that, for example, 0.01% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Skelligs SPA; this equates to <0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Skelligs SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Skelligs SPA is calculated as 0.009 individuals per annum.

4796. Increases to Skelligs SPA Manx shearwater mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-141**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-141: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Skelligs SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.005	1476	13.00%	191.88	0.003%
50% / 1%	**0.009**				**0.005%**
70% / 1%	0.012				0.007%

4797. As additional mortality to the Manx shearwater SCI of Skelligs SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. Specifically, operation and maintenance phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population as a viable component of the SPA, neither will its natural range and habitat extent be reduced or be likely to be reduced for the foreseeable future. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4798. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4799. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4800. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4801. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4802. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4803. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4804. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4805. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4806. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4807. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4808. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skelligs SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4809. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4810. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4811. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4812. As per project-only assessment, above.

OECC

Project-only assessment

4813. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Skelligs SPA.

4814. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Skelligs SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4815. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4816. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4817. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4818. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4819. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4820. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Skelligs SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4821. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4822. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Skelligs SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Skelligs SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Skelligs SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Skelligs SPA.

Proposed mitigation

4823. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Skelligs SPA.

Residual effect

4824. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4825. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Skelligs SPA are presented in **Table 4-131**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Skelligs SPA Manx shearwater SCI.**

4.31 Rum SPA (Scotland – UK9001341)

4826. SPA is designated in relation to the following Feature which have been screened in for consideration within the NIS: Manx shearwater.

4827. The minimum separation distance between SPA and the array site is 418.71 km (with a 'by-sea' separation distance of 431.18 km).

4828. The minimum separation distance between SPA and the OECC is 396.30 km (with a 'by-sea' separation distance of 418.79 km).

4829. The minimum separation distance between SPA and the OECC intertidal landfall is 396.30 km (with a 'by-sea' separation distance of 420.32 km).

Table 4-142: Assessment of adverse effects on site integrity (project alone) – Rum SPA (Scotland – UK9001341)

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
To ensure that the qualifying features of the SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status. To ensure that the integrity of the SPA is restored in the context of environmental changes by meeting the following for each qualifying feature: 1. The populations of the qualifying features are viable components of the SPA. 2. The distributions of the qualifying features throughout the site are maintained by avoiding significant disturbance of the species. 3. The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA	Manx shearwater [A013]				
	Direct effects on habitat [1,3]	**Section 4.31.1**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [1]		None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.31.1 Receptor 1: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4830. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4831. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.
- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4832. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4833. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Rum SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4834. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4835. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Rum SPA.

Residual effect

4836. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4837. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

4838. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4839. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4840. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Rum SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.

4841. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4842. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4843. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-143**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Rum SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-143**.

4844. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

4845. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-143: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Rum SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	**Bio-season**			**Annual**
		Migration free breeding (Jun–Jul)	**Post-breeding migration (Aug–Oct)**	**Return migration (Mar–May)**	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.98%	15.14%	15.14%	
Impact to SPA	15% / 1%	0.003	0.255	0.177	0.435
	25% / 1%	**0.004**	**0.426**	**0.295**	**0.725**
	35% / 1%	0.006	0.596	0.413	1.016

4846. **Table 4-143**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Rum SPA for each bio-season it is estimated that, for example, 0.98% of total predicted displacement mortality during the migration-free breeding bio-

season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Rum SPA; this equates to 0.004 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Rum SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Rum SPA is calculated as 0.725 individuals per annum.

4847. Increases to Rum SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-144**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-144: Increase to annual mortality rates resulting from displacement mortalities apportioned to Rum SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.435	240000	13.00%	31200	0.001%
25% / 1%	**0.725**				**0.002%**
35% / 1%	1.016				0.003%

4848. As additional mortality to the Manx shearwater feature of Rum SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in instability to the breeding population as a viable component of the SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4849. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Rum SPA.

Residual effect

4850. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4851. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4852. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4853. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.
- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4854. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

4855. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of their diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this feature.

4856. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels

over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

4857. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this feature's breeding and non-breeding season range extents.

4858. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Rum SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4859. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4860. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Rum SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA

Proposed mitigation

4861. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Rum SPA.

Residual effect

4862. As per project-only assessment, above.

OECC

Project-only assessment

4863. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4864. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.
- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4865. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4866. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4867. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

4868. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4869. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Rum SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4870. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes

in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4871. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Rum SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA

Proposed mitigation

4872. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Rum SPA.

Residual effect

4873. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4874. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater feature.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

4875. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4876. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.

- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4877. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4878. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Rum SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4879. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4880. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rum SPA.

Residual effect

4881. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4882. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater feature.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

4883. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

4884. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4885. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Rum SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.

4886. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, given the presence of WTGs within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

4887. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4888. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-145**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Rum SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-145**.

4889. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-145: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Rum SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.98%	15.14%	15.14%	
Impact to SPA	30% / 1%	0.005	0.511	0.354	0.871
	50% / 1%	**0.009**	**0.851**	**0.591**	**1.451**
	70% / 1%	0.012	1.192	0.827	2.031

4890. **Table 4-145**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Rum SPA for each bio-season it is estimated that, for example, 0.98% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Rum SPA; this equates to 0.009 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Rum SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Rum SPA is calculated as 1.451 individuals per annum.

4891. Increases to Rum SPA Manx shearwater mortality rates resultant from apportioned annual operation and maintenance phase disturbance and displacement impacts are presented in **Table 4-146**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-146: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Rum SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.871	240000	13.00%	31200	0.003%
50% / 1%	**1.451**				**0.005%**
70% / 1%	2.031				0.007%

4892. As additional mortality to the Manx shearwater feature of Rum SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the feature in such a way as to result in instability to the breeding population as a viable component of the SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4893. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rum SPA.

Residual effect

4894. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4895. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater feature.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

4896. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4897. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.
- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4898. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4899. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

4900. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

4901. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4902. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

4903. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Rum SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4904. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4905. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Rum SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4906. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Rum SPA.

Residual effect

4907. As per project-only assessment, above.

OECC

Project-only assessment

4908. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater feature of Rum SPA.

4909. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species

have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater feature of Rum SPA:

- The populations of the qualifying features are viable components of the SPA.
- The supporting habitats and processes relevant to qualifying features and their prey/food resources are maintained, or where appropriate, restored at the SPA.

4910. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature 's population on a long-term basis.

4911. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

4912. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4913. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), increased SSC levels, which occur during construction phase activities are not considered to occur during the operational phase and there is no pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

4914. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

4915. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Rum SPA (mean–maximum + 1 SD = 2,365.5 km,

Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4916. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4917. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater feature of Rum SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the supporting habitats and processes in such a way as to result in the Manx shearwater population no longer being a viable component of Rum SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater feature of Rum SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Rum SPA.

Proposed mitigation

4918. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Rum SPA.

Residual effect

4919. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4920. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Rum SPA are presented in **Table 4-142**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Rum SPA Manx shearwater feature.**

4.32 Mingulay and Berneray SPA (Scotland – UK9001121)

4921. SPA is designated in relation to the following Feature which has been screened in for consideration within the NIS: fulmar

4922. The minimum separation distance between SPA and the array site is 417.63 km (with a ‘by-sea’ separation distance of 438.51 km).

4923. The minimum separation distance between SPA and the OECC is 390.95 km (with a ‘by-sea’ separation distance of 426.11 km).

4924. The minimum separation distance between SPA and the OECC intertidal landfall is 390.95 km (with a ‘by-sea’ separation distance of 427.64 km).

Table 4-147: Assessment of adverse effects on site integrity (project alone) Mingulay and Berneray SPA (Scotland – UK9001121)

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. To ensure for the qualifying species that the following are maintained in the long term: 1. Population of the species as a viable component of the site 2. Distribution of the species within site 3. Distribution and extent of habitats supporting the species 4. Structure, function and supporting processes of habitats supporting the species 5. No significant disturbance of the species	fulmar [A009]				
	Direct effects on habitat [1,3,4]	**Section 4.32.1**	None	No change	No AESI
	Changes in prey availability [1,3,4]		None	No change	No AESI
	Introduction or spread of INNS [1,3,4]	See high-level assessment in **Section 4**			No AESI

4.32.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4925. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4926. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat

has the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4927. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4928. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Mingulay and Berneray SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4929. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4930. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Mingulay and Berneray SPA.

Residual effect

4931. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4932. The Conservation Objective and its attributes and targets for the fulmar feature of Mingulay and Berneray SPA are presented in **Table 4-147**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to

the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Mingulay and Berneray SPA fulmar feature.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4933. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4934. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4935. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4936. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

4937. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this feature.

4938. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4939. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Mingulay and Berneray SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4940. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

4941. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar feature of Mingulay and Berneray SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4942. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Mingulay and Berneray SPA.

Residual effect

4943. As per project-only assessment, above.

OECC

Project-only assessment

4944. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4945. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4946. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4947. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

4948. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this feature's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

4949. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

4950. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Mingulay and Berneray SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4951. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

4952. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions

in offspring provisioning rates for the fulmar feature of Mingulay and Berneray SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar feature of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4953. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Mingulay and Berneray SPA.

Residual effect

4954. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4955. The Conservation Objective and its attributes and targets for the Manx shearwater feature of Mingulay and Berneray SPA are presented in **Table 4-147**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Mingulay and Berneray SPA Manx shearwater feature.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

4956. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabirds to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4957. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4958. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the feature to maintain its population.

4959. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this feature within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Mingulay and Berneray SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4960. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4961. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Mingulay and Berneray SPA.

Residual effect

4962. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4963. The Conservation Objective and its attributes and targets for the fulmar feature of Mingulay and Berneray SPA are presented in **Table 4-147**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Mingulay and Berneray SPA fulmar feature.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

4964. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4965. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4966. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4967. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

4968. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4969. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

4970. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

4971. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Mingulay and Berneray SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4972. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

4973. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar feature of Mingulay and Berneray SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the distribution and extent of supporting habitat, nor alter the population, structure, function and supporting process of supporting habitat, in such a way as to result in kittiwake no longer being a viable component of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4974. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Mingulay and Berneray SPA.

Residual effect

4975. As per project-only assessment, above.

OECC

Project-only assessment

4976. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar feature of Mingulay and Berneray SPA.

4977. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar feature of Mingulay and Berneray SPA:

- Population of the species as a viable component of the site.
- Distribution and extent of habitats supporting the species.
- Structure, function and supporting processes of habitats supporting the species.

4978. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this feature through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the feature to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the feature's population on a long-term basis.

4979. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this feature.

4980. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

4981. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), increased SSC levels, which occur during construction phase activities are not considered to occur during the operational phase and there is no pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this feature.

4982. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this feature.

4983. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Mingulay and Berneray SPA (mean–maximum + 1 SD =

1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4984. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

4985. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar feature of Mingulay and Berneray SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar feature of Mingulay and Berneray SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar feature of Mingulay and Berneray SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Mingulay and Berneray SPA.

Proposed mitigation

4986. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Mingulay and Berneray SPA.

Residual effect

4987. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

4988. The Conservation Objective and its attributes and targets for the fulmar feature of Mingulay and Berneray SPA are presented in **Table 4-147**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this feature and, in turn, that there is **no project-only AESI for the Mingulay and Berneray SPA fulmar feature.**

4.33 Blasket Islands SPA (IE004008)

4989. SPA is designated in relation to the following SCIs which have been screened in for consideration within the NIS: fulmar, and Manx shearwater

4990. The minimum separation distance between SPA and the array site is 330.65 km (with a ‘by-sea’ separation distance of 440.57 km).

4991. The minimum separation distance between SPA and the OECC is 319.62 km (with a ‘by-sea’ separation distance of 448.71 km).

4992. The minimum separation distance between SPA and the OECC intertidal landfall is 319.62 km (with a ‘by-sea’ separation distance of 476.79 km).

Table 4-148: Assessment of adverse effects on site integrity (project alone) – Blasket Islands SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.33.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI
	Manx shearwater [A013]				
	Direct effects on habitat [1,3]	**Section 4.33.2**	None	No change	No AESI
	Disturbance and Displacement (including barrier effects) [1,2,3]		None	No change	No AESI
	Changes in prey availability [1,2,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.33.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

4993. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site

does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

4994. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

4995. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

4996. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

4997. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

4998. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

4999. As per project-only assessment, above.

5000. The Conservation Objective and its attributes and targets for the fulmar SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to direct effects on habitat impacts during the

construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5001. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

5002. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5003. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5004. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

5005. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than

underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5006. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5007. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5008. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5009. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA

Proposed mitigation

5010. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

5011. As per project-only assessment, above.

OECC

Project-only assessment

5012. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

5013. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential

to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5014. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5015. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

5016. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5017. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

5018. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5019. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey

availability impacts associated with construction phase activities within the OECC is considered to be negligible.

5020. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5021. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

5022. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5023. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5024. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

5025. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5026. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5027. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5028. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5029. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5030. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5031. The Conservation Objective and its attributes and targets for the fulmar SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5032. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

5033. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5034. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5035. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5036. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5037. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5038. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5039. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Blasket Islands SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5040. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

5041. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5042. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5043. As per project-only assessment, above.

OECC

Project-only assessment

5044. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Blasket Islands SPA.

5045. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5046. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5047. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5048. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5049. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5050. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5051. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Blasket Islands SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5052. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

5053. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5054. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5055. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5056. The Conservation Objective and its attributes and targets for the fulmar SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA fulmar SCI.**

4.33.2 Receptor 2: Manx shearwater

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5057. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5058. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5059. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5060. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5061. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5062. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

5063. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5064. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to direct effects on habitat impacts

during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and displacement

Array site

Project-only assessment

5065. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

5066. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5067. As such, during the construction phase of the CWP Project, the presence of partially and fully installed above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Blasket Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5068. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are erected within the array site during the construction phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

5069. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5070. Total bio-seasonal and total annual estimated construction phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-149**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such

infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Blasket Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-149**.

5071. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

5072. In the general absence of information relating to construction-specific displacement rates and following the precedent of recent UK OWF assessment of construction phase disturbance and displacement impacts to seabirds (for example, Awel y Môr EIAR, 2022), displacement mortalities have been determined on the basis that displacement rates during construction are half of those during the operation and maintenance phase.

Table 4-149: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Blasket Islands SPA for a range of displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	15% / 1%	0.270	1.688	1.171	3.128
	25% / 1%	**0.451**	**2.813**	**1.951**	**5.214**
	35% / 1%	0.631	3.938	2.732	7.300
Percentage of impact apportioned to SPA		0.13%	2.46%	2.46%	
Impact to SPA	15% / 1%	0.000	0.042	0.029	0.071
	25% / 1%	**0.001**	**0.069**	**0.048**	**0.118**
	35% / 1%	0.001	0.097	0.067	0.165

5073. **Table 4-149**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 5.214 individuals. When predicted mortalities are apportioned to Blasket Islands SPA for each bio-season it is estimated that, for example, 0.13% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Blasket Islands SPA; this equates to 0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Blasket Islands SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Blasket Islands SPA is calculated as 0.118 individuals per annum.

5074. Increases to Blasket Islands SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-150**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of

the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional construction phase displacement associated with the CWP Project.

Table 4-150: Increase to annual mortality rates resulting from displacement mortalities apportioned to Blasket Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
15% / 1%	0.071	39068	13.00%	5078.84	0.001%
25% / 1%	**0.118**				**0.002%**
35% / 1%	0.165				0.003%

5075. As additional mortality to the Manx shearwater SCI of Blasket Islands SPA resulting from construction phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population or productivity rate, and that there will continue to be a sufficiently large habitat available such as to maintain the SCI on a long-term basis. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5076. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the construction phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5077. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5078. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

5079. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5080. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5081. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5082. As Manx shearwater is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to Manx shearwater on account of the high level of dietary flexibility demonstrated by this SCI.

5083. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5084. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5085. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5086. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5087. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA

Proposed mitigation

5088. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

5089. As per project-only assessment, above.

OECC

Project-only assessment

5090. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5091. Manx shearwater forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5092. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5093. As Manx shearwater is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

5094. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 2,365.5 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5095. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high-levels of recoverability (i.e. within weeks or months).

5096. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5097. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by Manx shearwater and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

5098. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA

Proposed mitigation

5099. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Blasket Islands SPA.

Residual effect

5100. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5101. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Operation and maintenance phase impacts

Operation and maintenance impact 1 – Direct effects on habitat

Array site

5102. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5103. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5104. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of operation and maintenance phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5105. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) of Manx shearwater breeding within Blasket Islands SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5106. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5107. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5108. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5109. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Operation and maintenance impact 2 – Disturbance and displacement

Array site

Project-only assessment

5110. Although Manx shearwater are insensitive to disturbance and displacement from presence of vessels (i.e. low behavioural sensitivity to vessel disturbance – Cook & Burton, 2010), they are however considered sensitive to disturbance from the presence of array site infrastructure (i.e. overall behavioural response characterised as 'Avoidance' – Dierschke et al., 2016).

5111. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding the array site (for Manx shearwater this is regarded as a 2 km buffer) all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5112. As such, during the operation and maintenance phase of the CWP Project, the presence of above-sea level WTG infrastructures may result in the disturbance and displacement of Manx shearwater which breed within Blasket Islands SPA from areas within and surrounding the array site. Disturbance and displacement has the potential to impact the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5113. In relation to these Conservation Objective attributes, disturbance leading to displacement of Manx shearwater from the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss). Similarly, as WTGs are present within the array site during the operation and maintenance phase, Manx shearwaters which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects').

5114. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5115. Total bio-seasonal and total annual estimated operation and maintenance phase Manx shearwater displacement mortalities, as determined in **Appendix 10.4: Displacement** of the EIAR, are presented for a range of displacement scenarios in **Table 4-151**. Note that for seabird receptors such as Manx shearwater, which are potentially displaying frequent distributional responses to the presence of array site infrastructure (as opposed to migrants which typically may display one-off responses to avoid such infrastructure), indirect habitat loss and barrier effects are treated collectively when displacement matrices are used to calculate displacement mortality figures. These values are apportioned to Blasket

Islands SPA according to the apportioning ratios determined in **Appendix 3: Apportioning Impacts to SPAs** in **Volume 7** of this NIS, and also presented in **Table 4-151**.

5116. Displacement mortalities are presented for an evidence-led central displacement scenario, highlighted in bold, and a range of other displacement and/or displacement mortality proportions.

Table 4-151: Total bio-seasonal and annual displacement mortalities to Manx shearwater and mortalities apportioned to Blasket Islands SPA for a range of operation and maintenance phase displacement rates and percentage of displaced individuals experiencing mortality (evidence-led central value highlighted)

	Displacement scenario (percentage of individuals displaced from array site and surrounding 2 km buffer / percentage of displaced individuals experiencing mortality)	Bio-season			Annual
		Migration free breeding (Jun–Jul)	Post-breeding migration (Aug–Oct)	Return migration (Mar–May)	
Total impact	30% / 1%	0.54	3.375	2.341	6.256
	50% / 1%	**0.901**	**5.625**	**3.902**	**10.428**
	70% / 1%	1.261	7.875	5.463	14.599
Percentage of impact apportioned to SPA		0.13%	2.46%	2.46%	
Impact to SPA	30% / 1%	0.001	0.083	0.058	0.142
	50% / 1%	**0.001**	**0.139**	**0.096**	**0.236**
	70% / 1%	0.002	0.194	0.135	0.330

5117. **Table 4-151**, above, outlines that, in relation to the evidence-led central displacement rate scenario, total annual predicted Manx shearwater displacement mortality is calculated as 10.428 individuals. When predicted mortalities are apportioned to Blasket Islands SPA for each bio-season it is estimated that, for example, 0.13% of total predicted displacement mortality during the migration-free breeding bio-season (which, for Manx shearwater, is considered as the June to July period) relates to breeding adults from Blasket Islands SPA; this equates to 0.001 individuals from the SPA per migration-free breeding period. Apportioning is similarly undertaken in relation to the post-breeding migration and return migration periods and totals of all three bio-seasons summed to estimate annual displacement mortality to Blasket Islands SPA. When considering the central displacement rate scenario, annual predicted Manx shearwater displacement mortality to Blasket Islands SPA is calculated as 0.236 individuals per annum.

5118. Increases to Blasket Islands SPA Manx shearwater mortality rates resultant from apportioned annual construction phase disturbance and displacement impacts are presented in **Table 4-152**. In this table, the most recent colony count from the SPA (2001 count – SMP, 2023) is used to estimate the average number of breeding adults from the SPA colony which die each year by multiplying by one minus Manx shearwater adult annual survival rate (taken from Horswill and Robinson, 2015). The percentage of the apportioned mortality compared to this baseline SPA annual mortality is derived to show the proportional increase to SPA mortality rates owing to additional operation and maintenance phase displacement associated with the CWP Project.

Table 4-152: Increase to annual mortality rates resulting from operation and maintenance phase displacement mortalities apportioned to Blasket Islands SPA

Displacement scenario	Impact to SPA	SPA population (breeding adults)	Adult annual mortality rate	Baseline estimated SPA annual mortality	Increase to SPA mortality rate
30% / 1%	0.142	39068	13.00%	5078.84	0.003%
50% / 1%	**0.236**				**0.005%**
70% / 1%	0.330				0.007%

5119. As additional mortality to the Manx shearwater SCI of Blasket Islands SPA resulting from operation and maintenance phase displacement impacts within the array site and a surrounding 2 km buffer area is estimated to represent-only a very small potential increase (much less than 1%, for the evidence-led central value and also for the more precautionary potential displacement scenarios presented) to SPA baseline mortality rates, this impact is considered not to impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. Specifically, construction phase displacement mortality will not affect the population dynamics of the SCI in such a way as to result in instability to the breeding population or productivity rate, and that there will continue to be a sufficiently large habitat available such as to maintain the SCI on a long-term basis. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5120. No specific mitigation is proposed or required in respect of disturbance and displacement impacts during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5121. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5122. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

Project-only assessment

5123. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5124. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of Manx shearwater have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5125. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5126. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5127. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5128. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5129. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5130. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Blasket Islands SPA (mean–maximum + 1 SD = 2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5131. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

5132. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5133. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5134. As per project-only assessment, above.

OECC

Project-only assessment

5135. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to

prey species within ex situ habitats which may support the Manx shearwater SCI of Blasket Islands SPA.

5136. Manx shearwater forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the potential to impact on the following Conservation Objective attributes and targets for the Manx shearwater SCI of Blasket Islands SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5137. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact Manx shearwater prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5138. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5139. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5140. Key fish species, upon which Manx shearwater predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5141. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5142. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of Manx shearwater breeding within Blasket Islands SPA (mean–maximum + 1 SD =

2,365.5 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5143. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

5144. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the Manx shearwater SCI of Blasket Islands SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of Manx shearwater prey species in such a way as to result in a significant decline in the breeding population abundance of the Manx shearwater SCI of Blasket Islands SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the Manx shearwater SCI of Blasket Islands SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Blasket Islands SPA.

Proposed mitigation

5145. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Blasket Islands SPA.

Residual effect

5146. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5147. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Blasket Islands SPA are presented in **Table 4-148**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Blasket Islands SPA Manx shearwater SCI.**

4.34 Dingle Peninsula SPA (IE004153)

5148. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: fulmar

5149. The minimum separation distance between SPA and the array site is 293.61 km (with a 'by-sea' separation distance of 446.78 km).

5150. The minimum separation distance between SPA and the OECC is 281.89 km (with a 'by-sea' separation distance of 454.92 km).

5151. The minimum separation distance between SPA and the OECC intertidal landfall is 281.89 km (with a 'by-sea' separation distance of 483.00 km).

Table 4-153: Assessment of adverse effects on site integrity (project alone) Dingle Peninsula SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.34.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.34.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5152. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5153. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5154. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5155. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Dingle Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5156. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5157. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Dingle Peninsula SPA.

Residual effect

5158. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5159. The Conservation Objective and its attributes and targets for the fulmar SCI of Dingle Peninsula SPA are presented in **Table 4-153**, above. With regards to direct effects on habitat impacts during the

construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Dingle Peninsula SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5160. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5161. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5162. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5163. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

5164. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than

underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5165. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5166. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Dingle Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5167. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5168. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Dingle Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5169. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Dingle Peninsula SPA.

Residual effect

5170. As per project-only assessment, above.

OECC

Project-only assessment

5171. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5172. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential

to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5173. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5174. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

5175. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5176. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

5177. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Dingle Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5178. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey

availability impacts associated with construction phase activities within the OECC is considered to be negligible.

5179. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Dingle Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5180. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Dingle Peninsula SPA.

Residual effect

5181. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5182. The Conservation Objective and its attributes and targets for the fulmar SCI of Dingle Peninsula SPA are presented in **Table 4-153**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Dingle Peninsula SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5183. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5184. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5185. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5186. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Dingle Peninsula SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5187. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5188. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Dingle Peninsula SPA.

Residual effect

5189. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5190. The Conservation Objective and its attributes and targets for the fulmar SCI of Dingle Peninsula SPA are presented in **Table 4-153**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Dingle Peninsula SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5191. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5192. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5193. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5194. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5195. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5196. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5197. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5198. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Dingle Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5199. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

5200. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Dingle Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5201. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Dingle Peninsula SPA.

Residual effect

5202. As per project-only assessment, above.

OECC

Project-only assessment

5203. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Dingle Peninsula SPA.

5204. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Dingle Peninsula SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5205. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5206. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5207. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5208. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5209. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5210. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Dingle Peninsula SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5211. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

5212. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Dingle Peninsula SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Dingle Peninsula SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Dingle Peninsula SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Dingle Peninsula SPA.

Proposed mitigation

5213. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Dingle Peninsula SPA.

Residual effect

5214. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5215. The Conservation Objective and its attributes and targets for the fulmar SCI of Dingle Peninsula SPA are presented in **Table 4-153**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Dingle Peninsula SPA fulmar SCI.**

4.35 Kerry Head SPA (IE002263)

5216. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: fulmar

5217. The minimum separation distance between SPA and the array site is 268.57 km (with a ‘by-sea’ separation distance of 498.86 km).

5218. The minimum separation distance between SPA and the OECC is 254.90 km (with a ‘by-sea’ separation distance of 507.00 km).

5219. The minimum separation distance between SPA and the OECC intertidal landfall is 254.90 km (with a ‘by-sea’ separation distance of 535.08 km).

Table 4-154: Assessment of adverse effects on site integrity (project alone) – Kerry Head SPA

Objective: Attributes and targets	Predicted effect	Link to assessment	Mitigation	Residual effect	Conclusion
Disturbance and Objective: To maintain or restore the favourable conservation condition of the SCI(s): 1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats. 2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future. 3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	Fulmar [A009]				
	Direct effects on habitat [1,3]	**Section 4.35.1**	None	No change	No AESI
	Changes in prey availability [1,3]		None	No change	No AESI
	Introduction or spread of INNS [1,3]	See high-level assessment in **Section 4**			No AESI

4.35.1 Receptor 1: Fulmar

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5220. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and, therefore, unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5221. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5222. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require

individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5223. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Kerry Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5224. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA.

Proposed mitigation

5225. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Kerry Head SPA.

Residual effect

5226. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5227. The Conservation Objective and its attributes and targets for the fulmar SCI of Kerry Head SPA are presented in **Table 4-154**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Kerry Head SPA fulmar SCI.**

Construction phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5228. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5229. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the array site which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5230. In relation to these Conservation Objective attributes, construction of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5231. As fulmar is a generalist forager, although fish species (including gadoids, sprats and sand eels) are anticipated to be impacted by underwater noise during the construction phase, these species are not considered to form a key part of the SCI's diet. Underwater noise impacts to gadoids, sprats and sand eels (primarily in relation to pile driving for WTG and OSS foundation installation which may occur over a total duration of 78 days [if a single piling event per 24-hour period is undertaken], within a broader construction window of 262.5 days) are therefore not considered to have potential to result in population level consequences to fulmar on account of the high level of dietary flexibility demonstrated by this SCI.

5232. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5233. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the array site (up to 6.30 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5234. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Kerry Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5235. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5236. In particular, potential changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Kerry Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA

Proposed mitigation

5237. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Kerry Head SPA.

Residual effect

5238. As per project-only assessment, above.

OECC

Project-only assessment

5239. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5240. Fulmar forage on a variety of food items, including fish species, crustaceans, squid and surface offal. Construction phase activities within the OECC which may affect fulmar prey species have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5241. In relation to these Conservation Objective attributes, construction of the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5242. As fulmar is a generalist forager, and underwater noise impacts to prey fish species (including gadoids, sprats and sand eels) are anticipated to be very limited, given that no pile driving activities are proposed in relation to the installation of the export cable within OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten), the associated scale of changes in prey availability resultant from construction phase activities within the OECC will be negligible.

5243. Areas affected by increased SSC levels during construction phase activities within the OECC are assessed to be of negligible size in relation to this SCI's breeding (mean–maximum foraging range + 1 SD = 1,200.2 km, Woodward et al., 2019) and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. These areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents, with impacts occurring over considerably shorter durations than underwater noise effects and are similarly considered unlikely to affect a key part of the very wide dietary range of this SCI.

5244. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities within the OECC (up to 5.63 km^2) is also assessed to be of negligible size in relation to this SCI's breeding and non-breeding season range extents. Within these areas, benthic communities are typically resilient to localised habitat disturbance, demonstrating high or very high levels of recoverability (i.e. within weeks or months).

5245. Despite the above potential pathways to impact, the areas in which impacts to prey species availability may occur represent a negligible proportion of sea area within the foraging range of fulmar breeding within Kerry Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5246. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, the wide range of foraging resources used by fulmar and that potential temporary impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible.

5247. In particular, potential changes to prey availability resultant from construction phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging or lead to reductions in offspring provisioning rates for the fulmar SCI of Kerry Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA.

Proposed mitigation

5248. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Kerry Head SPA.

Residual effect

5249. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5250. The Conservation Objective and its attributes and targets for the fulmar SCI of Kerry Head SPA are presented in **Table 4-154**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Kerry Head SPA fulmar SCI.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5251. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5252. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5253. In relation to these Conservation Objective attributes, the footprint of operational infrastructure within the CWP Project array site may reduce the marine areas in which individuals can undertake non-foraging behaviours or require individuals to use alternative areas for non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of non-foraging behaviours and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5254. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area within the foraging range (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) of fulmar breeding within Kerry Head SPA and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5255. In the context of the extent of available habitat within foraging range of the SPA, and the negligible proportion that will be occupied by operational infrastructure, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, the level of impact is not considered capable of altering the extent of available habitat in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA.

Proposed mitigation

5256. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Kerry Head SPA.

Residual effect

5257. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5258. The Conservation Objective and its attributes and targets for the fulmar SCI of Kerry Head SPA are presented in **Table 4-154**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Kerry Head SPA fulmar SCI.**

Operation and maintenance phase impact 2 – Changes in prey availability

Array site

Project-only assessment

5259. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5260. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the array site which may affect the fish prey species of fulmar have the potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5261. In relation to these Conservation Objective attributes, maintenance activities during the operational phase of the CWP Project array site may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5262. As operational phase activities within the array site will not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5263. Similarly, as operational phase activities within the array site do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5264. Key fish species, upon which fulmar predate, may experience the loss of up to 0.49 km^2 of previously available benthic habitat within the array site as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5265. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects,

associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5266. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Kerry Head SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5267. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the array site is considered to be negligible.

5268. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Kerry Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA.

Proposed mitigation

5269. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the array site, as this impact will not give rise to any AESI in relation to the Kerry Head SPA.

Residual effect

5270. As per project-only assessment, above.

OECC

Project-only assessment

5271. As the OECC does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from operation and maintenance phase activities, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support the fulmar SCI of Kerry Head SPA.

5272. Fulmar forage on a variety of food items including fish, squid, crustaceans and surface offal. Operation and maintenance phase activities within the OECC which may affect those prey species have the

potential to impact on the following Conservation Objective attributes and targets for the fulmar SCI of Kerry Head SPA:

- Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.

5273. In relation to these Conservation Objective attributes, operation and maintenance phase activities within the CWP Project OECC may impact fulmar prey species through underwater noise effects, increases to suspended sediment concentrations, removal or alteration of important benthic habitats for those prey species, or electromagnetic field effects affecting prey species distributions around electrical infrastructure. Should these impacts to prey species reduce the availability of those prey species to foraging fulmar, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or productivity rates, or reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its population, with prey availability changes potentially resulting in there being insufficient habitat to support the SCI's population on a long-term basis.

5274. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause perceptible changes to prey availability in such a way that could impact this SCI.

5275. Similarly, as operational phase activities within the OECC do not routinely require disturbance of the seabed (in the form of trenching or dredging activities) except within localised areas in which this is necessary to facilitate repairs, increased SSC levels, are considered to occur only potentially infrequently and locally during the operational phase and there is no perceptible pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact this SCI.

5276. Key fish species, upon which fulmar predate, may experience the loss of up to 0.11 km^2 of previously available benthic habitat within the OECC as a result of occupancy of the seabed by infrastructure during the operation and maintenance phase of the CWP Project. The spatial extent of such prey species habitat loss is, however, considered to be of negligible size in relation to this SCI's breeding and non-breeding season range extents.

5277. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered, namely EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact this SCI.

5278. Despite the above potential pathway to impact in the form of benthic habitat loss, the area in which impacts to prey species availability may occur represents a negligible proportion of sea area within the foraging range of fulmar breeding within Kerry Head SPA (mean–maximum + 1 SD = 1,200.2 km, Woodward et al., 2019) and a smaller still proportion of the wider Irish Sea and Western UK-waters region likely used by the majority of SPA individuals outside of the breeding period.

5279. In the context of the extent of available habitat within foraging range of the SPA, the negligible proportion of that habitat in which potential impacts to prey species may occur, and that potential

impacts to prey species may be of limited (if any) demographic consequence to their seabird predators, the scale of changes in prey availability impacts associated with operation and maintenance phase activities within the OECC is considered to be negligible.

5280. In particular, potential changes to prey availability resultant from operation and maintenance phase activities within the OECC are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for the fulmar SCI of Kerry Head SPA in such a way as to affect demographic parameters. Accordingly, the level of impact is not considered capable of altering the availability of fulmar prey species in such a way as to result in a significant decline in the breeding population abundance of the fulmar SCI of Kerry Head SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the fulmar SCI of Kerry Head SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Kerry Head SPA.

Proposed mitigation

5281. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to the Kerry Head SPA.

Residual effect

5282. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5283. The Conservation Objective and its attributes and targets for the fulmar SCI of Kerry Head SPA are presented in **Table 4-154**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Kerry Head SPA fulmar SCI.**

Marine Area SPAs

5284. Given the similarity in assessment for each SCI for these SPAs, an assessment is made collectively for each impact.

4.36 North-west Irish Sea SPA (IE004236)

5285. SPA is to be designated in relation to the following SCIs which have been screened in for consideration within the NIS: red-throated diver, great northern diver, fulmar, Manx shearwater, cormorant, shag, common scoter, little gull, black-headed gull, common gull, lesser black-backed gull, herring gull, great black-backed gull, kittiwake, roseate tern, common tern, Arctic tern, little tern, guillemot, razorbill, puffin. For the purposes of this assessment the site is assumed to be fully and formally designated, although it is noted that final consultation responses and status for both this site and seas off Wexford have not been published. It is important to note that the SPA in question is designated as a foraging area for adjacent breeding SPAs and as such whilst a precautionary assessment has been undertaken

for potential effects on habitats, the site is designated for foraging, and SCIs present within the site are foraging, rather than at a central point from which further foraging will take place. It is therefore evidently the case that this assessment is precautionary and works associated with the Codling Project would not be anticipated to have any direct effect, with minimal likelihood of significant or adverse ex situ effects to occur.

5286. The minimum separation distance between SPA and the array site is 21.35 km.

5287. The minimum separation distance between SPA and the OECC is 1.27 km.

5288. The minimum separation distance between SPA and the OECC intertidal landfall is 1.60 km.

Table 4-155: Assessment of adverse effects on site integrity (project alone) – North-west Irish Sea SPA

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Kittiwake [A188]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. Long term SPA population trend is stable or increasing 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Fulmar [A009]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. Long term SPA population trend is stable or increasing 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Cormorant [A017]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. Long term population trend within the SPA is stable or increasing 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Herring gull [A184]							
To maintain the favourable conservation	1. Population size 2. Spatial distribution	1. Long term SPA population trend is stable or increasing 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Direct effects on habitat [1,2]	Section 4.36	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
condition of the SCI in the SPA	3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Lesser black-backed gull [A183]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Guillemot [A199]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Razorbill [A200]							
	1. Population size	1. No significant decline	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
To maintain the favourable conservation condition of the SCI in the SPA	2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Puffin [A204]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. Long term SPA population trend is stable or increasing 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Manx shearwater [A013]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Common tern [A193]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Arctic tern [A194]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Roseate tern [A192] – All impacts to this SCI screened out							
Shag [A018] – All impacts to this SCI screened out							
Great northern diver [A003]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity and site use	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Little tern [A195] – All impacts to this SCI screened out							
Red-throated diver [A001]							
		1. No significant decline	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity and site use	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Common scoter [A065]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity and site use	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Black-headed gull [A179]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	5. Barriers to connectivity and site use	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Common gull [A182]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity and site use	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high-level assessment in **Section 4**			No AESI
Little gull [A177]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size 2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity	1. No significant decline 2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI
			Disturbance and displacement (including barrier effects) [1,2,3,4,5]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Great black-backed gull [A187]							
To maintain the favourable	1. Non-breeding population size	1. No significant decline	Direct effects on habitat [1,2]	**Section 4.36**	None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
conservation condition of the SCI in the SPA	2. Spatial distribution 3. Forage spatial distribution, extent, abundance and availability 4. Disturbance across the site 5. Barriers to connectivity and site use	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population 3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target 4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution 5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Disturbance and displacement [1,2,3,4]		None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
			Collision [1]		None	No change	No AESI
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5289. The following SCIs of North-west Irish Sea SPA were screened in on a precautionary basis in relation to construction phase ex situ direct effects on habitat impacts associated with the array site: fulmar, Manx shearwater, cormorant, lesser black-backed gull, herring gull, kittiwake, common tern, guillemot, razorbill, puffin, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull, little gull.

Project-only assessment

5290. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may also support these SCIs of seabirds that breed at colonies on the north-west Irish Sea's islands and coastal headlands and that forage at the North-west Irish Sea SPA.

5291. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing / no significant decline.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5292. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging and non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect energetic costs and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5293. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of foraging or non-foraging habitat of these SCIs within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by these SCIs during the breeding and/or non-breeding seasons.

5294. In the context of the extent of available supporting ex situ habitat utilised by these SCIs of this SPA and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. Accordingly, the level of impact is not considered capable of altering the extent of available ex situ supporting habitat in such a way as to adversely affect the populations abundance of these SCIs of this SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of theses SCIs of North-west Irish Sea SPA.

5295. With reference to the Conservation Objectives, attributes and targets (**Table 4-155**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5296. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5297. As per project-only assessment, above.

OECC Intertidal landfall

5298. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase ex situ direct effects on habitat impacts associated with the array site: common tern, Arctic tern, lesser black-backed gull, herring gull, cormorant, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull.

Project-only assessment

5299. As the OECC does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5300. Although the North-west Irish Sea SPA is to be designated as a foraging area for seabirds that breed at colonies on the north-west Irish Sea's islands and coastal headlands, rather than a central point of origin such as a breeding colony, for the purposes of this precautionary assessment it is assumed that these SCIs which utilise marine habitats within North-west Irish Sea SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by these SCIs. Cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to alter areas of ex situ intertidal habitat such that they become temporarily unavailable as supporting habitat for these SCIs of North-west Irish Sea SPA, which may otherwise utilise those areas for non-foraging behaviours.

5301. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of North-west Irish Sea

5302. SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing / no significant decline.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5303. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging and non-foraging

behaviours. These potential consequences of construction phase activities within the array site may affect energetic costs and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5304. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within North-west Irish Sea SPA (and hence do not affect the distribution of non-foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible.

5305. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting these SCIs of North-west Irish Sea SPA is *de minimis*. Accordingly, with reference to the Conservation Objectives, attributes and targets (**Table 4-155**), the level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5306. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5307. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5308. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA.**

Construction phase impact 2 – Disturbance and Displacement

Array site

5309. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase disturbance and displacement impacts associated with the array site: guillemot, razorbill, puffin, Manx shearwater, cormorant, great northern diver, red-throated diver, common scoter and little gull.

Project-only assessment

5310. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of standing OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for all SCIs except divers, for which disturbance and displacement impacts may occur over considerably larger distances [i.e. disturbance of red-throated diver up to 16 km, Mendel et al., 2019]), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA. Note that this means that disturbance and displacement impacts relating to construction of the array site are not considered relevant in relation to the following Conservation Objective attribute and target of each SCI:

- Disturbance across the site: the intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5311. During the construction phase of the CWP Project, vessel traffic and/or, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of the above listed SCIs of North-west Irish Sea SPA from areas of ex situ supporting habitat within and surrounding the array site. Disturbance and displacement impacts within these area has the potential to impact the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing / no significant decline.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [only for species which are sensitive to disturbance in relation to the presence of OWF infrastructure] Barriers to connectivity: the number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5312. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss).

5313. Similarly, for those SCIs which are sensitive to disturbance in relation to the presence of OWF infrastructure (all of the above listed SCIs, excluding cormorant), as WTGs are erected within the array site during the construction phase, individuals which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects') or reduced connectivity between the SPA and other ecologically important ex situ areas.

5314. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5315. The potential consequences of these pathways to impact to each of the above listed SCIs in relation to relevant Conservation Objective attributes are considered in **Table 4-156**.

Table 4-156: Project-only assessments of construction phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	Red-throated diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although red-throated diver which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods, or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km, and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA, there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the red-throated diver SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-west Irish Sea SPA and any other Irish east coast SPA where non-breeding red-throated diver is a designated SCI (namely The Murrough SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Great northern diver	Great northern diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although great northern diver which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA, there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the great northern diver SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding great northern diver is a designated SCI), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Common scoter	Common scoter is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods.

SCI	Project-only assessment
	Although common scoter which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods, or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA, there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the common scoter SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding common scoter is a designated SCI (namely Dundalk Bay SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Little gull	Little gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although little gull which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods, or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the little gull SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding little gull is a designated SCI, the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Guillemot	Guillemot is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA and Ireland's Eye SPA. Both of these colonies are within the mean maximum (+ 1 SD) foraging range of guillemot (153.7 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 5.190 guillemot mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site

SCI	Project-only assessment
	and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.6.3 and 4.7.5**, above). Collectively the breeding populations of these SPAs are estimated to total 64,393 individuals (see **Sections 4.6.3 and 4.7.5**, above). Therefore, assuming an average breeding adult annual mortality rate of 6.1% (Horswill and Robinson, 2015), the average annual baseline mortality rate of guillemot associated with named breeding colonies SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 3,927.973 individuals. Additional construction phase displacement mortality would therefore equate to an increase of 0.13% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the guillemot SCI of North-west Irish Sea SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Razorbill	Razorbill is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA and Ireland's Eye SPA. Both of these colonies are within the mean maximum (+ 1 SD) foraging range of razorbill (164.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.755 razorbill mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.6.4 and 4.7.6**, above). Collectively the breeding populations of these SPAs are estimated to total 8,953 individuals (see **Sections 4.6.4 and 4.7.6**, above). Therefore, assuming an average adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of razorbill associated with named breeding colony SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 940.065 individuals. Additional construction phase displacement mortality would therefore equate to an increase of 0.08% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds.

SCI	Project-only assessment
	As additional mortality to the razorbill SCI of North-west Irish Sea SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the razorbill SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where razorbill is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Puffin	Puffin is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with the breeding colony at Lambay Island SPA. This colony is within the mean maximum (+ 1 SD) foraging range of puffin (265.4 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site. As assessed for the puffin SCI of Lambay Island in **Section 4.7.7**, above, additional construction phase displacement mortality would equate to an increase of 0.03% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the puffin SCI of North-west Irish Sea SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA. As additional mortality to the puffin SCI of North-west Irish Sea SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where puffin is a designated SCI (namely Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area

SCI	Project-only assessment
	would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Manx shearwater	Manx shearwater is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skomer, Skokholm and seas off Pembrokeshire SPA (i.e. all SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of Manx shearwater (2,365.5 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 3.015 Manx shearwater mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Collectively the breeding populations of these SPAs are estimated to total 936,195 individuals (see **Sections 4.10.1, 4.12.3 and 4.14.1** above). Therefore, assuming an average adult annual mortality rate of 13.0% (Horswill and Robinson, 2015), the average annual baseline mortality rate of Manx shearwater associated with SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 121,705.350 individuals. Additional construction phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the Manx shearwater SCI of North-west Irish Sea SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the Manx shearwater SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and North-west Irish Sea SPA and SPAs surrounding the Irish Sea where breeding Manx shearwater is a designated feature, should individuals on transit to or from North-west Irish Sea SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Cormorant	Cormorant is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and

SCI	Project-only assessment
	in particular associated with breeding colonies at Lambay Island SPA, Skerries Islands SPA and Ireland's Eye SPA. Of these breeding colony SPAs, only Ireland's Eye SPA colony is within the mean maximum (+ 1 SD) foraging range of cormorant (33.9 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site. Unlike the other SCIs assessed above within this table, cormorant is not considered sensitive to disturbance in relation to the presence of OWF infrastructure. For this SCI disturbance impacts associated with construction phase activities within the array site are assessed to occur at a much more localised scale, around vessels engaged in construction works within the array site. Specifically, given the minimal overlap between the foraging range of cormorant and the array site, potentially disturbance inducing vessel activity to cormorant connected with Ireland's Eye SPA, and therefore to cormorant within ex situ supporting habitat of North-west Irish Sea SPA, may occur only in relation to construction phase vessel activity within the extreme north-west corner of the array site. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel. Given the extremely localised area in which ex situ disturbance and displacement impacts may occur to the cormorant SCI of North-west Irish Sea SPA in relation to construction phase activities within the array site, and the temporary and limited nature of each potential disturbance event within that area, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the cormorant SCI of North-west Irish Sea SPA.

5316. As outlined in **Table 4-156**, above, for all SCIs of North-west Irish Sea SPA screened in with regard to disturbance and displacement impacts from construction phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-155**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5317. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5318. As per project-only assessment, above.

OECC

5319. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase disturbance and displacement impacts associated with the OECC: guillemot, razorbill, puffin, cormorant, great northern diver, red-throated diver, common scoter and little gull.

Project-only assessment

5320. During the construction phase of the CWP Project, vessel traffic within the OECC may result in the temporary disturbance and displacement of the above listed SCIs of North-west Irish Sea SPA from areas of ex situ supporting habitat within and surrounding the OECC. Although the OECC does not overlap this SPA, the minimum separation distance between both (1.27 km) is such that, for certain SCIs which are particularly sensitive to disturbance by vessel activity (specifically common scoter, cormorant and red-throated diver and also, potentially, great northern diver), individuals within North-west Irish Sea SPA may experience temporary disturbance and displacement impacts from vessel activity associated with construction phase activities within the northernmost part of the OECC (i.e., limited in situ effects).

5321. Disturbance and displacement impacts within these areas have the potential to impact the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / No significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [only for common scoter, cormorant, red-throated diver and potentially for great northern diver SCIs] Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5322. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats (and, for particularly sensitive SCIs, extremely limited areas of in situ habitat), may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours.

5323. Temporary reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5324. Construction phase works within the OECC at any period in time, and the associated extent of areas in which the SCIs may experience potential disturbance or displacement by construction vessels will cover only an extremely small proportion of the overall OECC and surrounding areas. Studies undertaken within the North and Baltic Seas by Fliessbach et al., (2019), describe the maximum ranges at which seabird species demonstrate disturbance responses to approaching vessel traffic. From these ranges it is possible to estimate the maximum spatial extent of ex situ and in situ disturbance and displacement impacts as a result of construction phase vessel activity around each vessel within the OECC (**Table 4-157**).

Table 4-157: Estimated maximum extent of SPA area in which SCIs may experience disturbance and displacement impacts from construction phase activities within the OECC

SCI	Max disturbance response range (Fliessbach et al., 2019)	Maximum potential extent of ex situ areas experiencing disturbance around each vessel	Maximum potential extent of in situ areas experiencing disturbance around each vessel
Guillemot	500 m	0.785 km^2	No overlap
Razorbill	900 m	2.545 km^2	No overlap
Puffin (razorbill as proxy)			
Cormorant	1,500 m	7.068 km^2	0.042 km^2 overlap, which equates to < 0.01% of SPA area
Great northern diver	2,000 m ('unidentified diver species')	12.566 km^2	0.387 km^2 overlap, which equates to 0.02% of SPA area
Red-throated diver			
Common scoter	3,200 m	32.170 km^2	1.728 km^2 overlap, which equates to < 0.07% of SPA area
Little gull	Using 'all gull species' value of 500m or less	0.785 km^2	No overlap

5325. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

5326. For all SCIs, in the context of the extent of available in-situ SPA habitat and ex situ supporting habitat, the area in which temporary disturbance and displacement may occur in relation to construction phase vessel activity within the OECC is considered negligible. In the event of potential temporary exclusion from affected areas, a sufficient extent of accessible suitable supporting habitat and foraging resource within and surrounding the SPA would remain available to all SCIs to support SPA population targets.

5327. For all SCIs of North-west Irish Sea SPA screened in with regard to disturbance and displacement impacts from construction phase activities within the OECC, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it

can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5328. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5329. As per project-only assessment, above.

OECC intertidal landfall

5330. The following SCIs of North-west Irish Sea SPA were screened in in relation to ex situ construction phase disturbance and displacement impacts associated with the OECC intertidal landfall: common tern, Arctic tern, lesser black-backed gull, herring gull, cormorant, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull.

Project-only assessment

5331. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5332. These SCIs which utilise North-west Irish Sea SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

5333. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5334. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project OECC intertidal landfall and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

5335. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the

condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of these SCIs to maintain their populations.

5336. Despite the above potential pathways to impact, given that North-west Irish Sea SPA does not overlap with construction phase within South Dublin Bay for the OECC intertidal landfall, only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance, and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting populations of these SCIs of North-west Irish Sea SPA is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline extent of supporting habitat or prey resource of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5337. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5338. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5339. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA.**

Onshore infrastructure

5340. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase disturbance and displacement impacts associated with onshore infrastructure: Common tern.

Project-only assessment

5341. As the onshore area does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of onshore infrastructure are considered to occur, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA. Note that this means that disturbance and

displacement impacts relating to construction of the onshore infrastructure are not considered relevant in relation to the following Conservation Objective attributes and targets of this SCI:

- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- Barriers to connectivity: the number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
- Disturbance across the site: the intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5342. During the construction phase of the CWP Project, construction activity in the form of the movement of machinery and personnel, noise, and lighting, may result in the disturbance and displacement of the above listed SCIs of North-west Irish Sea SPA from areas of ex situ supporting habitat within and surrounding the onshore site. Disturbance and displacement impacts within this area has the potential to impact the following Conservation Objective attribute and target for this SCIs of North-west Irish Sea SPA:

- Breeding population size: no significant decline.

5343. In relation to this Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within or near the CWP Project onshore areas may lead to the exclusion of individuals from a known breeding colony which would otherwise be used by the species (i.e. indirect habitat loss).

5344. One common tern breeding colony was recorded during onshore surveys near to the onshore substation area on a mooring dolphin owned by the Electricity Supply Board (ESB), which is associated with the South Dublin Bay and River Tolka Estuary SPA. The established common tern colony occurs approximately 250 m to the northeast of the onshore substation area during the breeding season. According to Goodship and Furness (2022), this species is assessed as having medium sensitivity to human disturbance at breeding colonies and suggest a 200 m buffer zone around colonies to protect the species from pedestrian disturbance, but that a larger buffer may be required if terns are not habituated to disturbance or if there is likely to be aerial disturbance.

5345. It is important to note that this colony, near the onshore substation area, is located within Dublin Port, which is a busy shipping and industrial area. A report prepared by ALC nature on behalf of CWP Project (see **Appendix 10.9** of the EIAR) was commissioned to determine the current disturbance tolerance of the breeding terns near to the proposed onshore substation. The study recreated potential construction disturbance / displacement included experimental disturbances in the form of the movement of personnel and machinery, creating light and moderate noise, within the onshore substation site. The results concluded that the terns within this study area have habituated to high levels of background disturbance and show low levels of disturbance to several current forms of more severe sporadic disturbance events, such as boats, traffic, predators, humans and aircraft.

5346. In this context, based on the distance of the onshore substation construction works to the breeding common tern colony and the habituation of the species to activities within Dublin Bay, the scale of disturbance and displacement effects on common tern within the breeding colony is considered to be negligible. The level of impact is not considered capable of resulting in a significant decline in breeding population abundance, productivity rate, passage population, and/or distribution of breeding colonies and roosting areas. Accordingly, the CWP Project will not impede the overall objective of maintaining the favourable conservation condition of common tern in the South Dublin and River Tolka Estuary SPA and therefore will not impede on the overall objective of maintaining the favourable conservation condition of common tern in the north-west Irish sea SPA. In light of these factors, it can be concluded

beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI on the north-west Irish sea SPA.

Proposed mitigation

5347. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5348. As per project-only assessment, above.

Construction phase impact 3 – Changes in prey availability

Array site

5349. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase changes in prey availability impacts associated with the array site: fulmar, Manx shearwater, cormorant, lesser black-backed gull, herring gull, kittiwake, common tern, guillemot, razorbill, puffin, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull and little gull.

Project-only assessment

5350. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5351. Construction phase activities within the array site which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5352. In relation to these Conservation Objective attributes, construction within the array site may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their

populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5353. Mortality or injury-inducing underwater noise impacts to seabird prey species associated with construction phase activities at the array site are calculated to occur within limited areas within and immediately around the array site. As the separation distance between the array site and North-west Irish Sea SPA is 21.35 km, such impacts will not affect seabird prey populations within or immediately surrounding the SPA.

5354. Should SCIs of North-west Irish Sea SPA occur within the array site or its immediate vicinity during the construction phase, this represents a negligible proportion of ex situ supporting habitat used by those SCIs for foraging.

5355. Although TTS inducing underwater noise impacts to seabird prey species are predicted to occur over larger areas TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

5356. Areas affected by increased SSC levels during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

5357. As the maximum potential extent of removed or altered benthic habitat within the array site is 6.30 km^2, the spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5358. In the context of the extent of available ex situ foraging habitat available to these SCIs surrounding the SPA and the limited potential of impacts to prey species within these areas to affect the population dynamics of seabird SCIs which depredate those species, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5359. In particular, potential ex situ changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for these SCIs of North-west Irish Sea SPA in such a way as to affect demographic parameters. Accordingly, taking the Conservation Objectives, attributes and targets (**Table 4-155**) into account the level of impact is not considered capable of altering the availability of prey species in such a way as to result in a significant decline in the populations of these SCIs of North-west Irish Sea SPA.

5360. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5361. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5362. As per project-only assessment, above.

OECC

5363. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase changes in prey availability impacts associated with the OECC: kittiwake, fulmar, cormorant, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, common tern, Arctic tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull, great black-backed gull.

Project-only assessment

5364. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5365. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5366. In relation to these Conservation Objective attributes, construction within the OECC may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5367. Despite the above potential pathways to impact, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible for all SCIs for the following reasons.

5368. Mortality or injury inducing underwater noise impacts to SCI prey species are anticipated to be very limited, as no pile driving activities are proposed in relation to the installation of the export cable within the OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

5369. Areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal

conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

5370. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5371. Accordingly, the level of impact is not considered capable of altering the availability of the prey species of these SCIs in such a way as to impede the overall objective of maintaining their favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5372. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5373. As per project-only assessment, above.

OECC intertidal landfall

5374. The following SCIs of North-west Irish Sea SPA were screened in in relation to construction phase changes in prey availability impacts associated with the OECC intertidal landfall: cormorant, herring gull, lesser black-backed gull, common tern, Arctic tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull and great black-backed gull.

Project-only assessment

5375. As the OECC intertidal landfall does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5376. These SCIs which utilise marine habitats within North-west Irish Sea SPA may also utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to these SCIs is temporarily reduced within those areas.

5377. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.

- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5378. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of these SCIs to maintain their populations.

5379. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within North-west Irish Sea SPA (and hence do not affect the distribution of foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting these SCIs of North-west Irish Sea SPA is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5380. No specific mitigation is proposed or required in respect of changes in prey availability impacts during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5381. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5382. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5383. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the array site: fulmar, Manx shearwater, cormorant, lesser black-backed gull, herring gull, kittiwake, common tern, guillemot, razorbill, puffin, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull, little gull.

Project-only assessment

5384. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may provide additional support to these SCIs of North-west Irish Sea SPA which are foraging beyond the site which is to be designated to support the foraging of breeding colonies and SPAs adjacent to the North-west Irish Sea SPA.

5385. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of North-west Irish Sea SPA:

- Population size / Breeding population size / non-breeding population size: Long term population trend is stable or increasing / No significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5386. In relation to these Conservation Objective attributes, the presence of above sea level CWP Project infrastructure within the array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging or non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5387. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of these SCIs within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by these SCIs during the breeding and/or non-breeding seasons.

5388. In the context of the extent of available supporting ex situ habitat utilised by these SCIs of this SPA and the negligible proportion that will be lost within the array site throughout the operation and maintenance phase, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, with respect to the Conservation Objectives, attributes and targets for the SCIs (**Table 4-155**), the level of impact is not considered capable of altering the extent

of available ex situ supporting habitat in such a way as to adversely affect the populations abundance of these SCIs of this SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of theses SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5389. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase at the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5390. As per project-only assessment, above.

OECC Intertidal landfall

5391. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the array site: common tern, Arctic tern, lesser black-backed gull, herring gull, cormorant, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull.

Project-only assessment

5392. As the OECC does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5393. These SCIs which utilise marine habitats within North-west Irish Sea SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by these SCIs. Specifically, export cable maintenance activities during the operational phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable as supporting habitat for these SCIs of North-west Irish Sea SPA, which may otherwise utilise those areas for non-foraging behaviours.

5394. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5395. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent of ex situ intertidal areas in which individuals can undertake foraging or non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may affect the energetic costs of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5396. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within North-west Irish Sea SPA (and hence do not affect the distribution of non-foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible.

5397. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting these SCIs of North-west Irish Sea SPA is *de minimis*. Accordingly, with respect to the Conservation Objectives, attributes and targets for the SCIs (**Table 4-155**), the level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5398. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5399. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5400. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA**.

Operation and maintenance phase impact 2 – Disturbance and Displacement

Array site

5401. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the array site: guillemot, razorbill, puffin, Manx shearwater, cormorant, great northern diver, red-throated diver, common scoter and little gull.

Project-only assessment

5402. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of operational OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for all SCIs except divers, for which disturbance and displacement impacts may occur over considerably larger distances [i.e. disturbance of red-throated diver up to 16 km, Mendel et al., 2019]), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA. Note that this means that disturbance and displacement impacts relating to operation and maintenance of the array site are not considered relevant in relation to the following Conservation Objective attribute and target of each SCI:

- Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5403. During the operation and maintenance phase of the CWP Project, vessel traffic and/or the presence of operational WTG infrastructure may result in the disturbance and displacement of the above listed SCIs of North-west Irish Sea SPA from areas of ex situ supporting habitat within and surrounding the array site. Disturbance and displacement impacts within these area has the potential to impact the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [only for species which are sensitive to disturbance in relation to the presence of OWF infrastructure] Barriers to connectivity: The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5404. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss).

5405. Similarly, for those SCIs which are sensitive to disturbance in relation to the presence of OWF infrastructure (all of the above listed SCIs, excluding cormorant), individuals which would otherwise pass through these areas, may avoid flying through, or close, to operational WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects') or reduced connectivity between the SPA and other ecologically important ex situ areas.

5406. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to operational WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5407. The potential consequences of these pathways to impact to each of the above listed SCIs in relation to relevant Conservation Objective attributes are considered in **Table 4-158**.

Table 4-158: Project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	Red-throated diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although red-throated diver which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the red-throated diver SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-west Irish Sea SPA and any other Irish east coast SPA where non-breeding red-throated diver is a designated SCI (namely The Murrough SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Great northern diver	Great northern diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although great northern diver which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the great northern diver SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding great northern diver is a designated SCI), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Common scoter	Common scoter is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods.

SCI	Project-only assessment
	Although common scoter which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the common scoter SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding common scoter is a designated SCI (namely Dundalk Bay SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Little gull	Little gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Although little gull which utilise marine areas within North-west Irish Sea SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the North-west Irish Sea SPA. As the minimum separation distance between the SPA and the array site is 21.35 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the little gull SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where non-breeding little gull is a designated SCI, the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Guillemot	Guillemot is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA and Ireland's Eye SPA. Both of these colonies are within the mean maximum (+ 1 SD) foraging range of guillemot (153.7 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 10.380 guillemot mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the

SCI	Project-only assessment
	array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.6.3 and 4.7.5**, above). Collectively the breeding populations of these SPAs are estimated to total 64,393 individuals (see **Sections 4.6.3 and 4.7.5**, above). Therefore, assuming an average breeding adult annual mortality rate of 6.1% (Horswill and Robinson, 2015), the average annual baseline mortality rate of guillemot associated with named breeding colonies SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 3,927.973 individuals. Additional operation and maintenance phase displacement mortality would therefore equate to an increase of 0.26% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the guillemot SCI of North-west Irish Sea SPA resulting from operational and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Razorbill	Razorbill is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA and Ireland's Eye SPA. Both of these colonies are within the mean maximum (+ 1 SD) foraging range of razorbill (164.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 1.510 razorbill mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.6.4 and 4.7.6**, above). Collectively the breeding populations of these SPAs are estimated to total 8,953 individuals (see **Sections 4.6.4 and 4.7.6**, above). Therefore, assuming an average adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of razorbill associated with named breeding colony SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 940.065 individuals. Additional operation and maintenance phase displacement mortality would therefore equate to an increase of 0.16% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds.

SCI	Project-only assessment
	As additional mortality to the razorbill SCI of North-west Irish Sea SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the razorbill SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where razorbill is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Puffin	Puffin is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with the breeding colony at Lambay Island SPA. This colony is within the mean maximum (+ 1 SD) foraging range of puffin (265.4 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site. As assessed for the puffin SCI of Lambay Island in **Section 4.7.7**, above, additional operation and maintenance phase displacement mortality would equate to an increase of 0.06% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the puffin SCI of North-west Irish Sea SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between North-West Irish Sea SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, seas off Wexford SPA, and Saltees Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Manx shearwater	Manx shearwater is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skomer, Skokholm and seas off Pembrokeshire SPA (i.e. all SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature).

SCI	Project-only assessment
	All of these colonies are within the mean maximum (+ 1 SD) foraging range of Manx shearwater (2,365.5 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 6.030 Manx shearwater mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Collectively the breeding populations of these SPAs are estimated to total 936,195 individuals (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Therefore, assuming an average adult annual mortality rate of 13.0% (Horswill and Robinson, 2015), the average annual baseline mortality rate of Manx shearwater associated with SPA's surrounding the Irish sea where breeding Manx shearwater is a designated Feature which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 121,705.350 individuals. Additional operation and maintenance phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the Manx shearwater SCI of North-west Irish Sea SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the Manx shearwater SCI of North-west Irish Sea SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and North-west Irish Sea SPA and SPAs surrounding the Irish Sea where breeding Manx shearwater is a designated feature, should individuals on transit to or from North-west Irish Sea SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Cormorant	Cormorant is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA, Skerries Islands SPA and Ireland's Eye SPA. Of these breeding colony SPAs, only Ireland's Eye SPA colony is within the mean maximum (+ 1 SD) foraging range of cormorant (33.9 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site. Unlike the other SCIs assessed above within this table, cormorant is not considered sensitive to disturbance in relation to the presence of OWF infrastructure. For this SCI disturbance impacts associated with operation and maintenance phase activities within the array site are assessed to occur at a much more localised scale, around vessels engaged in maintenance activities within the array site. Specifically, given the minimal overlap between the foraging range of cormorant and the array

SCI	Project-only assessment
	site, potentially disturbance inducing vessel activity to cormorant connected with Ireland's Eye SPA, and therefore to cormorant within ex situ supporting habitat of North-west Irish Sea SPA, may occur only in relation to operation and maintenance phase vessel activity within the extreme north-west corner of the array site. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel. Given the extremely localised area in which ex situ disturbance and displacement impacts may occur to the cormorant SCI of North-west Irish Sea SPA in relation to operation and maintenance phase activities within the array site, and the temporary and limited nature of each potential disturbance event within that area, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the cormorant SCI of North-west Irish Sea SPA.

5408. As outlined in **Table 4-158**, above, for all SCIs of North-west Irish Sea SPA screened in with regard to disturbance and displacement impacts from operation and maintenance phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5409. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5410. As per project-only assessment, above.

OECC

5411. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC: guillemot, razorbill, puffin, cormorant, great northern diver, red-throated diver, common scoter and little gull.

Project-only assessment

5412. During the operation and maintenance phase of the CWP Project, vessel traffic within the OECC may result in the temporary disturbance and displacement of the above listed SCIs of North-west Irish Sea SPA from areas of ex situ supporting habitat within and surrounding the OECC. Although the OECC does not overlap this SPA, the minimum separation distance between both (1.27 km) is such that, for certain SCIs which are particularly sensitive to disturbance by vessel activity (specifically common scoter, cormorant and red-throated diver and also, potentially, great northern diver – Fliessbach et al., 2019), individuals within North-west Irish Sea SPA may experience temporary disturbance and displacement impacts from vessel activity associated with operation and maintenance phase activities within the northernmost part of the OECC (i.e., limited in situ effects).

5413. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

5414. Disturbance and displacement impacts within these areas have the potential to impact the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [only for common scoter, cormorant, red-throated diver and potentially for great northern diver SCIs] Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5415. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats (and, for particularly sensitive SCIs, extremely limited areas of in situ habitat), may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours.

5416. Temporary reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5417. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the SCIs may experience potential disturbance or displacement, will only ever, at most, cover an extremely small proportion of the overall OECC and surrounding areas and through the majority of the operational lifetime of the CWP Project there is likely to be no vessel activity associated with the maintenance of the export cable.

5418. For all SCIs, in the context of the extent of available in-situ SPA habitat and ex situ supporting habitat, the area in which temporary disturbance and displacement may occur in relation to operation and maintenance phase vessel activity within the OECC is considered negligible. In the event of potential temporary exclusion from affected areas, a sufficient extent of accessible suitable supporting habitat and foraging resource within and surrounding the SPA would remain available to all SCIs to support SPA population targets.

5419. For all SCIs of North-west Irish Sea SPA screened in with regard to disturbance and displacement impacts from operation and maintenance phase activities within the OECC, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets (**Table 4-155**).

5420. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5421. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance phase within the OECC, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5422. As per project-only assessment, above.

OECC intertidal landfall

5423. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC intertidal landfall: common tern, Arctic tern, lesser black-backed gull, herring gull, cormorant, red-throated diver, great northern diver, common scoter, black-headed gull, common gull and great black-backed gull.

Project-only assessment

5424. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding potential operation and maintenance phase activities at the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5425. These SCIs which utilise North-west Irish Sea SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to maintenance activities at the OECC intertidal landfall within South Dublin Bay.

5426. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5427. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project OECC intertidal landfall and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

5428. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of these SCIs to maintain their populations.

5429. Despite the above potential pathways to impact, given that North-west Irish Sea SPA does not overlap with areas within South Dublin Bay in which maintenance activities for the OECC intertidal landfall may be undertaken during the operational phase, during any periods in which maintenance works are carried out-only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from potential maintenance activities at the OECC intertidal landfall is considered negligible.

5430. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting populations of these SCIs of North-west Irish Sea SPA is *de minimis*. This level of impact is not considered capable of resulting in a significant decline extent of supporting habitat or prey resource of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5431. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5432. As per project-only assessment, above.

Onshore infrastructure

5433. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with onshore infrastructure: Common tern.

Project-only assessment

5434. As the onshore area does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of onshore infrastructure are considered to occur, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of North-west Irish Sea SPA. Note that this means that disturbance and

displacement impacts relating to operation of the onshore infrastructure are not considered relevant in relation to the following Conservation Objective attributes and targets of this SCI:

- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population;
- Forage spatial distribution, extent, abundance and availability: sufficient number of locations, area of suitable habitat and available forage biomass to support the population target; and
- Barriers to connectivity: the number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA
- Disturbance across the site: the intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5435. Following installation of the substation and associated onshore landfall infrastructure, the operational nature of infrastructure in the vicinity of breeding common tern colonies (including the ESB pontoon which forms part of the South Dublin Bay and River Tolka Estuary SPA) is passive. Disturbance and displacement impacts within this area has the potential to impact the following Conservation Objective attribute and target for this SCIs of North-west Irish Sea SPA:

- Breeding population size: no significant decline.

5436. It is possible that unplanned maintenance may be required on infrastructure during the operational phase of the project, and that such activities may occur within 200 m of breeding common terns. It is considered, however, that routine activities during the operational phase of the project would be no greater in magnitude than existing anthropogenic activities to which breeding terns are already habituated.

5437. Given short temporal duration of any unplanned maintenance activities and that routine operational activities are considered to be at levels to which breeding terns are already habituated, it is considered such that there is no potential for AESI to this SCI as a result of disturbance and displacement impacts during the operation and maintenance phase around the substation and associated onshore infrastructure, in relation to the Conservation Objectives, attributes and targets.

Proposed mitigation

5438. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5439. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5440. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA**.

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

5441. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the array site: fulmar, Manx shearwater, cormorant, lesser black-backed gull, herring gull, kittiwake, common tern, guillemot, razorbill, puffin, red-throated diver, great northern diver, common scoter, black-headed gull, common gull, great black-backed gull and little gull.

Project-only assessment

5442. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5443. Operation and maintenance phase activities within the array site which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5444. In relation to these Conservation Objective attributes, maintenance activities and the presence of operational infrastructure within the array site may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5445. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5446. As operational phase activities do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact these SCIs.

5447. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5448. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact these SCIs.

5449. In relation to potential EMF effects, any impacts on SCI fish prey species are anticipated to occur within the immediate vicinity of inter array cables and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of these SCIs.

5450. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. Taking account of the Conservation Objectives, attributes and targets for the SCIs (**Table 4-155**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5451. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5452. As per project-only assessment, above.

OECC

5453. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC: kittiwake, fulmar, cormorant, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, common tern, Arctic tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull and great black-backed gull.

Project-only assessment

5454. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5455. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5456. In relation to these Conservation Objective attributes, maintenance activities within the OECC may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5457. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5458. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact these SCIs.

5459. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5460. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact these SCIs.

5461. In relation to potential EMF effects, any impacts on SCI fish prey species are anticipated to occur within the immediate vicinity of the export cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of these SCIs.

5462. With respect to the Conservation Objectives, attributes and targets for these SCIs (**Table 4-155**), the CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5463. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance activities within the OECC, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5464. As per project-only assessment, above.

OECC intertidal landfall

5465. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC intertidal landfall: cormorant, herring gull, lesser black-backed gull, common tern, Arctic tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull and great black-backed gull.

Project-only assessment

5466. As the OECC intertidal landfall does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of North-west Irish Sea SPA.

5467. These SCIs which utilise marine habitats within North-west Irish Sea SPA may also utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, export cable maintenance activities during the operational phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that prey species availability to these SCIs is temporarily reduced within those areas.

5468. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / No significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5469. In relation to these Conservation Objective attributes, maintenance activities at the OECC intertidal landfall may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5470. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing

productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis

5471. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within North-west Irish Sea SPA (and hence do not affect the distribution of foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with North-west Irish Sea SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible.

5472. As such, taking account of the Conservation Objectives, attributes and targets (**Table 4-155**), the potential for changes in prey availability impacts at the OECC intertidal landfall affecting these SCIs of North-west Irish Sea SPA is *de minimis*. This level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of North-west Irish Sea SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5473. No specific mitigation is proposed or required in respect of changes in prey availability impacts during operation and maintenance phase activities at the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5474. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5475. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA**

Operation and maintenance impact 4 – Collision

Array site

5476. The following SCIs of North-west Irish Sea SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC: Kittiwake, cormorant, herring gull, lesser black-backed gull, common tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull, great black-backed gull, little gull.

Project-only assessment

5477. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of the above listed screened in SCIs from North-west Irish Sea SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for these SCIs of North-west Irish Sea SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.

5478. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of these SCIs at North-west Irish Sea SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of these SCIs at North-west Irish Sea SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis

5479. Project-only assessments of operation and maintenance phase collision impacts at the array site for each SCI are presented in **Table 4-159**, below.

Table 4-159: Project-only assessments of operation and maintenance phase collision impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	Red-throated diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. No flight activity of red-throated diver was recorded within the array site during baseline surveys (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding red-throated diver SCI of North-west Irish Sea SPA may pass through the array site during post-breeding migration, migration-free non-breeding and return migration periods, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the red-throated diver SCI of North-west Irish Sea SPA.
Great northern diver	Great northern diver is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. No flight activity of great-northern diver was recorded within the array site during baseline surveys (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding great-northern diver SCI of North-west Irish Sea SPA may pass through the array site during post-breeding migration, migration-free non-breeding and return migration periods, any collision mortality to this SCI would be negligible and for this impact there is therefore

SCI	Project-only assessment
	assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the great northern diver SCI of North-west Irish Sea SPA.
Cormorant	Cormorant is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA, Ireland's Eye SPA and Skerries Islands SPA. Of these colonies, that at Ireland's Eye SPA is within the mean maximum (+ 1 SD) foraging range of cormorant (33.9 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Flight activity by cormorant recorded within the array site during baseline surveys was, however, extremely low throughout the baseline survey period (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although cormorants from Ireland's Eye SPA, which use areas within North-west Irish Sea SPA, may pass through the array site, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the population size of the cormorant SCI of North-west Irish Sea SPA.
Common scoter	Common scoter is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. No flight activity of common scoter was recorded within the array site during baseline surveys (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding common scoter SCI of North-west Irish Sea SPA may pass through the array site during non-breeding periods, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the common scoter SCI of North-west Irish Sea SPA.
Little gull	Little gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Flight activity levels of little gull recorded within the array site during baseline surveys were low (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR) and the proportion of this species predicted to be flying at the altitudes associated with potential collision with project WTGs is also low (1.61% – from flight heigh distribution data summarise in Johnston et al., 2014a&b). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although little gulls from North-west Irish Sea SPA may pass through the array site, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to

SCI	Project-only assessment
	affect the non-breeding population size of the little gull SCI of North-west Irish Sea SPA.
Black-headed gull	Black-headed gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Flight activity by black-headed gull recorded within the array site during baseline surveys was extremely low throughout the baseline survey period (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding black-headed gull SCI of North-west Irish Sea SPA may pass through the array site during non-breeding periods, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the black-headed gull SCI of North-west Irish Sea SPA.
Common gull	Common gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Based on Jessopp et al. (2018) it is estimated that 2,866 common gull individuals occur in the SPA in the winter (NPWS, 2023). This is estimated to constitute 4.25% of the regional common gull non-breeding population as determined within Appendix 10.5: Baseline Characterisation Report of the EIAR (67,500 individuals). Total annual collision mortality to common gull is estimated to be 2.359 individuals for array site Design Option A and 2.073 individuals for array site Design Option B. As such, if it is assumed that the proportion of common gull which would pass through the array site which are associated with North-west Irish Sea SPA is equal to the SPA population as a proportion of the regional non-breeding population, then a total of 0.100 and 0.088 common gull mortalities per annum would be apportioned to North-west Irish Sea SPA for array site Design Options A and B respectively. Assuming a non-breeding population of 2,866 individuals, and an average annual mortality rate of 25.3% (as calculated, using demographic parameters from Horswill and Robinson (2015), in Technical Appendix 10.5: Baseline Characterisation Report of the EIAR), the average annual baseline mortality rate of common gull associated with North-west Irish Sea SPA is 725.098 individuals. Additional collision mortality would therefor equate to an increase of 0.01% to SPA baseline mortality rates for array site Design Options A and B. As additional mortality to the common gull SCI of North-west Irish Sea SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 0.1%, for preferred Band Option 2 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the non-breeding population size of the common gull SCI of North-west Irish Sea SPA.
Lesser black-backed gull	Lesser black-backed gull is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with breeding colony at Lambay

SCI	Project-only assessment
	Island SPA. This colony is within the mean maximum (+ 1 SD) foraging range of lesser black-backed gull (236 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site. Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was, however, extremely low throughout the baseline survey period (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although lesser black-backed gulls from Lambay Island SPA, which use areas within North-west Irish Sea SPA may pass through the array site, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the breeding population size of the lesser black-backed gull SCI of North-west Irish Sea SPA.
Herring gull	Herring gull is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA, Ireland's Eye SPA and Skerries Islands SPA. All of these colonies are within the mean maximum (+ 1 SD) foraging range of herring gull (85.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 2.524 and 2.137 herring gull mortalities per annum are apportioned to these SPAs for array site Design Options A and B respectively for preferred Band Option 1 CRMs (see **Sections 4.6.2, 4.7.3 and 4.9.1**, above). Collectively the breeding populations of these SPAs are estimated to total 2,468 individuals (**Sections 4.6.2, 4.7.3 and 4.9.1**, above). Therefore, assuming an average adult annual mortality rate of 16.6% (Horswill and Robinson, 2015), the average annual baseline mortality rate of herring gull associated with named breeding colony SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 409.688 individuals. Additional collision mortality would therefore equate to an increase of 0.62% and 0.52% to SPA baseline mortality rates for array site Design Options A and B respectively. As additional mortality to the herring gull SCI of North-west Irish Sea SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (much less than 1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the population size of the herring gull SCI of North-west Irish Sea SPA.
Great black-backed gull	Great black-backed gull is designated as an SCI of North-west Irish Sea SPA in relation to the population of this species which utilises this area during non-breeding periods. Based on Jessopp et al. (2018) it is estimated that 2,096 great black-backed gull individuals occur in the SPA in the winter (NPWS, 2023). This is estimated to constitute 3.92% of the regional great black-backed gull non-breeding population

SCI	Project-only assessment
	as determined within Appendix 10.5: Baseline Characterisation Report of the EIAR (53,405 individuals). Total annual collision mortality to common gull is estimated to be 4.147 individuals for array site Design Option A and 3.303 individuals for array site Design Option B. As such, if it is assumed that the proportion of great black-backed gull which would pass through the array site which are associated with North-west Irish Sea SPA is equal to the SPA population as a proportion of the regional non-breeding population, then a total of 0.163 and 0.129 great black-backed gull mortalities per annum would be apportioned to North-west Irish Sea SPA for array site Design Options A and B respectively. Assuming a non-breeding population of 2,096 individuals, and an average annual mortality rate of 9.5% (as calculated, using demographic parameters from Horswill and Robinson (2015), in Technical Appendix 10.5: Baseline Characterisation Report of the EIAR), the average annual baseline mortality rate of great black-backed gull associated with North-west Irish Sea SPA is 199.120 individuals. Additional collision mortality would therefor equate to an increase of 0.08% and 0.06% to SPA baseline mortality rates for array site Design Options A and B respectively. As additional mortality to the great black-backed gull SCI of North-west Irish Sea SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 0.1%, for preferred Band Option 2 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the non-breeding population size of the great black-backed gull SCI of North-west Irish Sea SPA.
Kittiwake	Kittiwake is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Lambay Island SPA, Howth Head Coast SPA and Ireland's Eye SPA. All of these colonies are within the mean maximum (+ 1 SD) foraging range of kittiwake (300.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.981 and 0.853 kittiwake mortalities per annum are apportioned to these SPAs for array site Design Options A and B respectively for preferred Band Option 1 CRMs (see **Sections 4.5.1, 0 and 0**, above). Collectively the breeding populations of these SPAs are estimated to total 10,988 individuals (see **Sections 4.5.1, 0 and 0**, above). Therefore, assuming an average adult annual mortality rate of 14.6% (Horswill and Robinson, 2015), the average annual baseline mortality rate of kittiwake associated with named breeding colonies SPAs which contribute to the population utilising the marine area encompassed by North-west Irish Sea SPA is 1,604.248 individuals. Additional collision mortality would therefore equate to an increase of 0.06% and 0.05% to SPA baseline mortality rates for array site Design Options A and B respectively. As additional mortality to the kittiwake SCI of North-west Irish Sea SPA resulting from collision with operational WTGs is estimated to represent-only a very small

SCI	Project-only assessment
	potential increase (less than 0.1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the population size of the kittiwake SCI of North-west Irish Sea SPA.
Common tern	Common tern is designated as a SCI of North-west Irish Sea SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with breeding colonies at Rockabill SPA and South Dublin Bay and River Tolka Estuary SPA. The separation distance between Rockabill SPA and the array site is greater than the mean maximum (+ 1 SD) foraging range of common tern (26.9 km – Woodward et al., 2019), and therefore common tern breeding within this SPA are not assessed to have potential connectivity with the array site. Despite the separation distance between South Dublin Bay and River Tolka Estuary SPA and the array site (straight line distance = 26.20 km) being less than the mean maximum (+ 1 SD) foraging range of common tern (26.9 km – Woodward et al., 2019), the distance between common tern breeding colonies within the SPA and the array site (straight line distance = 32.06 km) is greater than the mean maximum (+ 1 SD) foraging range of common tern. On this basis, breeding common tern from South Dublin Bay and River Tolka Estuary SPA are not assessed to have potential connectivity with the array site. For this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the breeding population size of the common tern SCI of North-west Irish Sea SPA.

5480. As outlined in **Table 4-159**, above, for all SCIs of North-west Irish Sea SPA screened in with regard to collision impacts during the operational phase at the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-155**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at North-west Irish Sea SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to North-west Irish Sea SPA.

Proposed mitigation

5481. No specific mitigation is proposed or required in respect of collision impacts during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to North-west Irish Sea SPA.

Residual effect

5482. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5483. The Conservation Objectives, attributes and targets for these SCIs of North-west Irish Sea SPA are presented in **Table 4-155**, above. With regard to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of North-west Irish Sea SPA.**

4.37 Seas off Wexford SPA (IE004237)

5484. SPA is to be designated in relation to the following SCIs which have been screened in for consideration within the NIS: kittiwake, fulmar, cormorant, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, red-throated diver, common scoter and gannet. For the purposes of this assessment the site is assumed to be fully and formally designated, although it is noted that final consultation responses and status for both this site and seas off Wexford SPA have not been published.

5485. The minimum separation distance between SPA and the array site is 51.925 km (with the 'by-sea' separation distance being the same).

5486. The minimum separation distance between SPA and the OECC is 60.411 km (with the 'by-sea' separation distance being the same).

5487. The minimum separation distance between SPA and the OECC intertidal landfall is 83.94 km (with the 'by-sea' separation distance of 86.69 km).

Table 4-160: Assessment of adverse effects on site integrity (project alone) – Seas off Wexford SPA

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Kittiwake [A188]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
			Changes in prey availability [1,2,3]		None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Collision [1]		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target					
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Fulmar [A009]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Changes in prey availability [1,2,3]		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target					
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA	Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Cormorant [A017]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Population size	1. Long term population trend within the SPA is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement [1,2,3,4]		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Collision [1]		None	No change	No AESI
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Herring gull [A184]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Changes in prey availability [1,2,3]		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Collision [1]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Lesser black-backed gull [A183]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
			Disturbance and displacement [1,2,3,4]		None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Changes in prey availability [1,2,3]		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Collision [1]		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in Section 4			No AESI
Guillemot [A199]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Razorbill [A200]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Puffin [A204]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Manx shearwater [A013]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution					
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Red-throated diver [A001]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, and abundance	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Collision [1]		None	No change	No AESI
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Common scoter [A065]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Non-breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Collision [1]		None	No change	No AESI
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI
Gannet [A016]							
To maintain the favourable conservation condition of the SCI in the SPA	1. Breeding population size	1. Long term SPA population trend is stable or increasing	Direct effects on habitat [1,2]	**Section 4.37**	None	No change	No AESI
	2. Spatial distribution	2. Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population	Disturbance and displacement (including barrier effects)		None	No change	No AESI

Objective:	Attribute	Target	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
	3. Forage spatial distribution, extent, abundance and availability	3. Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Changes in prey availability [1,2,3]		None	No change	No AESI
	4. Disturbance across the site	4. The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution	Collision [1]		None	No change	No AESI
	5. Barriers to connectivity	5. The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA					
			Introduction or spread of INNS [1,2,3]	See high level assessment in **Section 4**			No AESI

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5488. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase direct effects on habitat impacts associated with the array site: kittiwake, fulmar, cormorant, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, red-throated diver, common scoter and gannet.

Project-only assessment

5489. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5490. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5491. In relation to these Conservation Objective attributes, construction of the CWP Project array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging and non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect energetic costs and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5492. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of foraging or non-foraging habitat of these SCIs within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by these SCIs during the breeding and/or non-breeding seasons.

5493. In the context of the extent of available supporting ex situ habitat utilised by these SCIs of this SPA and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. Accordingly, the level of impact is not considered capable of altering the extent of available ex situ supporting habitat in such a way as to adversely affect the populations abundance of these SCIs of this SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of theses SCIs of seas off Wexford SPA.

5494. With reference to the Conservation Objectives, attributes and targets (**Table 4-160**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5495. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5496. As per project-only assessment, above.

OECC Intertidal landfall

5497. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase direct effects on habitat impacts associated with the OECC intertidal landfall: lesser black-backed gull, red-throated diver and common scoter.

Project-only assessment

5498. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5499. The above-listed SCIs which occur within seas off Wexford SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

5500. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for the SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5501. In relation to these Conservation Objective attributes, disturbance leading to temporary displacement of these SCIs from ex situ intertidal habitats around construction activity within at the OECC intertidal landfall may lead to the temporary and localised exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

5502. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5503. Despite the above potential pathways to impact, given the separation distance between this SPA and the OECC intertidal landfall (a minimum straight-line distance of 83.94 km (with 'by-sea' distance of 86.69 km), only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance

and displacement impacts at the OECC intertidal landfall affecting the relevant populations of seas off Wexford SPA SCIs is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in significant declines in the population abundance of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining / restoring the favourable conservation condition of the SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA

Proposed mitigation

5504. No specific mitigation is proposed or required in respect of disturbance and displacement during the construction phase within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5505. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5506. The Conservation Objective and its attributes and targets for the SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for the seas off Wexford SPA lesser black-backed gull, red-throated diver or common scoter SCIs**.

Construction phase impact 2 – Disturbance and Displacement

Array site

5507. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase disturbance and displacement impacts associated with the array site: guillemot, razorbill, puffin, Manx shearwater, red-throated diver, common scoter and gannet.

Project-only assessment

5508. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of standing OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for all SCIs except divers, for which disturbance and displacement impacts may occur over considerably larger distances [i.e. disturbance of red-throated diver up to 16 km, Mendel et al., 2019]), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA. Note that this means that disturbance and displacement impacts relating to construction of the array site are not considered relevant in relation to the following Conservation Objective attribute and target of each SCI:

- Disturbance across the site: the intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5509. During the construction phase of the CWP Project, vessel traffic and/or, as it is installed, the presence of above sea level WTG infrastructure may result in the disturbance and displacement of the above listed SCIs of seas off Wexford SPA from areas of ex situ supporting habitat within and surrounding the array site. Disturbance and displacement impacts within these area has the potential to impact the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: long term population trend is stable or increasing.
- Spatial distribution: sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [only for species which are sensitive to disturbance in relation to the presence of OWF infrastructure] Barriers to connectivity: the number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5510. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss).

5511. Similarly, for those SCIs which are sensitive to disturbance in relation to the presence of OWF infrastructure (all of the above listed SCIs), as WTGs are erected within the array site during the construction phase, individuals which would otherwise pass through these areas, may avoid flying through, or close, to standing WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat ‘behind’ installed infrastructure (i.e. experience ‘barrier effects’) or reduced connectivity between the SPA and other ecologically important ex situ areas.

5512. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to installed WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5513. The potential consequences of these pathways to impact to each of the above listed SCIs in relation to relevant Conservation Objective attributes are considered in **Table 4-161**.

Table 4-161: Project-only assessments of construction phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	Red-throated diver is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. Although red-throated diver which utilise marine areas within seas off Wexford SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the seas off Wexford SPA. As the minimum separation distance between the SPA and the array site is 51.925 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the red-throated diver SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other Irish east coast SPA where non-breeding red-throated diver is a designated SCI (namely The Murrough SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Common scoter	Common scoter is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. Although common scoter which utilise marine areas within seas off Wexford SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the seas off Wexford SPA. As the minimum separation distance between the SPA and the array site is 51.925 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the common scoter SCI of seas off Wexford SPA.

SCI	Project-only assessment
	In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where non-breeding common scoter is a designated SCI (namely Dundalk Bay SPA, The Raven SPA, and North-west Irish Sea SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Guillemot	Guillemot is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Saltee Islands SPA. This colony is are within the mean maximum (+ 1 SD) foraging range of guillemot (153.7 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.806 guillemot mortalities per annum are apportioned to Saltee Islands SPA using the evidence-led central displacement rates of 25% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Section 4.11.4**, above). The breeding population of this SPA is estimated to total 25,851 individuals (see **Section 4.11.4**, above). Therefore, assuming an average breeding adult annual mortality rate of 6.1% (Horswill and Robinson, 2015), the average annual baseline mortality rate of guillemot associated with the above-named breeding colony SPA which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 1,576.911 individuals. Additional construction phase displacement mortality would therefore equate to an increase of 0.022% to SPA baseline mortality rates using the evidence-led central displacement rates of 25% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the guillemot SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, North-west Irish Sea SPA, and Saltee Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

SCI	Project-only assessment
Razorbill	Razorbill is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Saltee Islands SPA. This colony is are within the mean maximum (+ 1 SD) foraging range of guillemot (164.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.194 razorbill mortalities per annum are apportioned to Saltee Islands SPA using the evidence-led central displacement rates of 25% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Section 4.11.5**, above). The breeding population of this SPA is estimated to total 6,519 individuals (see **Section 4.11.5**, above). Therefore, assuming an average breeding adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of razorbill associated with the above-named breeding colony SPA which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 684.495 individuals. Additional construction phase displacement mortality would therefore equate to an increase of 0.028% to SPA baseline mortality rates using the evidence-led central displacement rates of 25% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the razorbill SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where razorbill is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, North-west Irish Sea SPA, and Saltee Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Puffin	Puffin is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with the breeding colony at Saltee Islands SPA. This colony is within the mean maximum (+ 1 SD) foraging range of puffin (265.4 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site.

SCI	Project-only assessment
	As assessed for the puffin SCI of Saltee Islands in **Section 4.11.6**, above, additional construction phase displacement mortality would equate to an increase of 0.006% to SPA baseline mortality rates using the evidence-led central displacement rates of 25% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the puffin SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where puffin is a designated SCI (namely Saltee Islands SPA, North-west Irish Sea SPA, and Lambay Island SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Manx shearwater	Manx shearwater is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skomer, Skokholm and seas off Pembrokeshire SPA (i.e. all SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of Manx shearwater (2,365.5 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 3.015 Manx shearwater mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Collectively the breeding populations of these SPAs are estimated to total 936,195 individuals (**Sections 4.10.1, 4.12.3 and 4.14.1**, above). Therefore, assuming an average adult annual mortality rate of 13.0% (Horswill and Robinson, 2015), the average annual baseline mortality rate of Manx shearwater associated with SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 121,705.350 individuals.

SCI	Project-only assessment
	Additional construction phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the Manx shearwater SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the Manx shearwater SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and seas off Wexford SPA and SPAs surrounding the Irish Sea where breeding Manx shearwater is a designated feature, should individuals on transit to or from seas off Wexford SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Gannet	Gannet is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Saltee Islands SPA, Grassholm SPA, Ailsa Craig SPA, The Bull and the Cow Rocks SPA and Skelligs SPA (i.e. all SPAs surrounding the Irish sea where breeding gannet is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of gannet (509.4 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 4.64 gannet mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 35% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above). Collectively the breeding populations of these SPAs are estimated to total 231,282 individuals (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above). Therefore, assuming an average adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of gannet associated with SPAs surrounding the Irish sea where breeding gannet is a designated Feature which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 24,284.61 individuals.

SCI	Project-only assessment
	Additional construction phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 35% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the gannet SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the gannet SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and seas off Wexford SPA and SPAs surrounding the Irish Sea where breeding gannet is a designated feature, should individuals on transit to or from seas off Wexford SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5514. As outlined in **Table 4-161**, above, for all SCIs of seas off Wexford SPA screened in with regard to disturbance and displacement impacts from construction phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-160**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5515. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5516. As per project-only assessment, above.

OECC

5517. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase disturbance and displacement impacts associated with the OECC: guillemot, razorbill, puffin, cormorant, red-throated diver and common scoter.

Project-only assessment

5518. Disturbance and displacement impacts within the OECC areas have the potential to impact the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [common scoter and red-throated diver only] Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5519. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours.

5520. During the construction phase of the CWP Project, vessel traffic within the OECC may result in the temporary disturbance and displacement of the above listed SCIs of seas off Wexford SPA from areas of ex situ supporting habitat within and surrounding the OECC. The OECC does not overlap this SPA, with the minimum separation distance between being 60.411 km. It is considered that, for all SCIs (of which common scoter and red-throated diver are particularly sensitive to disturbance by vessel activity), individuals within seas off Wexford SPA are beyond the range within which they would

experience temporary disturbance and displacement impacts from vessel activity associated with construction phase activities within the OECC.

5521. Construction phase activities within the OECC will include up to a maximum of seven vessels at any one time in offshore areas. These vessels will typically be operating in close proximity to accomplish specific construction activities and therefore have overlapping areas in which they may be causing disturbance.

5522. For all SCIs, in the context of the extent of available ex situ supporting habitat, the area in which temporary disturbance and displacement may occur in relation to construction phase vessel activity within the OECC is considered negligible. In the event of potential temporary exclusion from affected areas, a sufficient extent of accessible suitable supporting habitat within and surrounding the SPA would remain available to all SCIs to support SPA population targets.

5523. For all SCIs of seas off Wexford SPA screened in with regard to disturbance and displacement impacts from construction phase activities within the OECC, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5524. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5525. As per project-only assessment, above.

OECC intertidal landfall

5526. The following SCIs of seas off Wexford SPA were screened in in relation to ex situ construction phase disturbance and displacement impacts associated with the OECC intertidal landfall: lesser black-backed gull, red-throated diver, common scoter.

Project-only assessment

5527. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding construction phase works for the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5528. These SCIs which utilise seas off Wexford SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to construction phase activities at the OECC intertidal landfall within South Dublin Bay.

5529. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5530. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project OECC intertidal landfall and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

5531. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of these SCIs to maintain their populations.

5532. Despite the above potential pathways to impact, given that seas off Wexford SPA does not overlap with construction phase within South Dublin Bay for the OECC intertidal landfall, only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting populations of these SCIs of seas off Wexford SPA is *de minimis*. Accordingly, the level of impact is not considered capable of resulting in a significant decline extent of supporting habitat or prey resource of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5533. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5534. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5535. The Conservation Objective and its attributes and targets for the SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the seas off Wexford SPA SCIs.**

Construction phase impact 3 – Changes in prey availability

Array site

5536. All SCIs of seas off Wexford SPA were screened in in relation to construction phase changes in prey availability impacts associated with the array site.

Project-only assessment

5537. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5538. Construction phase activities within the array site which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / Breeding population size / Non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5539. In relation to these Conservation Objective attributes, construction within the array site may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5540. Mortality or injury-inducing underwater noise impacts to seabird prey species associated with construction phase activities at the array site are calculated to occur within limited areas within and immediately around the array site. As the minimum (and 'by-sea') separation distance between the array site and seas off Wexford SPA is 60.411 km, such impacts will not affect seabird prey populations within or immediately surrounding the SPA.

5541. Should SCIs of seas off Wexford SPA occur within the array site or its immediate vicinity during the construction phase, this represents a negligible proportion of ex situ supporting habitat used by those SCIs for foraging.

5542. Although TTS inducing underwater noise impacts to seabird prey species are predicted to occur over larger areas TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

5543. Areas affected by increased SSC levels during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending

on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

5544. As the maximum potential extent of removed or altered benthic habitat within the array site is 6.30 km^2, the spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5545. In the context of the extent of available ex situ foraging habitat available to these SCIs surrounding the SPA and the limited potential of impacts to prey species within these areas to affect the population dynamics of seabird SCIs which depredate those species, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5546. In particular, potential ex situ changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to reductions in offspring provisioning rates for these SCIs of seas off Wexford SPA in such a way as to affect demographic parameters. Accordingly, taking the Conservation Objectives, attributes and targets (**Table 4-160**) into account the level of impact is not considered capable of altering the availability of prey species in such a way as to result in a significant decline in the populations of these SCIs of seas off Wexford SPA.

5547. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5548. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5549. As per project-only assessment, above.

OECC

5550. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase changes in prey availability impacts associated with the OECC: kittiwake, fulmar, lesser black-backed gull, guillemot, razorbill, puffin, Manx shearwater, gannet, red-throated diver, common scoter.

Project-only assessment

5551. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats

which may support these SCIs of seas off Wexford SPA. impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5552. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5553. In relation to these Conservation Objective attributes, construction within the OECC may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5554. Despite the above potential pathways to impact, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible for all SCIs for the following reasons.

5555. Mortality or injury inducing underwater noise impacts to SCI prey species are anticipated to be very limited, as no pile driving activities are proposed in relation to the installation of the export cable within the OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

5556. Areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

5557. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5558. Accordingly, the level of impact is not considered capable of altering the availability of the prey species of these SCIs in such a way as to impede the overall objective of maintaining their favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5559. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5560. As per project-only assessment, above.

OECC intertidal landfall

5561. The following SCIs of seas off Wexford SPA were screened in in relation to construction phase changes in prey availability impacts associated with the OECC intertidal landfall: lesser black-backed gull, red-throated diver, common scoter.

Project-only assessment

5562. As the OECC intertidal landfall does not overlap this SPA, potential changes in prey availability impacts will occur outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA. impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5563. These SCIs which utilise marine habitats within seas off Wexford SPA may also utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from construction phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, cable landfall duct installation and cable laying activities during the construction phase within South Dublin Bay have the potential to affect areas of intertidal habitat such that prey species availability to these SCIs is temporarily reduced within those areas.

5564. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / No significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5565. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent and / or quality of intertidal areas in which individuals can undertake foraging behaviours or require individuals to use alternative areas for foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may directly affect demographic parameters (for example, use of alternative foraging areas may affect the energetic costs of foraging behaviours through increased occupancy of sub-optimal foraging habitats and in turn the condition of individuals and their consequent survival and / or productivity rates), and thereby compromise the ability of these SCIs to maintain their populations.

5566. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within seas off Wexford SPA (and hence do not affect the distribution of foraging habitat of these

SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from construction phase activities at the OECC intertidal landfall is considered negligible. As such, the potential for changes in prey availability impacts at the OECC intertidal landfall affecting these SCIs of seas off Wexford SPA is *de minimis*. Accordingly, the level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5567. No specific mitigation is proposed or required in respect of changes in prey availability impacts during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5568. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5569. The Conservation Objectives, attributes and targets for these SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regard to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of seas off Wexford SPA.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5570. All SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the array site.

Project-only assessment

5571. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5572. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5573. In relation to these Conservation Objective attributes, the presence of above sea level CWP Project infrastructure within the array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging or non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5574. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of these SCIs within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by these SCIs during the breeding and/or non-breeding seasons.

5575. In the context of the extent of available supporting ex situ habitat utilised by these SCIs of this SPA and the negligible proportion that will be lost within the array site throughout the operation and maintenance phase, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, with respect to the Conservation Objectives, attributes and targets for the SCIs (**Table 4-160**), the level of impact is not considered capable of altering the extent of available ex situ supporting habitat in such a way as to adversely affect the populations abundance of these SCIs of this SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of theses SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5576. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase at the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5577. As per project-only assessment, above.

OECC Intertidal landfall

5578. All SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the array site.

Project-only assessment

5579. As the OECC does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5580. These SCIs which utilise marine habitats within seas off Wexford SPA may also utilise intertidal areas within South Dublin Bay to undertake non-foraging behaviours (such as roosting, loafing or for maintenance activities). Impacts considered to be direct effects on habitat may arise as a consequence of activities which remove or alter areas of intertidal habitat which are utilised by these SCIs. Specifically, export cable maintenance activities during the operational phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that they become temporarily unavailable as supporting habitat for these SCIs of seas off Wexford SPA, which may otherwise utilise those areas for non-foraging behaviours.

5581. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the above listed SCIs of seas off Wexford SPA:

- Population size / Breeding population size / Non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.

5582. In relation to these Conservation Objective attributes, construction of the CWP Project OECC intertidal landfall may reduce the extent of ex situ intertidal areas in which individuals can undertake foraging or non-foraging behaviours. These potential consequences of construction phase activities within the OECC intertidal landfall may affect the energetic costs of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5583. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area within seas off Wexford SPA (and hence do not affect the distribution of non-foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay for non-foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience direct effect on habitat impacts from construction phase activities at the OECC intertidal landfall is considered negligible.

5584. As such, the potential for direct effects on habitat impacts at the OECC intertidal landfall affecting these SCIs of seas off Wexford SPA is *de minimis*. Accordingly, with respect to the Conservation Objectives, attributes and targets for the SCIs (**Table 4-160**), the level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5585. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5586. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5587. The Conservation Objectives, attributes and targets for these SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regard to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of seas off Wexford SPA**.

Operation and maintenance phase impact 2 – Disturbance and Displacement

Array site

5588. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the array site: guillemot, razorbill, puffin, Manx shearwater, red-throated diver, common scoter and gannet.

Project-only assessment

5589. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of operational OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for all SCIs except divers, for which disturbance and displacement impacts may occur over considerably larger distances [i.e. disturbance of red-throated diver up to 16 km, Mendel et al., 2019]), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA. Note that this means that disturbance and displacement impacts relating to operation and maintenance of the array site are not considered relevant in relation to the following Conservation Objective attribute and target of each SCI:

- Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5590. During the operation and maintenance phase of the CWP Project, vessel traffic and/or the presence of operational WTG infrastructure may result in the disturbance and displacement of the above listed SCIs of seas off Wexford SPA from areas of ex situ supporting habitat within and surrounding the array site. Disturbance and displacement impacts within these area has the potential to impact the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

- [only for species which are sensitive to disturbance in relation to the presence of OWF infrastructure] Barriers to connectivity: The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5591. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project array site and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. indirect habitat loss).

5592. Similarly, for those SCIs which are sensitive to disturbance in relation to the presence of OWF infrastructure, individuals which would otherwise pass through these areas, may avoid flying through, or close, to operational WTG infrastructure and alter flightpaths so as to go round such areas, with potential reductions in habitat 'behind' installed infrastructure (i.e. experience 'barrier effects') or reduced connectivity between the SPA and other ecologically important ex situ areas.

5593. Resultant reductions in the extent of marine areas in which individuals can undertake foraging and non-foraging behaviours, or the requirement of individuals to use alternative areas for such behaviours, or the requirement for individuals to increase flight lengths to avoid passage through or close to operational WTGs, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its population.

5594. The potential consequences of these pathways to impact to each of the above listed SCIs in relation to relevant Conservation Objective attributes are considered in **Table 4-162**.

Table 4-162; Project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	Red-throated diver is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. Although red-throated diver which utilise marine areas within seas off Wexford SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the seas off Wexford SPA. As the minimum separation distance between the SPA and the array site is 51.925 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the red-throated diver SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other Irish east coast SPA where non-breeding red-throated diver is a designated SCI (namely The Murrough SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Common scoter	Common scoter is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. Although common scoter which utilise marine areas within seas off Wexford SPA during non-breeding periods may occur within the array site or surrounding areas during migration periods or as a result of movements during over-wintering periods, such occurrences do not relate to individuals undertaking regular and frequent movements from the seas off Wexford SPA. As the minimum separation distance between the SPA and the array site is 51.925 km and beyond the distance at which disturbance and displacement impacts may be experienced by SCIs within the SPA there is therefore assessed to be no meaningful impact pathway for disturbance and displacement impacts originating within the array site to affect the non-breeding population size, spatial distribution or forage spatial distribution of the common scoter SCI of seas off Wexford SPA.

SCI	Project-only assessment
	In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where non-breeding common scoter is a designated SCI (namely Dundalk Bay SPA, The Raven SPA, and seas off Wexford SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Guillemot	Guillemot is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Saltee Islands SPA. This colony is are within the mean maximum (+ 1 SD) foraging range of guillemot (153.7 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 1.612 guillemot mortalities per annum are apportioned to Saltee Islands SPA using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Section 4.11.4**, above). The breeding population of this SPA is estimated to total 25,851 individuals (see **Section 4.11.4**, above). Therefore, assuming an average breeding adult annual mortality rate of 6.1% (Horswill and Robinson, 2015), the average annual baseline mortality rate of guillemot associated with the above-named breeding colony SPA which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 1,576.911 individuals. Additional operation and maintenance phase displacement mortality would therefore equate to an increase of 0.044% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the guillemot SCI of seas off Wexford SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, North-west Irish Sea SPA, and Saltee Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

SCI	Project-only assessment
Razorbill	Razorbill is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Saltee Islands SPA. This colony is are within the mean maximum (+ 1 SD) foraging range of guillemot (164.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.388 razorbill mortalities per annum are apportioned to Saltee Islands SPA using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Section 4.11.5**, above). The breeding population of this SPA is estimated to total 6,519 individuals (see **Section 4.11.5**, above). Therefore, assuming an average breeding adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of razorbill associated with the above-named breeding colony SPA which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 684.495 individuals. Additional operation and maintenance phase displacement mortality would therefore equate to an increase of 0.057% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the razorbill SCI of seas off Wexford SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the guillemot SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where razorbill is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, North-west Irish Sea SPA, and Saltee Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Puffin	Puffin is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with the breeding colony at Saltee Islands SPA. This colony is within the mean maximum (+ 1 SD) foraging range of puffin (265.4 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site.

SCI	Project-only assessment
	As assessed for the puffin SCI of Saltee Islands in **Section 4.11.6**, above, additional construction phase displacement mortality would equate to an increase of 0.012% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the puffin SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where guillemot is a designated SCI (namely Ireland's Eye SPA, Lambay Island SPA, North-west Irish Sea SPA, and Saltee Islands SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA. As additional mortality to the puffin SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the puffin SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, as the array site is sited approximately 13–22 km off the County Wicklow coast, between Greystones and Wicklow Town and not between seas off Wexford SPA and any other SPA where puffin is a designated SCI (namely Saltee Islands SPA, North-west Irish Sea SPA, and Lambay Island SPA), the presence of OWF infrastructure in this area would not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Manx shearwater	Manx shearwater is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skomer, Skokholm and seas off Pembrokeshire SPA (i.e. all SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of Manx shearwater (2,365.5 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site.

SCI	Project-only assessment
	Collectively a total of 3.015 Manx shearwater mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Collectively the breeding populations of these SPAs are estimated to total 936,195 individuals (see **Sections 4.10.1, 4.12.3 and 4.14.1**, above). Therefore, assuming an average adult annual mortality rate of 13.0% (Horswill and Robinson, 2015), the average annual baseline mortality rate of Manx shearwater associated with SPAs surrounding the Irish sea where breeding Manx shearwater is a designated Feature which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 121,705.350 individuals. Additional construction phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 50% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the Manx shearwater SCI of seas off Wexford SPA resulting from operation and maintenance phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the Manx shearwater SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and seas off Wexford SPA and SPAs surrounding the Irish Sea where breeding Manx shearwater is a designated feature, should individuals on transit to or from seas off Wexford SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.
Gannet	Gannet is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Saltee Islands SPA, Grassholm SPA, Ailsa Craig SPA, The Bull and the Cow Rocks SPA and Skelligs SPA (i.e. all SPAs surrounding the Irish sea where breeding gannet is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of gannet (509.4 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site.

SCI	Project-only assessment
	Collectively a total of 0.716 gannet mortalities per annum are apportioned to these SPAs using the evidence-led central displacement rates of 70% within the array site and a 2 km buffer, with 1% mortality of displaced birds (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above). Collectively the breeding populations of these SPAs are estimated to total 231,282 individuals (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above). Therefore, assuming an average adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of gannet associated with SPAs surrounding the Irish sea where breeding gannet is a designated Feature which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 24,284.61 individuals. Additional construction phase displacement mortality would therefore equate to an increase of less than 0.01% to SPA baseline mortality rates using the evidence-led central displacement rates of 70% within the array site and a 2 km buffer, with 1% mortality of displaced birds. As additional mortality to the gannet SCI of seas off Wexford SPA resulting from construction phase displacement from the array site and surrounding 2 km buffer is estimated to represent-only a very small potential increase (much less than 1%) to SPA baseline mortality rates, this impact will not result in an AESI in relation to Conservation Objective attributes regarding population size (and, by association, spatial distribution) of the gannet SCI of seas off Wexford SPA. In relation to it representing a potential barrier to connectivity, given the separation distance between the array site and seas off Wexford SPA and SPAs surrounding the Irish Sea where breeding gannet is a designated feature, should individuals on transit to or from seas off Wexford SPA deviate their flight paths to avoid passing through or close to the array site, the energetic consequence of such deviations in relation to the very large foraging ranges of this species would be negligible The presence of the array site therefore does not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA.

5595. As outlined in **Table 4-162**, above, for all SCIs of seas off Wexford SPA screened in with regard to disturbance and displacement impacts from operation and maintenance phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5596. No specific mitigation is proposed or required in respect of disturbance and displacement during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5597. As per project-only assessment, above.

OECC

5598. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC: guillemot, razorbill, puffin, cormorant, red-throated diver and common scoter.

Project-only assessment

5599. Disturbance and displacement impacts within the OECC areas have the potential to impact the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / No significant decline.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.
- [Common scoter and red-throated diver only] Disturbance across the site: The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution.

5600. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats may lead to the temporary exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours.

5601. During the operation and maintenance phase of the CWP Project, vessel traffic within the OECC may result in the temporary disturbance and displacement of the above listed SCIs of seas off Wexford SPA from areas of ex situ supporting habitat within and surrounding the OECC. The OECC does not overlap this SPA, with the minimum separation distance between being 60.411 km. It is considered

that, for all SCIs (of which common scoter and red-throated diver are particularly sensitive to disturbance by vessel activity), individuals within seas off Wexford SPA are beyond the range within which they would experience temporary disturbance and displacement impacts from vessel activity associated with construction phase activities within the OECC.

5602. For all SCIs, in the context of the extent of available ex situ supporting habitat, the area in which temporary disturbance and displacement may occur in relation to operation and maintenance phase vessel activity within the OECC is considered negligible. In the event of potential temporary exclusion from affected areas, a sufficient extent of accessible suitable supporting habitat within and surrounding the SPA would remain available to all SCIs to support SPA population targets.

5603. Maintenance activities within the OECC at any period in time, and the associated extent of areas in which the SCIs may experience potential disturbance or displacement, will only ever, at most, cover an extremely small proportion of the overall OECC and surrounding areas and through the majority of the operational lifetime of the CWP Project there is likely to be no vessel activity associated with the maintenance of the export cable.

5604. For all SCIs of seas off Wexford SPA screened in with regard to disturbance and displacement impacts from operation and maintenance phase activities within the OECC, levels of impact are not considered capable of altering any Conservation Objective attributes in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5605. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance within the OECC, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5606. As per project-only assessment, above.

OECC intertidal landfall

5607. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC intertidal landfall: Lesser black-backed gull, red-throated diver and common scoter.

Project-only assessment

5608. As the OECC intertidal landfall does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts are considered to occur surrounding potential operation and maintenance phase activities at the OECC intertidal landfall, all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCIs of seas off Wexford SPA.

5609. These SCIs which utilise seas off Wexford SPA may also utilise ex situ intertidal areas within South Dublin Bay and, as such, may experience disturbance and displacement impacts in relation to maintenance activities at the OECC intertidal landfall within South Dublin Bay.

5610. Such ex situ disturbance and displacement impacts have the potential to affect the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.,
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5611. In relation to these Conservation Objective attributes, disturbance leading to displacement of SCIs from ex situ supporting habitats within the CWP Project OECC intertidal landfall and surrounding areas may lead to the exclusion of individuals from areas of habitat which would otherwise be used for foraging or other behaviours (i.e. temporary indirect habitat loss).

5612. Temporary localised reductions in the extent of ex situ intertidal habitat areas in which individuals can undertake foraging and non-foraging behaviours, which may require individuals to use alternative areas for such behaviours, may affect the energetic costs of those behaviours and, in turn, affect the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of these SCIs to maintain their populations.

5613. Despite the above potential pathways to impact, given that seas off Wexford SPA does not overlap with areas within South Dublin Bay in which maintenance activities for the OECC intertidal landfall may be undertaken during the operational phase, during any periods in which maintenance works are carried out-only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay at any given time. Accordingly, the numbers of such individuals expected to experience disturbance and displacement impacts from potential maintenance activities at the OECC intertidal landfall is considered negligible.

5614. As such, the potential for disturbance and displacement impacts at the OECC intertidal landfall affecting populations of these SCIs of seas off Wexford SPA is *de minimis*. This level of impact is not considered capable of resulting in a significant decline extent of supporting habitat or prey resource of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5615. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance phase activities within the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5616. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5617. The Conservation Objectives, attributes and targets for these SCIs of seas off Wexford Sea SPA are presented in **Table 4-160**, above. With regard to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of seas off Wexford SPA**.

Operation and maintenance phase impact 3 – Changes in prey availability

Array site

5618. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the array site: Kittiwake, guillemot, razorbill, puffin, fulmar, Manx shearwater, gannet, lesser black-backed gull, red-throated diver and common scoter.

Project-only assessment

5619. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5620. Operation and maintenance phase activities within the array site which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5621. In relation to these Conservation Objective attributes, maintenance activities and the presence of operational infrastructure within the array site may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5622. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5623. As operational phase activities do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact these SCIs.

5624. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5625. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact these SCIs.

5626. In relation to potential EMF effects, any impacts on SCI fish prey species are anticipated to occur within the immediate vicinity of inter array cables and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of these SCIs.

5627. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. Taking account of the Conservation Objectives, attributes and targets for the SCIs (**Table 4-160**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5628. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5629. As per project-only assessment, above.

OECC

5630. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC: Kittiwake, guillemot, razorbill, puffin, fulmar, Manx shearwater, gannet, lesser black-backed gull, red-throated diver and common scoter.

Project-only assessment

5631. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5632. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5633. In relation to these Conservation Objective attributes, maintenance activities within the OECC may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5634. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5635. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact these SCIs.

5636. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5637. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact these SCIs.

5638. In relation to potential EMF effects, any impacts on SCI fish prey species are anticipated to occur within the immediate vicinity of the export cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of these SCIs.

5639. With respect to the Conservation Objectives, attributes and targets for these SCIs (**Table 4-160**), the CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5640. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance activities within the OECC, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5641. As per project-only assessment, above.

OECC intertidal landfall

5642. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC intertidal landfall: Lesser black-backed gull, red-throated diver and common scoter.

Project-only assessment

5643. As the OECC intertidal landfall does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support these SCIs of seas off Wexford SPA.

5644. These SCIs which utilise marine habitats within seas off Wexford SPA may also utilise intertidal areas within South Dublin Bay for foraging. Changes to prey availability from operation and maintenance phase activity for the OECC intertidal landfall may arise as a consequence of activities which remove or alter areas of intertidal prey species habitat, or otherwise alter conditions so as to reduce foraging efficiency. Specifically, export cable maintenance activities during the operational phase within South Dublin Bay have the potential to alter areas of intertidal habitat such that prey species availability to these SCIs is temporarily reduced within those areas.

5645. This change in prey species availability has the potential to impact on the following Conservation Objective attributes and targets for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing.
- Spatial distribution: Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population.
- Forage spatial distribution, extent, abundance and availability: Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.

5646. In relation to these Conservation Objective attributes, maintenance activities at the OECC intertidal landfall may impact the prey species of these SCIs through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to prey

species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5647. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis

5648. Despite the above potential pathways to impact, these changes in prey availability do not affect any area within seas off Wexford SPA (and hence do not affect the distribution of foraging habitat of these SCIs within the SPA). Furthermore, due to there being no spatial overlap between this SPA and the OECC intertidal landfall, only a minimal number of individuals connected with seas off Wexford SPA are likely to be using impacted areas within South Dublin Bay for foraging behaviours at any given time. Accordingly, the numbers of such individuals expected to experience changes in prey availability impacts from operation and maintenance phase activities at the OECC intertidal landfall is considered negligible.

5649. As such, taking account of the Conservation Objectives, attributes and targets (**Table 4-160**), the potential for changes in prey availability impacts at the OECC intertidal landfall affecting these SCIs of seas off Wexford SPA is *de minimis*. This level of impact is not considered capable of altering the extent of available ex situ intertidal supporting habitat in such a way as to result in a significant decline in the populations of these SCIs of seas off Wexford SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of these SCIs of seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5650. No specific mitigation is proposed or required in respect of changes in prey availability impacts during operation and maintenance phase activities at the OECC intertidal landfall, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5651. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5652. The Conservation Objectives, attributes and targets for these SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regard to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of seas off Wexford SPA.**

Operation and maintenance impact 4 – Collision

Array site

5653. The following SCIs of seas off Wexford SPA were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC: Kittiwake, cormorant, herring gull, lesser black-backed gull, common tern, great northern diver, red-throated diver, common scoter, common gull, black-headed gull, great black-backed gull, little gull.

Project-only assessment

5654. During the operation and maintenance phase of the CWP Project the presence of operational WTGs within the array site may result in the mortality of the above listed screened in SCIs from seas off Wexford SPA through the collision of individuals with turbine blades. Collision mortality has the potential to impact on the following Conservation Objective attribute and target for these SCIs of seas off Wexford SPA:

- Population size / breeding population size / non-breeding population size: Long term population trend is stable or increasing / no significant decline.

5655. In relation to this Conservation Objective attribute, mortality resultant from collision with operational WTGs within the array site may directly affect the overall survival rate of these SCIs at seas off Wexford SPA. Furthermore, collision mortality may also adversely affect the overall productivity rate of these SCIs at seas off Wexford SPA, through reductions to offspring provisioning rates and other parental care metrics. These potential consequences may compromise the ability of the SCI to maintain its population on a long-term basis

5656. Project-only assessments of operation and maintenance phase collision impacts at the array site for each SCI are presented in **Table 4-163**, below.

Table 4-163: Project-only assessments of operation and maintenance phase collision impacts for the array site for each SCI

SCI	Project-only assessment
Gannet	Gannet is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular, associated with several colonies located around the periphery of the Irish Sea – which for the purpose of this assessment are assumed to be Saltee Islands SPA, Grassholm SPA, Ailsa Craig SPA, The Bull and the Cow Rocks SPA and Skelligs SPA (i.e. all SPAs surrounding the Irish sea where breeding gannet is a designated Feature). All of these colonies are within the mean maximum (+ 1 SD) foraging range of gannet (509.4 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. Collectively a total of 0.345 and 0.295 gannet mortalities per annum are apportioned to these SPAs for array site Design Options A and B respectively for preferred Band Option 1 CRMs (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above). Collectively the breeding populations of these SPAs are estimated to total 231,282 individuals (see **Sections 4.11.7, 4.13.1, 4.18.3, 4.25.1 and 4.30.2**, above).

SCI	Project-only assessment
	Therefore, assuming an average adult annual mortality rate of 10.5% (Horswill and Robinson, 2015), the average annual baseline mortality rate of gannet associated with SPAs surrounding the Irish sea where breeding gannet is a designated Feature which contribute to the population utilising the marine area encompassed by seas off Wexford SPA is 24,284.61 individuals. Additional collision mortality would therefore equate to an increase of 0.002% and 0.002% to SPA baseline mortality rates for array site Design Options A and B respectively. As additional mortality to the gannet SCI of seas off Wexford SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 0.1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the population size of the gannet SCI of seas off Wexford SPA.
Red-throated diver	Red-throated diver is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. No flight activity of red-throated diver was recorded within the array site during baseline surveys (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding red-throated diver SCI of seas off Wexford SPA may pass through the array site during post-breeding migration, migration-free non-breeding and return migration periods, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the red-throated diver SCI of seas off Wexford SPA.
Common scoter	Common scoter is designated as an SCI of seas off Wexford SPA in relation to the population of this species which utilises this area during non-breeding periods. No flight activity of common scoter was recorded within the array site during baseline surveys (see Technical Appendix 10.5: Baseline Characterisation Report of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although individuals associated with the non-breeding common scoter SCI of seas off Wexford SPA may pass through the array site during non-breeding periods, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the non-breeding population size of the common scoter SCI of seas off Wexford SPA.
Lesser black-backed gull	Lesser black-backed gull is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area during the breeding season, and in particular associated with breeding colonies at Saltee Islands SPA, Keeragh Islands SPA, Lady's Island Lake SPA and Wexford Harbour and Slobs SPA. These colonies is within the mean maximum (+ 1 SD) foraging range of lesser black-backed gull (236 km – Woodward et al., 2019) from the array site, and as such is assessed to have potential connectivity with the array site.

SCI	Project-only assessment
	Flight activity by lesser black-backed gull recorded within the array site during baseline surveys was, however, extremely low throughout the baseline survey period (see **Technical Appendix 10.5: Baseline Characterisation Report** of the EIAR). Consequently, CRM has not been undertaken for this species on the basis that any collision mortality rates will be extremely low and negligible. Although lesser black-backed gulls from Saltee Islands SPA, Keeragh Islands SPA, Lady's Island Lake SPA and Wexford Harbour and Slobs SPA, which use areas within seas off Wexford SPA may pass through the array site, any collision mortality to this SCI would be negligible and for this impact there is therefore assessed to be no meaningful impact pathway for collision impacts to affect the breeding population size of the lesser black-backed gull SCI of seas off Wexford SPA.
Kittiwake	Kittiwake is designated as a SCI of seas off Wexford SPA in relation to the number of individuals of this species which use this area throughout the year, and in particular associated with breeding colonies at Saltee Islands SPA. This colony is within the mean maximum (+ 1 SD) foraging range of kittiwake (300.6 km – Woodward et al., 2019) from the array site, and as such are assessed to have potential connectivity with the array site. A total of 0.050 and 0.043 kittiwake mortalities per annum are apportioned to this SPAs for array site Design Options A and B respectively for preferred Band Option 1 CRMs (see **Section 4.11.1**, above). The breeding populations of Saltee Islands SPAs are estimated to total 2,076 individuals (see **Section 4.11.1**, above). Therefore, assuming an average adult annual mortality rate of 14.6% (Horswill and Robinson, 2015), the average annual baseline mortality rate of kittiwake associated with the above-named breeding colony SPA which contributes to the population utilising the marine area encompassed by seas off Wexford SPA is 303.096 individuals. Additional collision mortality would therefore equate to an increase of 0.016% and 0.014% to SPA baseline mortality rates for array site Design Options A and B respectively. As additional mortality to the kittiwake SCI of seas off Wexford SPA resulting from collision with operational WTGs is estimated to represent-only a very small potential increase (less than 0.1%, for preferred Band Option 1 models) to SPA baseline mortality rates, this impact is considered not to impede the realisation of Conservation Objective attribute targets associated with the maintenance of the population size of the kittiwake SCI of seas off Wexford SPA.

5657. As outlined in **Table 4-163**, above, for all SCIs of seas off Wexford SPA screened in with regard to collision impacts during the operational phase at the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-160**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for each SCI of maintaining favourable conservation condition at seas off Wexford SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to seas off Wexford SPA.

Proposed mitigation

5658. No specific mitigation is proposed or required in respect of collision impacts during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to seas off Wexford SPA.

Residual effect

5659. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5660. The Conservation Objectives, attributes and targets for these SCIs of seas off Wexford SPA are presented in **Table 4-160**, above. With regard to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for these SCIs of seas off Wexford SPA**.

4.38 Irish Sea Front SPA

5661. SPA is designated in relation to the following SCI which has been screened in for consideration within the NIS: Manx shearwater

5662. The minimum separation distance between SPA and the array site is 68.958 km.

5663. The minimum separation distance between SPA and the OECC is 73.522 km.

Table 4-164: Assessment of adverse effects on site integrity (project alone) –Irish Sea Front SPA

Objective: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
Manx shearwater [A013]					
Objective: To maintain or restore the favourable conservation condition of the SCI: 1. Avoid significant disturbance of the qualifying feature within the site, such that the ability of the species to use the site is maintained in the long-term 2. Maintain the habitats, processes and food resources of the	Direct effects on habitat [2]	**Section 4.38**	None	No change	No AESI
	Disturbance and displacement (including barrier effects) [3]		None	No change	No AESI
	Changes in prey availability [2]		None	No change	No AESI

Objective: Attributes and targets	Predicted effect(s)	Link to assessment	Mitigation	Residual effect	Conclusion
qualifying feature in favourable condition 3. Ensure connectivity between the site and its supporting habitats and Manx shearwater breeding colonies is maintained					
	Introduction or spread of INNS [2]	See high level assessment in Section 4			No AESI

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

5664. With regards to the array site, relevant construction phase direct effects on habitat relate to the alteration of sea surface areas as they become occupied by the footprint of installed infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Irish Sea Front SPA.

5665. As construction of the array site progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all WTGs and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attribute and target for the Manx shearwater SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5666. In relation to this Conservation Objective attribute, construction of the CWP Project array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging and non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect energetic costs and in turn the condition of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of SCIs to maintain their populations.

5667. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of foraging or non-foraging habitat of the SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by the SCI during the breeding season.

5668. In the context of the extent of available supporting ex situ habitat utilised by this SCI of this SPA and the negligible proportion that will be lost within the array site during construction, the scale of direct effects on habitat within the array site is considered to be negligible. Accordingly, the level of impact is not considered capable of altering the extent of available ex situ supporting habitat in such a way as

to adversely affect the populations abundance of this SCI of this SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the SCIs of Irish Sea Front SPA.

5669. With reference to the Conservation Objectives, attributes and targets (**Table 4-164**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5670. No specific mitigation is proposed or required in respect of direct effects on habitat during construction within the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5671. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5672. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Irish Sea Front Manx shearwater SCI.**

Construction phase impact 2 – Disturbance and Displacement

Array site

Project-only assessment

5673. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of standing OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for the Manx shearwater SCI), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support the Manx shearwater SCI of Irish Sea Front SPA. Note that this means that disturbance and displacement impacts relating to construction of the array site are not considered relevant in relation to the following Conservation Objective attributes and targets of the SCI:

- Avoid significant disturbance of the qualifying feature within the site, such that the ability of the species to use the site is maintained in the long-term.
- Ensure connectivity between the site and its supporting habitats and Manx shearwater breeding colonies is maintained.

5674. Given the large separation distance between the array site and Irish Sea Front SPA (68.96 km), construction phase activity or the presence of infrastructure within the array site will not be detectable by Manx shearwater within or immediately surrounding the Irish Sea Front SPA. As such construction

phase activities within the array site are considered not to have the potential to result in significant disturbance of the qualifying feature within the site.

5675. Furthermore, apportioned displacement impacts to SPA breeding colonies supported by the Irish Sea Front SPA (specifically Rum SPA, Copeland Island SPA, Aberdaron Coast and Bardsey Island SPA and Skomer, Skokholm and the seas off Pembrokeshire – presented in **Sections 4.31, 4.10 and 4.12**) are small in absolute terms and relative to baseline mortality rates for all SPAs.

5676. Lastly, the array site is sited approximately 13–22 km off the County Wicklow coast between Greystones and Wicklow Town and not between Irish Sea Front SPA and any other important Manx shearwater habitat SPAs (i.e. the North-West Irish Sea SPA and the seas off Wexford SPA) or the aforementioned important SPA breeding colonies. It therefore does not significantly impact the site's SCI population's access to the SPA or other ecologically important sites outside the SPA.

5677. For the Manx shearwater SCI of Irish Sea Front SPA, with regard to disturbance and displacement impacts from construction phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-164**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for this SCI of maintaining favourable conservation condition at Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5678. No specific mitigation is proposed or required in respect of disturbance and displacement during construction within the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5679. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5680. The Conservation Objectives, attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regard to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for the SCIs and, in turn, that there is **no project-only AESI for this SCI of Irish Sea Front SPA.**

Construction phase impact 3 – Changes in prey availability

Array site

Project-only assessment

5681. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability

impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of Irish Sea Front SPA.

5682. Construction phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attribute and target for this SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5683. In relation to this Conservation Objective attribute, construction within the array site may impact the prey species of the SCI through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging SCIs, this may result in effects to the demographic parameters, and resultant population dynamics, of those SCIs through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of SCIs to maintain their populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5684. Mortality or injury-inducing underwater noise impacts to Manx shearwater prey species associated with construction phase activities at the array site are calculated to occur within limited areas within and immediately around the array site. As the separation distance between the array site and the Irish Sea Front SPA is 68.96 km, such impacts will not affect Manx shearwater populations within or immediately surrounding the SPA.

5685. Should Manx shearwater which use the Irish Sea Front SPA occur within the array site or its immediate vicinity during the construction phase, this represents a negligible proportion of sea area used by those SCIs for foraging.

5686. Although TTS inducing underwater noise impacts to seabird prey species are predicted to occur over larger areas TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

5687. Areas affected by increased SSC levels during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

5688. As the maximum potential extent of removed or altered benthic habitat within the array site is 6.30 km^2, The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5689. In the context of the extent of available ex situ foraging habitat available to the SCI surrounding the SPA and the limited potential of impacts to prey species within these areas to affect the population dynamics of the Manx shearwater SCI which depredates those species, the scale of changes in prey availability impacts associated with construction phase activities within the array site is considered to be negligible.

5690. In particular, potential ex situ changes to prey availability resultant from construction phase activities within the array site are not expected to perceptibly increase the energetic costs of foraging, or lead to

reductions in offspring provisioning rates for these SCIs of Irish Sea Front SPA in such a way as to affect demographic parameters. Accordingly, taking the Conservation Objectives, attributes and targets (**Table 4-164**) into account the level of impact is not considered capable of altering the availability of prey species in such a way as to result in a significant decline in the populations of the SCI of Irish Sea Front SPA.

5691. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Manx shearwater SCI of Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5692. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5693. As per project-only assessment, above.

OECC

Project-only assessment

5694. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support the Manx shearwater SCI of Irish Sea Front SPA.

5695. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attribute and target for the Manx shearwater SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5696. In relation to this Conservation Objective attribute, construction within the OECC may impact the prey species of the SCI through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of the SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5697. Despite the above potential pathways to impact, the scale of changes in prey availability impacts associated with construction phase activities within the OECC is considered to be negligible for all SCIs for the following reasons.

5698. Mortality or injury inducing underwater noise impacts to SCI prey species are anticipated to be very limited, as no pile driving activities are proposed in relation to the installation of the export cable within the OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

5699. Areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

5700. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird breeding and non-breeding season range extents.

5701. Accordingly, the level of impact is not considered capable of altering the availability of the prey species of these SCIs in such a way as to impede the overall objective of maintaining their favourable conservation condition at Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5702. No specific mitigation is proposed or required in respect of changes in prey availability during construction within the OECC, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5703. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5704. The Conservation Objectives, attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regard to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for the SCIs and, in turn, that there is **no project-only AESI for this SCI of Irish Sea Front SPA**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

Project-only assessment

5705. With regards to the array site, relevant operation and maintenance phase direct effects on habitat relate to the occupation of sea surface areas by the footprint of operational infrastructure and unavailable for use by seabird SCIs to undertake non-foraging behaviours. As the array site does not overlap this SPA, all direct effects on habitat will occur entirely outside of the SPA, i.e. all direct effects assessed here relate to ex situ habitats which may support these SCIs of Irish Sea Front SPA.

5706. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs). This direct effect on habitat has the potential to impact on the following Conservation Objective attribute and target for the Manx shearwater SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5707. In relation to these Conservation Objective attributes, the presence of above sea level CWP Project infrastructure within the array site may reduce the extent of ex situ marine areas in which individuals can undertake foraging or non-foraging behaviours. These potential consequences of construction phase activities within the array site may affect the energetic costs of individuals and their consequent survival and / or productivity rates; and thereby compromise the ability of the SCI to maintain its populations.

5708. Despite the above potential pathways to impact, these direct effects on habitat do not affect any area of the SPA (and hence do not affect the distribution of non-foraging habitat of this SCI within the SPA). Further, the area of habitat loss represents a negligible proportion of sea area utilised by the SCI during the breeding season.

5709. In the context of the extent of available supporting ex situ habitat utilised by the Manx shearwater SCI of Irish Sea Front SPA and the negligible proportion that will be lost within the array site throughout the operation and maintenance phase, the scale of direct effects on habitat within the array site is considered to be negligible. In particular, the reduction in marine areas in which to undertake non-foraging behaviours, or requirement to use alternative areas for non-foraging behaviours, is not expected to give rise to energetic costs of non-foraging behaviours in such a way as to affect the condition of individuals and consequent survival rates. Accordingly, with respect to the Conservation Objectives, attributes and targets for the SCI (**Table 4-164**), the level of impact is not considered capable of altering the extent of available ex situ supporting habitat in such a way as to adversely affect the population abundance of the SCI of Irish Sea Front SPA. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Manx shearwater SCI of Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5710. No specific mitigation is proposed or required in respect of direct effects on habitat during the operation and maintenance phase at the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5711. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5712. The Conservation Objective and its attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for this SCI and, in turn, that there is **no project-only AESI for the Irish Sea Front SPA Manx shearwater SCI.**

Operation and maintenance phase impact 2 – Disturbance and Displacement

Array site

Project-only assessment

5713. As the array site does not overlap this SPA and the SPA is beyond the extent of areas in which disturbance and displacement impacts associated with the presence of operational OWF infrastructure are considered to occur surrounding the array site (this is regarded as a 2 km buffer for the Manx shearwater SCI), all disturbance and displacement impacts will occur entirely outside of the SPA, i.e. all disturbance and displacement impacts assessed here relate to ex situ habitats which may support these SCI of Irish Sea Front SPA. Note that this means that disturbance and displacement impacts relating to operation and maintenance of the array site are not considered relevant in relation to the following Conservation Objective attribute and target of the SCI:

- Avoid significant disturbance of the qualifying feature within the site, such that the ability of the species to use the site is maintained in the long-term; and
- Ensure connectivity between the site and its supporting habitats and Manx shearwater breeding colonies is maintained.

5714. Given the large separation distance between the array site and Irish Sea Front SPA (68.96 km), operation and maintenance phase activity or the presence of infrastructure within the array site will not be detectable by Manx shearwater within or immediately surrounding the Irish Sea Front SPA. As such construction phase activities within the array site are considered not to have the potential to result in significant disturbance of the qualifying feature within the site.

5715. Furthermore, apportioned displacement impacts to SPA breeding colonies supported by the Irish Sea Front SPA (specifically Rum SPA, Copeland Island SPA, Aberdaron Coast and Bardsey Island SPA and Skomer, Skokholm and the seas off Pembrokeshire – presented in **Sections 4.31, 4.10 and 4.12**) are small in absolute terms and relative to baseline mortality rates for all SPAs.

5716. Lastly, the array site is sited approximately 13–22 km off the County Wicklow coast between Greystones and Wicklow Town and not between Irish Sea Front SPA and any other important Manx shearwater habitat SPAs (i.e. the North-West Irish Sea SPA and the seas off Wexford SPA) or the aforementioned important SPA breeding colonies. It therefore does not significantly impact the site's SCI population's access to the SPA or other ecologically important sites outside the SPA.

5717. For the Manx shearwater SCI of Irish Sea Front SPA, with regard to disturbance and displacement impacts from operation and maintenance phase activities within the array site, levels of impact are not considered capable of altering any Conservation Objective attributes (**Table 4-164**) in such a way as to impede the realisation of attribute targets. The CWP Project will therefore not impede the overall objective for this SCI of maintaining favourable conservation condition at Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5718. No specific mitigation is proposed or required in respect of disturbance and displacement during operation and maintenance within the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5719. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5720. The Conservation Objectives, attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regard to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for the SCIs and, in turn, that there is **no project-only AESI for this SCI of Irish Sea Front SPA.**

Operation and maintenance phase impact 3 – Changes in prey availability

Project-only assessment

5721. As the array site does not overlap this SPA and the SPA is beyond the range in which prey species may experience potential impacts from construction phase works, potential changes in prey availability impacts will occur entirely outside of the SPA, i.e. all impacts assessed here relate to prey species within ex situ habitats which may support these SCIs of Irish Sea Front SPA.

5722. Operation and maintenance phase activities within the array site which may affect Manx shearwater prey species have the potential to impact on the following Conservation Objective attribute and target for this SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5723. In relation to these Conservation Objective attributes, maintenance activities and the presence of operational infrastructure within the array site may impact the prey species of the SCI through

underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5724. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of this SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5725. As operational phase activities do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact the Manx shearwater SCI.

5726. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5727. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact these SCIs.

5728. In relation to potential EMF effects, any impacts on Manx shearwater fish prey species are anticipated to occur within the immediate vicinity of inter array cables and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of the SCI.

5729. The CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Manx shearwater SCI of Irish Sea Front SPA. Taking account of the Conservation Objectives, attributes and targets for the SCIs (**Table 4-164**), and in light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5730. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance of the array site, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5731. As per project-only assessment, above.

OECC

Project-only assessment

5732. As the OECC does not overlap this SPA, potential changes in prey availability impacts will occur primarily outside of the SPA, i.e. impacts assessed here relate primarily to prey species within ex situ habitats which may support the Manx shearwater SCI of Irish Sea Front SPA.

5733. Construction phase activities within the OECC which may affect seabird prey species have the potential to impact on the following Conservation Objective attribute and target for the Manx shearwater SCI of Irish Sea Front SPA:

- Maintain the habitats, processes and food resources of the qualifying feature in favourable condition.

5734. In relation to this Conservation Objective attribute, maintenance activities within the OECC may impact the prey species of the Manx shearwater SCI through underwater noise effects, increases to suspended sediment concentrations or temporary disturbance of important benthic habitats for those prey species. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables.

5735. Should these impacts to prey species reduce the availability of those prey species to foraging Manx shearwater, this may result in effects to the demographic parameters, and resultant population dynamics, of the SCI through processes such as increased energetic consequences of foraging reducing individual condition and survival or (for breeding SCIs) reduced provisioning rates to offspring reducing productivity rates. These potential consequences may compromise the ability of the SCI to maintain its populations, with prey availability changes potentially resulting in there being insufficient ex situ habitat to support the SCI's population on a long-term basis.

5736. As operational phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact the Manx shearwater SCI.

5737. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5738. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities), except in relation to potential localised maintenance works, increased SSC levels, which occur during construction phase activities are not considered to occur during routine operations during the operation and maintenance phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operation and maintenance phase in such a way that could impact the Manx shearwater SCI.

5739. In relation to potential EMF effects, any impacts on Manx shearwater fish prey species are anticipated to occur within the immediate vicinity of the export cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to

potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impede the achievement of Conservation Objective attribute targets of the SCI.

5740. With respect to the Conservation Objectives, attributes and targets for the Manx shearwater SCI (**Table 4-164**), the CWP Project will therefore not impede the overall objective of maintaining the favourable conservation condition of the Manx shearwater SCI of Irish Sea Front SPA. In light of these factors, it can be concluded beyond reasonable scientific doubt that the CWP Project will not give rise to any AESI to Irish Sea Front SPA.

Proposed mitigation

5741. No specific mitigation is proposed or required in respect of changes in prey availability during the operation and maintenance activities within the OECC, as this impact will not give rise to any AESI in relation to Irish Sea Front SPA.

Residual effect

5742. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5743. The Conservation Objectives, attributes and targets for the Manx shearwater SCI of Irish Sea Front SPA are presented in **Table 4-164**, above. With regard to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for the SCIs and, in turn, that there is **no project-only AESI for this SCI of Irish Sea Front SPA**.

4.39 Non-breeding wader or wildfowl SPAs

Table 4-165: Screened in SCIs (Wader and waterbird Features of distant SPAs)

Non-overlapping SPA with migratory wildfowl and/or wader SCIs	Site code	Distance to intertidal part of OECC (straight line – km)	Distance to array site (straight line – km)	Conservation objectives reference	Screened in SCIs (Wader and waterbird Features of distant SPAs)																														
					Bar-tailed godwit	Bewick's swan	Black-tailed godwit	Coot	Curlew	Dunlin	Gadwall	Golden plover	Greenland white-fronted	Grey heron	Grey plover	Greylag goose	Knot	Lapwing	Light-bellied brent goose	Little grebe	Mallard	Oystercatcher	Pintail	Purple sandpiper	Redshank	Ringed plover	Sanderling	Shelduck	Shoveler	Teal	Tufted duck	Turnstone	Whooper swan	Wigeon	Assemblage
Dundalk Bay SPA	IE004026	58.14	83.99	SS1	X		X		X	X		X	X		X	X	X	X	X		X	X	X		X	X		X		X					
Boyne Estuary SPA	IE004080	42.56	69.30	SS2			X					X		X			X	X	X			X			X		X	X				X			
River Nanny Estuary and Shore SPA	IE004158	34.69	61.67	SS3								X					X		X			X				X	X								
Skerries Islands SPA	IE004122	26.12	49.82	GEN															X					X								X				
Rockabill SPA	IE004014	26.39	47.36	SS4																				X												
Rogerstown Estuary SPA	IE004015	17.49	41.92	SS5			X			X					X	X	X		X			X			X	X		X	X							
Baldoyle Bay SPA	IE004016	7.02	32.86	SS6	X							X			X				X							X		X								
Malahide Estuary SPA	IE004025	11.83	37.92	SS7	X		X			X		X			X		X					X	X		X			X								
Cahore Marshes SPA	IE004143	85.37	54.78	GEN		X						X	X					X														X	X		
The Raven SPA	IE004019	100.19	70.52	SS8									X		X												X								
Wexford Harbour and Slobs SPA	IE004076	96.48	74.82	SS9	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X		X	X		X			X	X	
Lady's Island Lake SPA	IE004009	124.22	94.51	GEN							X																								
Tacumshin Lake SPA	IE004092	125.72	97.56	GEN		X	X	X			X	X	X		X			X	X	X			X						X	X		X	X	
Ballyteige Burrow SPA	IE004020	126.86	102.36	SS10	X		X					X			X			X	X									X							
Bannow Bay SPA	IE004033	124.21	102.44	SS11	X		X		X	X		X			X		X	X	X			X	X		X			X							
Tramore Back Strand SPA	IE004027	141.84	124.20	SS12	X		X		X			X			X			X	X																
Dungarvan Harbour SPA	IE004032	165.08	154.27	SS13	X		X		X	X		X			X		X	X	X			X			X			X				X			
Blackwater Estuary SPA	IE004028	184.04	174.98	SS14	X		X		X	X		X						X	X						X									X	
Ballymacoda Bay SPA	IE004023	193.20	182.66	SS15	X		X		X	X		X			X			X	X						X	X	X			X		X		X	
Ballycotton Bay SPA	IE004022	203.93	193.86	SS16	X		X		X			X			X			X								X				X		X			
Cork Harbour SPA	IE004030	206.95	199.67	SS17	X		X		X	X		X		X	X			X		X		X	X		X			X	X	X			X	X	
Courtmacsherry Bay SPA	IE004219	250.08	243.64	SS18	X		X		X	X		X						X										X						X	

Non-overlapping SPA with migratory wildfowl and/or wader SCIs	Site code	Distance to intertidal part of OECC (straight line – km)	Distance to array site (straight line – km)	Conservation objectives reference	Screened in SCIs (Wader and waterbird Features of distant SPAs)																													
					Bar-tailed godwit	Bewick's swan	Black-tailed godwit	Coot	Curlew	Dunlin	Gadwall	Golden plover	Greenland white-fronted	Grey heron	Grey plover	Greylag goose	Knot	Lapwing	Light-bellied brent goose	Little grebe	Mallard	Oystercatcher	Pintail	Purple sandpiper	Redshank	Ringed plover	Sanderling	Shelduck	Shoveler	Teal	Tufted duck	Turnstone	Whooper swan	Wigeon	Assemblage
Clonakilty Bay SPA	IE004081	262.50	256.80	SS19			X		X	X																	X							
Poulaphouca Reservoir SPA	IE004063	24.89	42.48	GEN												X																		
Lambay Island SPA	IE004069	18.49	38.83	GEN												X																		
Strangford Lough SPA	UK9020111	114.59	129.68	NI	X							X					X		X						X			X						X
Outer Ards SPA	UK9020271	119.71	134.19	NI								X							X							X						X			
Carlingford Lough SPA	IE004078	73.63	96.68	NI															X																
Killough Bay SPA	UK9020221	107.49	123.48	NI															X																
Larne Lough SPA	UK9020042	162.03	181.11	NI															X																
Lough Neagh and Lough Beg SPA	UK9020091	128.28	153.33	NI		X																										X		X
Upper Lough Erne SPA	UK0016614	112.73	144.93	NI																												X		
Lough Foyle SPA	IE004087	204.03	232.87	NI		X																										X		X

Table 4-166: Conservation Objectives, attributes and targets of wader and waterfowl SCIs of non-overlapping SPAs

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
GEN	Skerries Islands SPA The Murrough SPA Cahore Marshes SPA Lady's Island Lake SPA Tachumshin Lake SPA Poulaphouca Reservoir SPA Lambay Island SPA	All	To maintain or restore the favourable conservation condition of the SCI(s)	1. Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.	
				2. The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.	
				3. There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	
SS1 – SS19	Dundalk Bay SPA Boyne Estuary SPA River Nanny Estuary and Shore SPA Rockabill SPA Rogerstown Estuary SPA Baldoyle Bay SPA Malahide Estuary SPA The Raven SPA Wexford Harbour and Slobs SPA Ballyteige Burrow SPA Bannow Bay SPA Tramore Back Strand SPA Dungarvan Harbour SPA Blackwater Estuary SPA Ballymacoda Bay SPA Ballycotton Bay SPA Cork Harbour SPA Courtmacsherry Bay SPA Clonakilty Bay SPA	All	To maintain the favourable conservation condition of the SCI in the SPA	1. Population trend	1. Long term population trend stable or increasing
				2. Distribution	2. No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation
NI	Strangford Lough SPA Outer Ards SPA Carlingford Lough SPA Killough Bay SPA Larne Lough SPA Lough Neagh and Lough Beg SPA Upper Lough Erne SPA Lough Foyle SPA	All	To maintain the favourable conservation condition of the SCI in the SPA	1. Population of the qualifying species	1. Maintain or enhance
				2. Supporting habitats	2. Maintain or enhance
				3. Site integrity	3. Maintain
				4. Disturbance	4. Ensure no significant disturbance to qualifying feature
				5. Distribution of the species within site	5. Maintain in the long-term

Table 4-167: Other Features assessed in relation to each non-overlapping SPAs with migratory wildfowl and/or wader SCIs, and link to assessment text for these other Features.

Distant estuarine sites	Other screened-in SCIs (Seabirds and terrestrial migrants)		
	Season designated	SCIs	Assessment location
Dundalk Bay SPA	Non-breeding	Common scoter, black-headed gull, herring gull, common gull, red-breasted merganser, great crested grebe	**Section 4.41**, below
Boyne Estuary SPA	N/a	None	
River Nanny Estuary and Shore SPA	Non-breeding	Herring gull	**Section 4.41**, below
Skerries Islands SPA	Breeding	Herring gull	**Section 4.9**, above
Rockabill SPA	Breeding	Common tern, Arctic tern, roseate tern	**Section 4.8**, above
Rogerstown Estuary SPA	N/a	None	
Baldoyle Bay SPA	N/a	None	
Malahide Estuary SPA	Non-breeding	Red-breasted merganser, goldeneye, great crested grebe	**Section 4.41**, below
Cahore Marshes SPA	N/a	None	
The Raven SPA	Non-breeding	Red-throated diver, common scoter, cormorant	**Section 4.41**, below
Wexford Harbour and Slobs SPA	Non-breeding	Cormorant, black-headed gull, red-breasted merganser, goldeneye, scaup, great crested grebe, lesser black-backed gull	**Section 4.42**, below
		Hen-harrier	**Section 4.42**, below
Lady's Island Lake SPA	Non-breeding	Black-headed gull	**Section 4.41**, below
Tachumshin Lake SPA	N/a	None	
Ballyteige Burrow SPA	N/a	None	
Bannow Bay SPA	N/a	None	
Tramore Back Strand SPA	N/a	None	
Dungarvan Harbour SPA	N/a	None	
Blackwater Estuary SPA	N/a	None	
Ballymacoda Bay SPA	N/a	None	
Ballycotton Bay SPA	N/a	None	
Cork Harbour SPA	N/a	None	
Courtmacsherry Bay SPA	N/a	None	
Clonakilty Bay SPA	N/a	None	
Poulaphouca Reservoir SPA	N/a	None	
Lambay Island SPA	Breeding	Kittiwake, fulmar, herring gull, lesser black-backed gull, guillemot, razorbill, puffin, cormorant	**Section 4.6**, above
Strangford Lough SPA	N/a	None	
Outer Ards SPA	N/a	None	
Carlingford Lough SPA	N/a	None	
Killough Bay SPA	N/a	None	
Larne Lough SPA	N/a	None	

Distant estuarine sites	Other screened-in SCIs (Seabirds and terrestrial migrants)		
	Season designated	SCIs	Assessment location
Lough Neagh and Lough Beg SPA	N/a	None	
Upper Lough Erne SPA	N/a	None	
Lough Foyle SPA	N/a	None	

4.39.1 Migratory wildfowl or wader receptor

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

OECC (intertidal landfall)

Project-only assessment

5744. Wildfowl and wader SCIs which utilise habitats within these SPAs may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience direct effects on habitat from construction phase activities within this area. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (Generic)There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.
- (SS1–SS9): Population trend – Long term population trend stable or increasing.
- (SS1–SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Supporting habitats – Maintain or enhance.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5745. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5746. As assessed for the wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary SPA (**Section 2.2.4 in Volume 5 Part 1**), in which the OECC intertidal landfall will be located, the total area anticipated to be subject to temporary direct effects on habitat during the construction phase of the proposed intertidal landfall works equates to 0.73% of the intertidal habitat available to the SCIs within South Dublin Bay. As the spatial extent of impacts will be even smaller at any given moment in time during construction phase activities, and given the rate of recoverability of available habitat following backfilling and removal of supporting infrastructure and / or vehicles, it is considered that there is no potential for AESI as a result of direct effects on habitat within the intertidal to the wader and waterfowl SCIs of these SPAs in relation to their Conservation Objectives, attributes and targets stated in **Table 4-166**, above.

Proposed mitigation

5747. No specific mitigation is proposed. However, proposed mitigation in relation to disturbance and displacement impacts to wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary (see **Section 2.2.4 in Volume 5 Part 1**) in the form of a seasonal restriction preventing construction works within intertidal areas of South Dublin Bay, will further reduce impact magnitudes of direct effects upon

habitat to these SCIs, as they are likely to be present in much reduced numbers during the non-restricted period.

Residual effect

5748. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5749. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to direct effects on habitat impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Construction phase impact 2 – Disturbance and displacement

Array site (barrier effects)

Project-only assessment

5750. For the purpose of this assessment disturbance and displacement impacts through barrier effects to migratory species are conservatively treated as being the same as during the operational phase (albeit spanning a much shorter duration than those during the operational phase; 16 months, from initial turbine erection to operational, compared to a 25-year operational lifespan – **Volume 2, Chapter 4: Project Description**).

5751. Disturbance and displacement has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (Generic) The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Disturbance – Ensure no significant disturbance to qualifying feature.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5752. For migratory species, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during typically large migratory movements are considered to be inconsequential in relation to energy reserves recruited for migration (Masden et al., 2009).

5753. Therefore, the potential magnitude of impact on birds that-only migrate through the array site (including waders and estuarine waterbirds) is considered negligible.

5754. Consequently, there is assessed to be no potential for AESI to result from disturbance and displacement in the form of barrier effects during the construction phase at the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-166**, above.

Proposed mitigation

5755. No specific mitigation is proposed.

Residual effect

5756. As per project-only assessment, above.

OECC (intertidal landfall)

Project-only assessment

5757. Wildfowl and wader SCIs which utilise habitats within these SPAs may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience disturbance and displacement impacts from construction phase activities within this area.

5758. Disturbance and displacement has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Disturbance – Ensure no significant disturbance to qualifying feature.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5759. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5760. Given the limited potential connectivity between with construction phase activities within South Dublin Bay, it is considered that the numbers of individuals experiencing potential disturbance from construction phase activities within South Dublin Bay which also utilise these SPAs are low, or zero, for all wildfowl and wader species which are SCIs of these SPAs. As such there is no potential for AESI as a result of disturbance and displacement impacts within the intertidal to the wildfowl and wader SCIs of these SPAs in relation to the Conservation Objectives, attributes and targets stated in **Table 4-166**, above.

Proposed mitigation

5761. No specific mitigation is proposed. However, proposed mitigation in relation to disturbance and displacement impacts to wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary (see **Section 2.2.4 in Volume 5 Part 1**) in the form of a seasonal restriction preventing construction works within intertidal areas of South Dublin Bay, will further reduce impact magnitudes of disturbance and displacement to these SCIs, as it is likely to be present in much reduced numbers during the non-restricted period.

Residual effect

5762. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5763. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Construction phase impact 3 – Changes in prey availability

OECC (intertidal landfall)

Project-only assessment

5764. Wildfowl and wader SCIs which utilise habitats within these SPAs, may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience changes in prey availability impacts from construction phase activities within this area.

5765. These changes in prey availability have the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Supporting habitats – maintain or enhance.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5766. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5767. As assessed for the wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary SPA, in which the OECC intertidal landfall will be located, the total area anticipated to be disturbed during landfall cable installation (see **Volume 2, Chapter 4: Project Description; Section 4.8**) totals approximately 0.16 km^2, which represents a very small proportion (0.53%) of the total area of intertidal habitat within South Dublin Bay (21.8 km^2). Furthermore, given the high rate of recoverability of the impacted habitat (and associated organisms) and the temporary nature of trenching activities, it is considered that there is no potential for AESI as a result of changes in prey availability within the intertidal to the waterfowl and wader SCIs of these SPAs in relation to the Conservation Objectives, attributes and targets stated in **Table 4-166**, above.

Proposed mitigation

5768. No specific mitigation is proposed. However, proposed mitigation in relation to disturbance and displacement impacts to wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary (see **Section 2.2.4 in Volume 5 Part 1**) in the form of a seasonal restriction preventing construction works within intertidal areas of South Dublin Bay, will further reduce impact magnitudes of changes in prey availability to these SCIs, as they are likely to be present in much reduced numbers during the non-restricted period.

Residual effect

5769. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5770. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

OECC (intertidal landfall)

Project-only assessment

5771. Wildfowl and wader SCIs which utilise habitats within these SPAs may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience direct effects on habitat impacts from operation and maintenance phase activities within this area. This direct effect on habitat has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.

- (Generic)There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Supporting habitats – Maintain or enhance.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5772. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5773. As assessed for the wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary SPA, during the operation and maintenance phase, it is considered that any potential maintenance works would be highly localised in spatial extent and limited in their temporal duration and frequency. Taking into account the relative spatial extent of remaining intertidal habitat available to wader and wildfowl SCIs (there are 21.40 km^2 of intertidal habitat within the South Dublin Bay and Tolka Estuary SPA) it is considered such that there is no potential for AESI as a result of direct effects on habitat within the intertidal in relation to the Conservation Objectives, attributes and targets of these SCIs of these SPAs as stated above.

Proposed mitigation

5774. No specific mitigation is proposed.

Residual effect

5775. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5776. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Operation and maintenance phase impact 2 – Disturbance and displacement

Array site (barrier effects)

Project-only assessment

5777. Disturbance and displacement has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (Generic) The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.
- ;(SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Disturbance – Ensure no significant disturbance to qualifying feature.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5778. Over the 25-year operational period of the project (**Volume 2, Chapter 4: Project Description**), for migratory species, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during typically large migratory movements are considered to be inconsequential in relation to energy reserves recruited for migration (Masden et al., 2009).

5779. Therefore, the potential magnitude of impact on birds that-only migrate through the array site (including waders and estuarine waterbirds) is considered negligible.

5780. Consequently, there is assessed to be no potential for AESI to result from disturbance and displacement in the form of barrier effects during the operation and maintenance phase at the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-166**, above.

Proposed mitigation

5781. No specific mitigation is proposed.

Residual effect

5782. As per project-only assessment, above.

OECC (intertidal landfall)

Project-only assessment

5783. Wildfowl and wader SCIs which utilise habitats within these SPAs, may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience disturbance and displacement impacts from operation and maintenance phase activities within this area.

5784. Disturbance and displacement has the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.

- (NI): Disturbance – Ensure no significant disturbance to qualifying feature.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5785. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5786. As assessed for the wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary SPA, the operational nature of any buried infrastructure within South Dublin Bay is passive any routine visual inspection of the OECC does not extend to buried infrastructure within the SPA.

5787. It is possible that unplanned maintenance may be required on buried infrastructure within the SPA during the operational phase of the project. Any such unplanned maintenance activities have the potential to cause disturbance and displacement to wildfowl and waders within the vicinity of the impacted area. It is considered, however, that any unplanned maintenance activities on buried infrastructure within South Dublin Bay during the operational phase of the project would be restricted in terms of their frequency, temporal duration and spatial scale.

5788. Given the extent of intertidal habitat available to the SCIs, the short temporal duration of any unplanned maintenance activities and the passive nature of buried infrastructure within South Dublin Bay, it is considered such that there is no potential for AESI to these SCIs of these SPAs as a result of disturbance and displacement impacts during the operation and maintenance phase around the OECC intertidal landfall in relation to the Conservation Objectives, attributes and targets outlined in **Table 4-166**, above.

Proposed mitigation

5789. No specific mitigation is proposed.

Residual effect

5790. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5791. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Operation and maintenance phase impact 3 – Changes in prey availability

OECC (intertidal landfall)

Project-only assessment

5792. Wildfowl and wader SCIs which utilise habitats within these SPAs, may also use intertidal areas within South Dublin Bay during migration periods or between site movements during the non-breeding period. As such, these SCIs may experience changes in prey availability impacts from operation and maintenance phase activities within this area. These changes in prey availability have the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (SS1 – SS9): Distribution – No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Supporting habitats – maintain or enhance.
- (NI): Site integrity – Maintain.
- (NI): Distribution of the species within the site.

5793. However, South Dublin Bay, where the OECC intertidal landfall will be sited, is located more than 5 km from all these SPAs (minimum distance – 7.02 km to Baldoyle Bay SPA; maximum distance – 262.50 km to Clonakilty Bay SPA) and, therefore, the potential for impacts within this area affecting the population or range of any wildfowl SCIs of these SPAs is considered to be limited.

5794. As assessed for the wader and waterfowl SCIs of South Dublin Bay and River Tolka Estuary SPA, as operation and maintenance phase activities within the OECC intertidal landfall area will not result in any non-negligible impacts to the abundance or distribution of wader and waterfowl prey species, it is considered that there is no potential for AESI as a result of changes in prey availability within the intertidal area to the wintering wildfowl SCIs of these SPAs.

Proposed mitigation

5795. No specific mitigation is proposed.

Residual effect

5796. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5797. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Operation and maintenance impact 4 – Collision

Array site

Project-only assessment

5798. Impacts arising from collision with WTGs have the potential to impact on the following Conservation Objective attributes and targets for the non-breeding wader or wildfowl SCIs of the above-listed SPAs:

- (Generic): Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- (SS1 – SS9): Population trend – Long term population trend stable or increasing.
- (NI): Population of the qualifying species – Maintain or enhance.
- (NI): Site integrity – Maintain.

5799. Estimated collision mortality apportioned to populations of Irish SPAs for migratory wildfowl and wader SCIs which may pass through the array site during migratory movements, are presented as a proportion of the mean-peak population of each site in **Table 4-168**. Apportioned collision mortality values for each SCI of each SPA were derived from total collision mortality figures for each species (as determined in **Appendix 10.3 Collision Risk Modelling** of the EIAR), apportioned on the basis of the SPA population (this is typically the 10-year mean-peak – 2011/12–2020/21 from the I-WeBS Site Summary Tables for each site [available at Site Summary Tables_S27 (caspio.com)]): as a proportion of the wider regional flyway population (taken from Burke et al., 2018).

5800. For Northern Irish SPAs (namely Strangford Lough SPA, Outer Ards SPA, Carlingford Lough SPA, Killough Bay SPA, Larne Lough SPA, Lough Neagh and Lough Beg SPA, Upper Lough Erne SPA, Lough Foyle SPA), the closest of which, Carlingford Lough SPA, is 96.68 km from the array site, on account of SCIs wintering at these sites coming from and returning to breeding sites to the north, northwest and northeast, the potential for migratory wader and waterfowl SCIs of these SPAs to pass through the array site during migration and thereby experience the risk of potential collision events, is considered to be negligible.

Table 4-168: Collision impacts apportioned to wildfowl and wader SCIs of non-overlapping Irish SPAs as a proportion of SPA mean-peak population

Distant estuarine sites	array site design option	Impact apportioned to SPA as a proportion of SPA mean peak population (%)																												
		Bar-tailed godwit	Bewick's swan	Black-tailed godwit	Coot	Curlew	Dunlin	Gadwall	Golden plover	Greenland white-fronted goose	Grey heron	Grey plover	Greylag goose	Knot	Lapwing	Light-bellied brent goose	Little grebe	Mallard	Oystercatcher	Pintail	Purple sandpiper	Redshank	Ringed plover	Sanderling	Shelduck	Shoveler	Teal	Tufted duck	Turnstone	Whooper swan	Wigeon
Dundalk Bay SPA	A	<0.001		0.001		<0.001	0.001		0.001	<0.001		<0.001	NA*[1]	0.001	<0.001	<0.001		0.003	<0.001	0.008		0.001	0.001		0.002		0.008				
	B	<0.001		0.001		<0.001	0.001		0.001	<0.001		<0.001	NA*[1]	0.001	<0.001	<0.001		0.002	<0.001	0.007		0.001	<0.001		0.001		0.007				
Boyne Estuary SPA	A			0.001					0.001			<0.001		0.001	<0.001	<0.001			<0.001			0.001		0.001	0.002				0.001		
	B			0.001					0.001			<0.001		0.001	<0.001	<0.001			<0.001			0.001		0.001	0.001				0.001		
River Nanny Estuary and Shore SPA	A								0.001					0.001		<0.001			<0.001				0.001	0.001							
	B								0.001					0.001		<0.001			<0.001				<0.001	0.001							
Skerries Islands SPA	A															<0.001					0.004								0.001		
	B															<0.001					0.004								0.001		
Rockabill SPA	A																				0.004										
	B																				0.004										
Rogerstown Estuary SPA	A			0.001			0.001					<0.001	NA*[1]	0.001		<0.001			<0.001			0.001	0.001		0.002	0.003					
	B			0.001			0.001					<0.001	NA*[1]	0.001		<0.001			<0.001			0.001	<0.001		0.001	0.003					
Baldoyle Bay SPA	A	<0.001							0.001			<0.001				<0.001							0.001		0.002						
	B	<0.001							0.001			<0.001				<0.001							<0.001		0.001						
Malahide Estuary SPA	A	<0.001		0.001			0.001		0.001			<0.001		0.001					<0.001	0.008		0.001			0.002						
	B	<0.001		0.001			0.001		0.001			<0.001		0.001					<0.001	0.007		0.001			0.001						
Cahore Marshes SPA	A		<0.001						0.001	<0.001					<0.001														<0.001	0.001
	B								0.001	<0.001					<0.001														<0.001	<0.001
The Raven SPA	A									<0.001		<0.001												0.001						
	B									<0.001		<0.001												0.001						
Wexford Harbour and Slobs SPA	A	<0.001	<0.001	0.001	NA*[1]	<0.001	0.001		0.001	<0.001	NA*[1]	<0.001		0.001	<0.001	<0.001	NA*[1]	0.003	<0.001	0.008		0.001		0.001	0.002		0.008			<0.001	0.001
	B	<0.001		0.001		<0.001	0.001		0.001	<0.001		<0.001		0.001	<0.001	<0.001		0.002	<0.001	0.007		0.001		0.001	0.001		0.007			<0.001	<0.001
Lady's Island Lake SPA	A							<0.001																							
	B							<0.001																							
Tachumshin Lake SPA	A		<0.001	0.001	NA*[1]v			<0.001	0.001	<0.001		<0.001			<0.001	<0.001	NA*[1]			0.008							0.008	<0.001		<0.001	0.001
	B			0.001				<0.001	0.001	<0.001		<0.001			<0.001	<0.001				0.007							0.007	<0.001		<0.001	<0.001
Ballyteige Burrow SPA	A	<0.001		0.001					0.001			<0.001			<0.001	<0.001									0.002						
	B	<0.001		0.001					0.001			<0.001			<0.001	<0.001									0.001						
Bannow Bay SPA	A	<0.001		0.001		<0.001	0.001		0.001			<0.001		0.001	<0.001	<0.001			<0.001	0.008		0.001			0.002						

Distant estuarine sites	array site design option	Impact apportioned to SPA as a proportion of SPA mean peak population (%)																												
		Bar-tailed godwit	Bewick's swan	Black-tailed godwit	Coot	Curlew	Dunlin	Gadwall	Golden plover	Greenland white-fronted goose	Grey heron	Grey plover	Greylag goose	Knot	Lapwing	Light-bellied brent goose	Little grebe	Mallard	Oystercatcher	Pintail	Purple sandpiper	Redshank	Ringed plover	Sanderling	Shelduck	Shoveler	Teal	Tufted duck	Turnstone	Whooper swan	Wigeon
	B	<0.001		0.001		<0.001	0.001		0.001			<0.001		0.001	<0.001	<0.001			<0.001	0.007		0.001			0.001						
Tramore Back Strand SPA	A	<0.001		0.001		<0.001			0.001			<0.001			<0.001	<0.001															
	B	<0.001		0.001		<0.001			0.001			<0.001			<0.001	<0.001															
Dungarvan Harbour SPA	A	<0.001		0.001		<0.001	0.001		0.001			<0.001		0.001	<0.001	<0.001			<0.001			0.001			0.002				0.001		
	B	<0.001		0.001		<0.001	0.001		0.001			<0.001		0.001	<0.001	<0.001			<0.001			0.001			0.001				0.001		
Blackwater Estuary SPA	A	<0.001		0.001		<0.001	0.001		0.001						<0.001	<0.001						0.001									0.001
	B	<0.001		0.001		<0.001	0.001		0.001						<0.001	<0.001						0.001									<0.001
Ballymacoda Bay SPA	A	<0.001		0.001		<0.001	0.001		0.001			<0.001			<0.001	<0.001						0.001	0.001	0.001			0.008		0.001		0.001
	B	<0.001		0.001		<0.001	0.001		0.001			<0.001			<0.001	<0.001						0.001	<0.001	0.001			0.007		0.001		<0.001
Ballycotton Bay SPA	A	<0.001		0.001		<0.001			0.001			<0.001			<0.001								0.001				0.008		0.001		
	B	<0.001		0.001		<0.001			0.001			<0.001			<0.001								<0.001				0.007		0.001		
Cork Harbour SPA	A	<0.001		0.001		<0.001	0.001		0.001		NA*1	<0.001			<0.001		NA*1		<0.001	0.008		0.001			0.002	0.003	0.008			<0.001	0.001
	B	<0.001		0.001		<0.001	0.001		0.001			<0.001			<0.001				<0.001	0.007		0.001			0.001	0.003	0.007			<0.001	<0.001
Courtmacsherry Bay SPA	A	<0.001		0.001		<0.001	0.001		0.001						<0.001										0.002						0.001
	B	<0.001		0.001		<0.001	0.001		0.001						<0.001										0.001						<0.001
Clonakilty Bay SPA	A			0.001		<0.001	0.001																		0.002						
	B			0.001		<0.001	0.001																		0.001						
Poulaphouca Reservoir SPA	A												NA*1																		
	B												NA*1																		
Lambay Island SPA	A												NA*1																		
	B												NA*1																		

NA*1 – SCI considered primarily to be a local migrant. CRM for limited passage over Irish Sea not undertaken. Should collision mortality occur, the numbers of individuals involved would be negligible in relation to SPA SCI populations.

5801. Although migratory wildfowl SCIs from these SPAs may pass through the array site, any collision mortality to these SCIs would be negligible (0.008% or less than site 10-year mean peak counts). Collision impacts will therefore not result in an AESI in relation to the Conservation Objective and attributes and targets for these SCIs of these SPAs as stated in **Table 4-166**, above. Specifically, any such negligible increase to baseline mortality is considered not to affect the long-term population trend of these SCIs in such a way as to result in its decline. Thereby, collision impacts to these SCIs of these SPAs will not adversely affect the Conservation Objectives of the SPAs to maintain the favourable conservation condition of the SCIs.

Proposed mitigation

5802. No specific mitigation is proposed.

Residual effect

5803. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5804. The Conservation Objective and its attributes and targets for the migratory wildfowl or wader receptors of these SPAs are presented in **Table 4-166**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objectives being met for these receptors and, in turn, that there is **no project-only AESI**.

Non-breeding seabird SPAs

4.41 Distant SPAs designated in relation to non-breeding seabirds

5805. A number of sites surrounding the Irish Sea (including the east coasts of Ireland and Northern Ireland, the south-west coast of Scotland, the north-west coast of England and the north and west coasts of Wales) have been screened into the NIS in relation to potential ex situ impacts to non-breeding seabird SCIs within marine, intertidal and estuarine habitats. The rational for this inclusion is that non-breeding seabird SCIs from these SPAs may pass through the intertidal landfall area, the offshore OECC or the array site during migration periods, or during movements within wintering periods, and thereby may experience impacts associated with project elements within these areas.

5806. All of the relevant receptors of all of these SPAs are shown in **Table 4-169** below.

5807. The Conservation Objectives, attributes and targets of each of these SPAs and their SCIs are detailed in **Table 4-170**.

5808. Where these SPAs are also assessed in relation to other types of Features (i.e. breeding seabirds, non-breeding waders and wildfowl, or terrestrial migrant species), this is outlined in **Table 4-171**.

5809. Among the 13 non-breeding seabird SCIs of 13 SPAs identified surrounding the Irish Sea, species-specific sensitivities to impacts assessed during each development phase and within each area of the development vary. Where species have been identified as not being sensitive to a particular impact during a particular stage of development and/or within particular development, these impacts have

been screened out (**NIS Volume 3 – Screening: Section 3.3, Table 3–5**) and are not considered in this section. For each screened-in impact within each development phase and within each development area, the species to which the assessment applies are listed for that assessment, and assessment of this impact applies to all SPAs in which that species is a SCI.

5810. For example, non-breeding gulls are considered insensitive to disturbance and displacement impacts associated with the array site and OECC and are therefore not assessed in relation to these impact pathways, but may theoretically experience this impact during construction phase activities surrounding the intertidal landfall should individuals from other SPA populations surrounding the Irish Sea also utilise intertidal habitats within South Dublin Bay during migration periods, or during movements within wintering periods.

5811. Note that reference to the term SCI in this section includes reference to SPA Features for UK SPAs.

Table 4-169: Non-overlapping SPAs with non-breeding seabird SCIs, with their SCIs listed, their distance to relevant development areas, and link to Conservation Objectives in **Table 4-170**

Distant non-breeding seabird sites	Site code	Distance to intertidal part of OECC (km)	Distance to offshore part of OECC (km)	Distance to array site (km)	Conservation objectives reference	SCIs												
						Lesser black-backed gull	Mediterranean gull	Common scoter	Black-headed gull	Red-breasted merganser	Herring gull	Common gull	Great crested grebe	Goldeneye	Red-throated diver	Cormorant	Scaup	Little gull
Malahide Estuary SPA	IE004025	21.49	17.98	38.13	SS1					X			X	X				
River Nanny Estuary and Shore SPA	IE004158	46.72	43.21	62.61	SS2						X							
The Raven SPA	IE004019	108.86	78.46	70.51	SS3			X							X	X		
Wexford Harbour and Slobs SPA	IE004076	108.43	97.57	79.54	SS4	X			X	X			X	X		X	X	
Dundalk Bay SPA	IE004026	68.54	64.97	83.98	SS5			X	X	X	X	X	X					
Lady's Island Lake SPA	IE004009	134.84	104.44	96.20	GEN				X									
Liverpool Bay SPA / Bae Lerpwl SPA	UK9020294	128.01	110.65	102.91	SS6			X							X			X
Traeth Lafan / Lavan Sands, Conway Bay SPA	UK9013031	154.64	137.28	129.58	SS7					X			X					
Mersey Narrows & North Wirral Foreshore SPA	UK9020287	198.80	181.28	173.58	SS8													X
Belfast Lough Open Water SPA	UK9020290	176.53	173.05	185.39	SS9								X					
Belfast Lough SPA	UK9020101	176.73	173.34	185.59	SS10								X					
Solway Firth SPA	UK9005012	209.10	205.63	203.54	SS11			X	X		X	X		X	X	X		
Morecambe Bay and Duddon Estuary SPA	UK9020326	241.82	211.98	208.68	SS12	X	X											

Table 4-170: Conservation Objectives, attributes and targets of non-breeding seabird SCIs of non-overlapping SPAs

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
GEN	Lady's Island Lake SPA	All	To maintain or restore the favourable conservation condition of the SCI(s).	Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.	
				The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.	
				There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	
SS1	Malahide Estuary SPA	All	To maintain the favourable conservation condition of the SCI in the SPA.	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS2	River Nanny Estuary and Shore SPA	All	To maintain the favourable conservation condition of the SCI in the SPA.	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS3	The Raven SPA	All	To maintain the favourable conservation condition of the SCI in the SPA.	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS4	Wexford Harbour and Slobs SPA	All	To maintain the favourable conservation condition of the SCI in the SPA.	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS5	Dundalk Bay SPA	All	To maintain the favourable conservation condition of the SCI in the SPA.	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS6	Liverpool Bay SPA / Bae Lerpwl SPA	Red-throated diver	Subject to natural change, maintain or restore the red-throated diver population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Maintain the size of the non-breeding population at a level which is at or above 1,800 individuals.
				Non-breeding population: distribution	Restore the distribution of the Feature; preventing further deterioration, and where possible, reduce any existing anthropogenic influences impacting Feature distribution.
				Disturbance caused by human activity	Minimise the frequency, duration and/or intensity of disturbance affecting the Feature so that the population, its distribution within the site, or its use of the habitat is not significantly affected.
				Supporting habitat: food availability and quality of prey	Maintain the distribution, abundance and availability of key food and prey items (e.g. fish) to maintain the population.
				Supporting habitat: extent, distribution and quality of supporting habitat for the non-breeding season	Restore the extent, distribution and availability of suitable habitat which supports the Feature; preventing further deterioration, and where possible, reduce any existing anthropogenic influences impacting the extent and quality (including water quality).
		Common scoter	Subject to natural change, maintain or restore the common scoter population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Maintain the size of the non-breeding population at a level which is at or above 141,801 individuals.
				Non-breeding population: distribution	Maintain the distribution of the Feature; the extent should not be reduced by anthropogenic factors.
				Disturbance caused by human activity	Minimise the frequency, duration and/or intensity of disturbance affecting the Feature so that the population, its distribution within the site, or its use of the habitat is not significantly affected.

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. molluscs and bivalves) to maintain the population.
				Supporting habitat: extent, distribution and quality of supporting habitat for the non-breeding season	Maintain the extent, distribution and availability of suitable habitat which supports the Feature; the quality and extent should not deteriorate by anthropogenic factors (including water quality).
		Little gull	Subject to natural change, maintain or restore the little gull population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Maintain the size of the non-breeding population at a level which is at or above 319 individuals.
				Non-breeding population: distribution	Maintain the distribution of the Feature; the extent should not be reduced by anthropogenic factors.
				Disturbance caused by human activity	Minimise the frequency, duration and/or intensity of disturbance affecting the Feature so that the population, its distribution within the site, or its use of the habitat is not significantly affected.
				Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. fish) to maintain the population.
				Connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.
				Supporting habitat: extent, distribution and quality of supporting habitat for the non-breeding season	Maintain the extent, distribution and availability of suitable habitat which supports the Feature; the quality and extent should not deteriorate by anthropogenic factors (including water quality).
SS7	Traeth Lafan / Lavan Sands, Conway Bay SPA	Great crested grebe	No Conservation Objective stated for these Features of this SPA. In the absence of stated Conservation Objectives, assessment was undertaken against the Conservation Objectives, attributes and targets of these species as used for Irish SPAs	Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
		Red-breasted merganser		Population trend	Long-term population trend stable or increasing.
				Distribution	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation.
SS8	Mersey Narrows & North Wirral Foreshore SPA	Little gull	Subject to natural change, maintain or restore the little gull population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Restore the size of the non-breeding population to a level which is above 213 individuals whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
				Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding).
				Disturbance caused by human activity	Restrict the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.
				Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. small fish and fresh water and marine invertebrates) at preferred sizes.
				Connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.
				Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants at below the site-relevant critical load or level values given for this Feature of the site on the Air Pollution Information System.

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.
				Supporting habitat: water quality – contaminants	Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – nutrients	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.
SS9	Belfast Lough Open Water SPA	Great crested grebe	To maintain Feature in favourable condition.	Wintering population	No significant decrease in population against national trends.
				Habitat extent	Maintain the extent of main habitat components subject to natural processes.
				Roosting/loafing sites	Maintain all locations of sites.
SS10	Belfast Lough SPA	Great crested grebe	To maintain Feature in favourable condition.	Wintering population	No significant decrease in population against national trends.
				Habitat extent	Maintain the extent of main habitat components subject to natural processes.
				Roosting/loafing sites	Maintain all locations of sites.
SS11	Solway Firth SPA	Common scoter Black-headed gull Herring gull Common gull Goldeneye Red-throated diver Cormorant	Avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained.	Population of the species as a viable component of the site	Ensure maintained in the long term.
				Distribution of the species within site	Ensure maintained in the long term.
				Distribution and extent of habitats supporting the species	Ensure maintained in the long term.
				Structure, function and supporting processes of habitats and supporting the species	Ensure maintained in the long term.
				No significant disturbance of the species	Ensure maintained in the long term.
SS12	Morecambe Bay and Duddon Estuary SPA	Lesser black-backed gull (non-breeding)	Subject to natural change, maintain or restore the lesser black-backed gull population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Restore the size of the non-breeding population to a level which is above 9,450 individuals whilst avoiding deterioration from its current level, as indicated by the latest mean peak count or equivalent.
				Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding). Freshwater and coastal grazing marsh (unknown), water column (unknown), large shallow inlets and bays as well as mudflats and sandflats not covered by seawater at low tide (31,000 ha)

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
					including intertidal coarse sediment, intertidal stony reef, sand and muddy sand, intertidal seagrass beds (41 ha), intertidal rock, intertidal biogenic reef: mussel beds, intertidal mud, intertidal mixed sediments, Atlantic salt meadows (*Glauco-puccinellietalia maritimae*) and Salicornia and other annuals colonising mud and sand under the umbrella of saltmarsh (3,744 ha) and coastal lagoons (195 ha).
				Disturbance caused by human activity	Restrict the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.
				Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sand eel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.
				Connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.
				Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants at below the site-relevant critical load or level values given for this Feature of the site on the Air Pollution Information System.
				Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.
				Supporting habitat: water quality – contaminants	Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – nutrients	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.
		Mediterranean gull	Subject to natural change, maintain or restore the Mediterranean gull population, distribution and its supporting habitats in favourable condition.	Non-breeding population: abundance	Maintain the size of the non-breeding population at a level which is above the citation value of 18 individuals whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.
				Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the Feature for all necessary stages of the non-breeding / wintering period (moulting, roosting, loafing, feeding).
				Disturbance caused by human activity	Restrict the frequency, duration and/or intensity of disturbance affecting roosting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Supporting habitat: food availability	Maintain the distribution, abundance and availability of key food and prey items (e.g. gobies, earthworm, snails, beetles, lepidoptera, grasshoppers, spider, diperan flies) at preferred sizes.
				Connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.
				Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants at below the site-relevant critical load or level values given for this Feature of the site on the Air Pollution Information System.
				Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the Feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.
				Supporting habitat: water quality – contaminants	Reduce aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex V of the Water Framework Directive, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – dissolved oxygen	Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status (specifically ≥ 5.7 mg L-1 (at 35 salinity) for 95% of year) avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – nutrients	Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and Features, avoiding deterioration from existing levels. This target was set using the Environmental Agency 2019 water body classifications data.
				Supporting habitat: water quality – turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.

Table 4-171: Other Features assessed in relation to each non-overlapping SPAs with non-breeding seabird SCIs, and link to assessment text for these other Features.

Distant estuarine sites	Distance to intertidal part of OECC (km)	Distance to offshore part of OECC (km)	Distance to array site (km)	Conservation objectives reference	Other Screened-in SCIs (Seabirds and terrestrial migrants)		
					Season designated	SCIs	Assessment location
Malahide Estuary SPA	21.49	17.98	38.13	SS1	Non-breeding	Bar-tailed godwit, black-tailed godwit, dunlin, golden plover, grey plover, knot, oystercatcher, pintail, redshank, shelduck	**Section 4.39**, above
River Nanny Estuary and Shore SPA	46.72	43.21	62.61	SS2	Non-breeding	Golden plover, knot, light-bellied brent goose, oystercatcher, ringed plover, sanderling	**Section 4.39**, above
The Raven SPA	108.86	78.46	70.51	SS3	Non-breeding	Greenland white-fronted goose, grey plover, sanderling	**Section 4.39**, above
Wexford Harbour and Slobs SPA	108.43	97.57	79.54	SS4	Non-breeding	Bar-tailed godwit, Bewick's swan, black-tailed godwit, coot, curlew, dunlin, golden plover, Greenland white-fronted goose, grey heron, grey plover, knot, lapwing, light-bellied brent goose, little grebe, mallard, oystercatcher, pintail, redshank, sanderling, shelduck, teal, whooper swan, wigeon	**Section 4.39**, above
					Non-breeding	Hen harrier	**Section 4.42**, below
Dundalk Bay SPA	68.54	64.97	83.98	SS5	Non-breeding	Bar-tailed godwit, black-tailed godwit, curlew, dunlin, golden plover, Greenland white-fronted goose, grey plover, greylag goose, knot, lapwing, light-bellied brent goose, mallard, oystercatcher, pintail, redshank, ringed plover, shelduck, teal	**Section 4.39**, above
Lady's Island Lake SPA	134.84	104.44	96.20	GEN	Non-breeding	Gadwall	**Section 4.39**, above
Liverpool Bay SPA / Bae Lerpwl SPA	128.01	110.65	102.91	SS6		No other SCIs screened in	
Traeth Lafan / Lavan Sands, Conway Bay SPA	154.64	137.28	129.58	SS7		No other SCIs screened in	
Mersey Narrows & North Wirral Foreshore SPA	198.80	181.28	173.58	SS8		No other SCIs screened in	
Belfast Lough Open Water SPA	176.53	173.05	185.39	SS9		No other SCIs screened in	
Belfast Lough SPA	176.73	173.34	185.59	SS10		No other SCIs screened in	
Solway Firth SPA	209.10	205.63	203.54	SS11		No other SCIs screened in	
Morecambe Bay and Duddon Estuary SPA	241.82	211.98	208.68	SS12	Breeding	Lesser black-backed gull	**Section 4.17**, above

Construction phase impacts

Construction phase impact 1 – Direct effects on habitat

Array site

5812. The following SCIs of these SPAs were screened in in relation to ex situ construction phase direct effects on habitat impacts associated with the array site: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each individual SPA are outlined in **Table 4-169**.

Project-only assessment

5813. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ effects on habitat from construction phase activities within this area. These direct effects on habitat have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, supporting habitats and distributions within the given SPA.

5814. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 62.61 km to River Nanny Estuary and Shore SPA; maximum distance – 208.68 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5815. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of directly affected habitat represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods. As the construction phase progresses through its planned duration of approximately 2.5 years, the above sea level spatial extent of infrastructure will increase to a maximum of less than 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs).

5816. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of directly affected ex situ habitat represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5817. Consequently, there is assessed to be no potential for AESI to result from direct effects on ex situ habitat during construction phase activities within the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5818. No specific mitigation is proposed, or required, in respect of direct effects on habitat during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5819. As per project-only assessment, above.

OECC intertidal landfall

5820. The following SCIs of these SPAs were screened in in relation to construction phase ex situ direct effects on habitat impacts associated with the OECC intertidal landfall: lesser black-backed gull, Mediterranean gull, black-headed gull, herring gull, common gull and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5821. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas within South Dublin Bay during migratory periods or during movements within wintering periods. As such, these SCIs may experience ex situ effects on habitat from construction phase activities within this area. These direct effects on habitat have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, supporting habitats and distributions within the given SPA.

5822. However, the CWP OECC intertidal landfall is located more than 45 km from all these SPAs (minimum distance – 46.72 km to River Nanny Estuary and Shore SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5823. The area in which the OECC intertidal landfall will be located forms part of a wider network of intertidal habitats which includes South Dublin Bay. As the spatial extent of impacts will be even smaller at any given moment in time during construction phase activities in comparison to the available habitat, and given the rate of recoverability of available habitat following backfilling and removal of supporting infrastructure and/or vehicles, it is considered that there is no potential for AESI as a result of direct effects on habitat within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to their Conservation Objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5824. No specific mitigation is proposed, or required, in respect of direct effects on habitat during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5825. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5826. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to direct effects on ex situ habitat impacts during the

construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Construction phase impact 2 – Disturbance and displacement

Array site

5827. The following SCIs of these SPAs were screened in in relation to construction phase disturbance and displacement impacts associated with the array site: Common scoter, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5828. Project-only assessments of construction phase disturbance and displacement impacts for the array site for each SCI are presented in **Table 4-172.** Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from construction phase activities within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance.

5829. However, the CWP array site is located more than 70 km from all these SPAs (minimum distance – 70.51 km to The Raven SPA; maximum distance – 203.54 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5830. In relation to migratory movements or between site movements during the non-breeding period, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during these typically large and infrequent movements are considered to be inconsequential in relation to energy reserves recruited (Masden et al., 2009). For all these non-breeding seabird SCIs, potential barrier effects regarding erected array site infrastructure are therefore considered negligible.

5831. SCI specific project-only assessments of construction phase disturbance and displacement impacts for the array site for each SCI are presented in **Table 4-172**.

Table 4-172: Project-only assessments of construction phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have red-throated diver as an SCI and the array site is 70.51 km (to The Raven SPA) and therefore considerably greater than the maximum published distances at which potential avoidance by divers of OWFs may occur (i.e. up to 16 km, Mendel et al., 2019), disturbance and displacement in the form of indirect habitat loss around installed WTGs and construction phase activities within the array site will not adversely affect the in situ spatial distribution of this SCI or its supporting habitats within those SPAs

SCI	Project-only assessment
	surrounding the Irish Sea listed in **Table 4-169** which are have red-throated diver as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have red-throated diver as an SCI, should red-throated diver from those SPAs occur within the array site or its immediate vicinity during the construction phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with construction phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in Table 4-170**Table 4-170** above.
Common scoter	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have common scoter as an SCI and the array site is 70.51 km (to The Raven SPA) and therefore considerably greater than the distances at which potential avoidance by common scoter of OWFs may occur, disturbance and displacement in the form of indirect habitat loss around installed WTGs and construction phase activities within the array site will not adversely affect the spatial distribution of this SCI or its supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have common scoter as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter as an SCI, should common scoter from those spas occur within the array site or its immediate vicinity during the construction phase, it is considered that-only a negligible proportion of the populations of those spas may do so. As such, any displacement related mortality associated with construction phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in **Table 4-170**, above.
Cormorant	Cormorant is not considered sensitive to disturbance and displacement from the presence of OWF infrastructure. As such, potential disturbance and displacement impacts to this SCI relate to extremely localised and temporary impacts surrounding construction phase vessel activity within the array site. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m: an area of approximately 0.209 km^2 around each vessel. Given the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have cormorant as an SCI and the array site is 70.51 km (to The Raven SPA) [and therefore the negligible proportion of the cormorant populations from those SPAs which may experience disturbance and displacement impacts from construction phase activities within the array site] and, the extremely localised area in which ex situ disturbance and displacement

SCI	Project-only assessment
	impacts may occur to the cormorant SCI of these SPAs, disturbance and displacement impacts from construction phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169.** Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in Table 4-170**Table 4-170,** above.
Little gull	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have little gull as an SCI and the array site is 102.91 km (to Liverpool Bay SPA / Bae Lerpwl SPA) and therefore considerably greater than the distances at which potential avoidance by little gull of OWFs may occur, disturbance and displacement in the form of indirect habitat loss around installed WTGs and construction phase activities within the array site will not adversely affect the spatial distribution of this SCI or its supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have little gull as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have little gull as an SCI, should little gull from those SPAs occur within the array site or its immediate vicinity during the construction phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with construction phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in **Table 4-170** above.

Proposed mitigation

5832. No specific mitigation is proposed, or required, in respect of disturbance and displacement during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5833. As per project-only assessment, above.

OECC

5834. The following SCIs of these SPAs were screened in in relation to construction phase disturbance and displacement impacts associated with the OECC: Common scoter, red-throated diver and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5835. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the OECC or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from construction phase activities within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance within the given SPA.

5836. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 64.97 km to Dundalk Bay SPA; maximum distance – 205.63 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5837. Construction phase works within the OECC at any period in time, and the associated extent of areas in which the SCIs may experience potential disturbance or displacement by construction vessels will cover only an extremely small proportion of the overall OECC area.

5838. Given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter, red-throated diver, little gull, red-breasted merganser, great crested grebe, goldeneye, cormorant or scaup designated as SCIs (minimum separation distance = 38.13 km to Malahide Estuary SPA, which is designated for red-breasted merganser, great crested grebe and goldeneye SCIs), disturbance and displacement in the form of indirect habitat loss around construction phase activities within the OECC will not adversely affect the spatial distribution of these SCIs or their supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have these species as SCIs. Given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter, red-throated diver or cormorant designated as SCIs (minimum separation distance = 64.97 km to Dundalk Bay SPA, which is designated in relation to its non-breeding common scoter population), disturbance and displacement in the form of indirect habitat loss around construction phase activities within the OECC will not adversely affect the spatial distribution of these SCIs or their supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have these species as SCIs.

5839. Should these SCIs from those SPAs identified in **Table 4-169** occur within the OECC or its immediate vicinity during the construction phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with construction phase activities within the OECC would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5840. No specific mitigation is proposed, or required, in respect of disturbance and displacement during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5841. As per project-only assessment, above.

OECC Intertidal landfall

5842. The following SCIs of these SPAs were screened in in relation to construction phase disturbance and displacement impacts associated with the OECC intertidal landfall: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, red-breasted merganser, herring gull, common gull, great crested grebe, goldeneye, red-throated diver and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5843. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas at the OECC intertidal landfall or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from construction phase activities within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance within the given SPA.

5844. However, the CWP array site is located more than 20 km from all these SPAs (minimum distance – 21.49 km to Malahide Estuary SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5845. The area in which the OECC intertidal landfall will be located forms part of a wider network of intertidal habitats which includes South Dublin Bay. Given the limited potential connectivity between with construction phase activities within South Dublin Bay, it is considered that the numbers of individuals experiencing potential disturbance from construction phase activities within South Dublin Bay which also utilise these SPAs are low, or zero, for all non-breeding seabird species which are SCIs of these SPAs. As such there is no potential for AESI as a result of disturbance and displacement impacts within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to the Conservation objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5846. No specific mitigation is proposed, or required, in respect of disturbance and displacement during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5847. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5848. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Construction phase impact 3 – Changes in prey availability

Array site

5849. The following SCIs of these SPAs were screened in in relation to construction phase changes in prey availability impacts associated with the array site: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5850. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from construction phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5851. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 62.61 km to River Nanny Estuary and Shore SPA; maximum distance – 208.68 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5852. Mortality or injury-inducing underwater noise impacts to seabird prey species associated with construction phase activities at the array site are calculated to occur within limited areas within and immediately around the array site. As the separation distance between the array site and SPAs surrounding the Irish Sea listed in **Table 4-169** is 38.13 km or more, such impacts will not affect seabird prey populations within or immediately surrounding these SPAs. As the separation distance between the array site and SPAs surrounding the Irish Sea listed in **Table 4-169** is 62.61 km or more, such impacts will not affect non-breeding seabird SCI prey populations within or immediately surrounding these SPAs.

5853. Although TTS-inducing underwater noise impacts to seabird prey species are predicted to occur over larger areas, TTS impacts to prey species are considered to have very limited potential to result in population level consequences to their seabird predators.

5854. Areas affected by increased SSC levels during construction phase activities are also assessed to be of negligible size in relation to seabird non-breeding season range extents and occur over considerably shorter durations. Suspended sediment plumes created during dredge disposal operations within the array site are predicted to enhance SSC levels over up to c. 7–9 km (depending on tidal conditions), for a duration of c. 10–15 days and resulting in cumulative deposition thicknesses of c. 1–2 cm. Suspended sediment plumes created during trenching operations within the array site are predicted to enhance SSC levels over up to c. 10 km (depending on tidal conditions), for a duration of c. 15 days and resulting in cumulative deposition thicknesses of < 1 cm.

5855. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of areas in which changes to prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods. As the maximum potential extent of removed or altered benthic habitat within the array site is 6.30 km^2, the spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird non-breeding season range extents.

5856. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of areas in which changes to prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5857. Consequently, there is assessed to be no potential for AESI to result from changes in prey availability during construction phase activities within the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5858. No specific mitigation is proposed, or required, in respect of changes in prey availability during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5859. As per project-only assessment, above.

OECC

5860. The following SCIs of these SPAs were screened in in relation to construction phase changes in prey availability impacts associated with the OECC: Lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5861. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the OECC or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from construction phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5862. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 64.97 km to Dundalk Bay SPA; maximum distance – 205.63 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5863. Mortality or injury inducing underwater noise impacts to SCI prey species are anticipated to be very limited, as no pile driving activities are proposed in relation to the installation of the export cable within the OECC, with high energy underwater noise sources limited to the potential treatment of a small number of UXO (fewer than ten).

5864. Areas affected by increased SSC levels during construction phase activities are assessed to be of negligible size in relation to seabird non-breeding season range extents and occur over relatively short durations. Suspended sediment plumes created during dredge disposal operations within the OECC are predicted to enhance SSC levels over up to c. 4–5 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm. Suspended

sediment plumes created during trenching operations within the OECC are predicted to enhance SSC levels over up c. 7 km (depending on tidal conditions), for a duration of c. 10 days and resulting in cumulative deposition thicknesses of c. 1 cm.

5865. The spatial extent of temporarily disturbed of areas of benthic habitat during construction phase activities are also assessed to be of negligible size in relation to seabird non-breeding season range extents.

5866. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the OECC or its immediate vicinity during the construction phase, the footprint of areas in which changes to prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5867. Consequently, there is assessed to be no potential for AESI to result from changes in prey availability during construction phase activities within the OECC in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5868. No specific mitigation is proposed, or required, in respect of changes in prey availability impacts during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5869. As per project-only assessment, above.

OECC Intertidal landfall

5870. The following SCIs of these SPAs were screened in in relation to construction phase changes in prey availability impacts associated with the OECC intertidal landfall: Lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, red-breasted merganser, herring gull, common gull, great crested grebe, goldeneye, red-throated diver and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5871. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas at the OECC intertidal landfall or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from construction phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5872. However, the CWP OECC intertidal landfall is located more than 20 km from all these SPAs (minimum distance – 21.49 km to Malahide Estuary SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5873. The area in which the OECC intertidal landfall will be located forms part of a wider network of intertidal habitats which includes South Dublin Bay. Given the limited potential connectivity between with

construction phase activities within South Dublin Bay, it is considered that the numbers of individuals experiencing potential changes in prey availability impacts from construction phase activities within South Dublin Bay which also utilise these SPAs are low, or zero, for all non-breeding seabird species which are SCIs of these SPAs. As such there is no potential for AESI as a result of changes in prey availability impacts within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to the Conservation objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5874. No specific mitigation is proposed, or required, in respect of changes in prey availability impacts during construction, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5875. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5876. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to changes in prey availability impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Direct effects on habitat

Array site

5877. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the array site: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5878. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ effects on habitat from the presence of operational infrastructure within this area. These direct effects on habitat have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, supporting habitats and distributions within the given SPA.

5879. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 62.61 km to River Nanny Estuary and Shore SPA; maximum distance – 208.68 km to Morecambe Bay

and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5880. As the operation and maintenance phase progresses through its planned duration of 25 years, the above sea level spatial extent of infrastructure will at no point exceed 0.005 km^2 within the array site (i.e. combined sea level area of all turbines and OSSs).

5881. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the operation and maintenance phase, the footprint of directly affected habitat represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5882. Consequently, there is assessed to be no potential for AESI to result from direct effects on habitat during operation and maintenance phase activities within the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5883. No specific mitigation is proposed, or required, in respect of direct effects on habitat during operation and maintenance, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5884. As per project-only assessment, above.

OECC Intertidal landfall

5885. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase direct effects on habitat impacts associated with the OECC intertidal landfall: lesser black-backed gull, Mediterranean gull, black-headed gull, herring gull, common gull and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5886. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas within South Dublin Bay during migratory periods or during movements within wintering periods. As such, these SCIs may experience ex situ effects on habitat from construction phase activities within this area. These direct effects on habitat have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, supporting habitats and distributions within the given SPA.

5887. However, the CWP OECC intertidal landfall is located more than 45 km from all these SPAs (minimum distance – 46.72 km to River Nanny Estuary and Shore SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5888. Furthermore, within South Dublin Bay, during the operation and maintenance phase, it is considered that any potential maintenance works relating to the export cable within intertidal habitats would be highly localised in spatial extent and limited in their temporal duration and frequency. Consequently, it

is considered that there is no potential for AESI as a result of direct effects on habitat within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to their Conservation Objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5889. No specific mitigation is proposed, or required, in respect of direct effects on habitat during operation and maintenance, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5890. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5891. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to direct effects on habitat impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Operation and maintenance phase impact 2 – Disturbance and Displacement

Array Site

5892. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the array site: Common scoter, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5893. Project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI are presented in **Table 4-173**. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from operation and maintenance phase activities and/or the presence of operational infrastructure within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance.

5894. However, the CWP array site is located more than 70 km from all these SPAs (minimum distance – 70.51 km to The Raven SPA; maximum distance – 203.54 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5895. In relation to migratory movements or between site movements during the non-breeding period, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during these typically large and infrequent movements are considered to be inconsequential in relation to energy reserves recruited (Masden et al., 2009). For all these non-breeding seabird SCIs, potential barrier effects regarding erected array site infrastructure are therefore considered negligible.

5896. SCI specific project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI are presented in **Table 4-173**.

5897. Project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI are presented in **Table 4-173**, below.

Table 4-173: Project-only assessments of operation and maintenance phase disturbance and displacement impacts for the array site for each SCI

SCI	Project-only assessment
Red-throated diver	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have red-throated diver as an SCI and the array site is 70.51 km (to The Raven SPA) and therefore considerably greater than the maximum published distances at which potential avoidance by divers of OWFs may occur (i.e. up to 16 km, Mendel et al., 2019), disturbance and displacement in the form of indirect habitat loss around operational WTGs and operation and maintenance phase activities within the array site will not adversely affect the in situ spatial distribution of this SCI or its supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have red-throated diver as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have red-throated diver as an SCI, should red-throated diver from those SPAs occur within the array site or its immediate vicinity during the operation and maintenance phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with the operation and maintenance of the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in Table 4-170**Table 4-170** above
Common scoter	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have common scoter as an SCI and the array site is 70.51 km (to The Raven SPA) and therefore considerably greater than the distances at which potential avoidance by common scoter of OWFs may occur, disturbance and displacement in the form of indirect habitat loss around operational WTGs and operation and maintenance phase activities within the array site will not adversely affect the spatial distribution of this SCI or its supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have common scoter as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter as an SCI, should common scoter from those spas occur within the array site or its immediate vicinity during the operation and maintenance phase, it is considered that-only a negligible proportion of the populations of those spas may do so. As such, any displacement related mortality associated with the presence of operational infrastructure or operation and maintenance phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in **Table 4-170,** above.

SCI	Project-only assessment
Cormorant	Cormorant is not considered sensitive to disturbance and displacement from the presence of OWF infrastructure. As such, potential disturbance and displacement impacts to this SCI relate to extremely localised and temporary impacts surrounding operation and maintenance phase vessel activity within the array site. From studies undertaken within the North and Baltic Seas (Fliessbach et al., 2019), 48% of cormorant were observed to demonstrate escape responses (typically in the form of taking off) in response to approaching vessels. The mean distance at which these responses occurred was 258 m; an area of approximately 0.209 km^2 around each vessel. Given the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have cormorant as an SCI and the array site is 70.51 km (to The Raven SPA) [and therefore the negligible proportion of the cormorant populations from those SPAs which may experience disturbance and displacement impacts from operation and maintenance phase activities within the array site] and, the extremely localised area in which ex situ disturbance and displacement impacts may occur to the cormorant SCI of these SPAs, disturbance and displacement impacts from operation and maintenance phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169.** Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in **Table 4-170**, above.
Little gull	As the minimum separation distance between those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have little gull as an SCI and the array site is 102.91 km (to Liverpool Bay SPA / Bae Lerpwl SPA) and therefore considerably greater than the distances at which potential avoidance by little gull of OWFs may occur, disturbance and displacement in the form of indirect habitat loss around installed WTGs and construction phase activities within the array site will not adversely affect the spatial distribution of this SCI or its supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have little gull as an SCI. Furthermore, given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have little gull as an SCI, should little gull from those SPAs occur within the array site or its immediate vicinity during the operation and maintenance phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with the presence of operational infrastructure or operation and maintenance phase activities within the array site would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of this SCI as stated in **Table 4-170**, above.

Proposed mitigation

5898. No specific mitigation is proposed, or required, in respect of disturbance and displacement during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5899. As per project-only assessment, above.

OECC

5900. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC: Common scoter, red-throated diver and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5901. Given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter, red-throated diver, little gull, red-breasted merganser, great crested grebe, goldeneye, cormorant or scaup designated as SCIs (minimum separation distance = 38.13 km to Malahide Estuary SPA, which is designated for red-breasted merganser, great crested grebe and goldeneye SCIs), disturbance and displacement in the form of indirect habitat loss around operation and maintenance phase activities within the OECC will not adversely affect the spatial distribution of these SCIs or their supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have these species as SCIs. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the OECC or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from operation and maintenance phase activities within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance within the given SPA.

5902. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 64.97 km to Dundalk Bay SPA; maximum distance – 205.63 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5903. Potential for disturbance and displacement within the OECC during the operational phase of the project is limited to works associated with routine monitoring activity and maintenance or repair events over the operational lifetime of the project. During such activities, displacement and disturbance would potentially occur only within a limited range of any vessels involved.

5904. Given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have common scoter, red-throated diver or cormorant designated as SCIs (minimum separation distance = 64.97 km to Dundalk Bay SPA, which is designated in relation to its non-breeding common scoter population), disturbance and displacement in the form of indirect habitat

loss around operation and maintenance phase activities within the OECC will not adversely affect the spatial distribution of these SCIs or their supporting habitats within those SPAs surrounding the Irish Sea listed in **Table 4-169** which are have these species as SCIs.

5905. Should these SCIs from those SPAs identified in **Table 4-169** occur within the OECC or its immediate vicinity during the operation and maintenance phase, it is considered that-only a negligible proportion of the populations of those SPAs may do so. As such, any displacement related mortality associated with operation and maintenance phase activities within the OECC would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169** and that any such impacts will be of limited duration and of minimal energetic consequence. Therefore, there is assessed to be no potential for such activities to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5906. No specific mitigation is proposed, or required, in respect of disturbance and displacement during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5907. As per project-only assessment, above.

OECC Intertidal landfall

5908. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase disturbance and displacement impacts associated with the OECC intertidal landfall: Lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, red-breasted merganser, herring gull, common gull, great crested grebe, goldeneye, red-throated diver and cormorant. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5909. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas at the OECC intertidal landfall or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ disturbance and displacement impacts from operation and maintenance phase activities within this area. These disturbance and displacement impacts have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance within the given SPA.

5910. However, the CWP array site is located more than 20 km from all these SPAs (minimum distance – 21.49 km to Malahide Estuary SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5911. The area in which the OECC intertidal landfall will be located forms part of a wider network of intertidal habitats which includes South Dublin Bay. Given the limited potential connectivity between with operation and maintenance phase activities within South Dublin Bay, it is considered that the numbers

of individuals experiencing potential disturbance from construction phase activities within South Dublin Bay which also utilise these SPAs are low, or zero, for all non-breeding seabird species which are SCIs of these SPAs. During the operation and maintenance phase buried infrastructure within South Dublin Bay is passive (i.e. not a source of disturbance for SCIs within intertidal areas) and any maintenance activities, beyond routine visual inspections, localised. As such there is no potential for AESI as a result of disturbance and displacement impacts within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to the Conservation objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5912. No specific mitigation is proposed, or required, in respect of disturbance and displacement during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5913. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5914. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Operation and maintenance phase impact 3 – Changes in prey availability

Array Site

5915. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the array site: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5916. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the array site or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from operation and maintenance phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5917. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 62.61 km to River Nanny Estuary and Shore SPA; maximum distance – 208.68 km to Morecambe Bay

and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5918. As operation and maintenance phase activities do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact the non-breeding seabird SCIs of the SPAs identified in **Table 4-169**, above.

5919. Areas within the array site which may experience long-term alteration of benthic habitats which have the potential to support populations of key seabird prey species are distantly located from SPAs surrounding the Irish Sea listed in **Table 4-169** (the closest being River Nanny Estuary and Shore SPA, with a minimum separation distance of 62.61 km) and of limited spatial scale.

5920. As operation and maintenance phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities) except in the case of potential localised repair works, increased SSC levels, which occur during construction phase activities are not considered to routinely occur during the operational phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact these SCIs.

5921. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact these SCIs.

5922. Areas within the array site which may experience long-term alteration of benthic habitats which have the potential to support populations of key seabird prey species are distantly located from SPAs surrounding the Irish Sea listed in **Table 4-169** (the closest being Malahide Estuary SPA, with a minimum separation distance of 38.13 km) and of limited spatial scale. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of areas in which changes in prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5923. Consequently, there is assessed to be no potential for AESI to result from changes in prey availability during operation and maintenance phase activities within the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the array site or its immediate vicinity during the construction phase, the footprint of areas in which changes in prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

Proposed mitigation

5924. No specific mitigation is proposed, or required, in respect of changes in prey availability during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5925. As per project-only assessment, above.

OECC

5926. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. Which SCIs are considered in relation to which SPA is outlined in **Table 4-169**.

Project-only assessment

5927. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use offshore areas within the OECC or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from operation and maintenance phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5928. However, the CWP array site is located more than 60 km from all these SPAs (minimum distance – 64.97 km to Dundalk Bay SPA; maximum distance – 205.63 km to Solway Firth SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5929. As operation and maintenance phase activities within the OECC do not include piling works or any other very high energy underwater noise inducing activities, and operational noise impact magnitudes to all potential prey species are assessed to be very low, there is not considered to be a pathway for operation and maintenance phase underwater noise impacts to have the potential to cause changes to prey availability in such a way that could impact these SCIs.

5930. Areas which may experience long-term alteration of any benthic habitats outside the SPA which have the potential to support populations of key seabird prey species constitute only very small proportions of seabird foraging areas.

5931. As operational phase activities do not require disturbance of the seabed (in the form of trenching or dredging activities) except in the case of potential localised repair works, increased SSC levels, which occur during construction phase activities are not considered to routinely occur during the operational phase and there is no meaningful pathway for this impact to have the potential to cause changes to prey availability during the operational phase in such a way that could impact these SCIs.

5932. During the operation and maintenance phase, one additional potential impact to seabird receptor prey species which does not occur during the construction phase is considered to be the presence of EMF effects, associated with electricity passing along infrastructure cables. Any effects on fish are anticipated to occur within the immediate vicinity of the cable and effect levels are likely to be low in relation to background levels associated with the Earth's magnetic field. The magnitude of such impacts to potentially sensitive fish species are assessed as being very low. Consequently, there is not considered to be a pathway for operation and maintenance phase EMF impacts to have the potential to cause impacts to prey availability in such a way that could impact these SCIs.

5933. Should non-breeding seabird SCIs of those SPAs surrounding the Irish Sea listed in **Table 4-169**, above, occur within the OECC or its immediate vicinity during the operation and maintenance phase, the footprint of areas in which changes to prey availability may occur represents a negligible proportion of sea area used by those SCIs during migratory periods or during movements within wintering periods.

5934. Consequently, there is assessed to be no potential for AESI to result from changes in prey availability during operation and maintenance phase activities within the OECC in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5935. No specific mitigation is proposed, or required, in respect of changes in prey availability impacts during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5936. As per project-only assessment, above.

OECC Intertidal landfall

5937. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase changes in prey availability impacts associated with the OECC intertidal landfall: Lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, red-breasted merganser, herring gull, common gull, great crested grebe, goldeneye, red-throated diver and cormorant. Which SCIs are considered in relation to which SPA is outlined in **Table 4-169**.

Project-only assessment

5938. Non-breeding seabird SCIs which utilise habitats within these SPAs may also use intertidal areas at the OECC intertidal landfall or surrounding areas during migratory periods or between site movements during the non-breeding period. As such, these SCIs may experience ex situ changes in prey availability impacts from operation and maintenance phase activities within this area. These changes in prey availability have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and supporting habitats within the given SPA.

5939. However, the CWP OECC intertidal landfall is located more than 20 km from all these SPAs (minimum distance – 21.49 km to Malahide Estuary SPA; maximum distance – 241.82 km to Morecambe Bay and Duddon Estuary SPA) and, therefore, the potential for impacts within this area affecting the population or range of any non-breeding seabird SCIs of these SPAs is considered to be limited.

5940. The area in which the OECC intertidal landfall will be located forms part of a wider network of intertidal habitats which includes South Dublin Bay. Given the limited potential connectivity between SCI populations from these distant SPAs and operation and maintenance phase activities within South Dublin Bay, it is considered that the numbers of individuals experiencing potential changes in prey availability impacts from construction phase activities within South Dublin Bay which also utilise these SPAs are low, or zero, for all non-breeding seabird species which are SCIs of these SPAs. During the operation and maintenance phase buried infrastructure within South Dublin Bay is passive (i.e. not impacting prey species populations within intertidal areas) and any maintenance activities requiring

excavation within intertidal habitats likely to be short-term and localised. As such there is no potential for AESI as a result of changes in prey availability impacts within the intertidal to the non-breeding seabird SCIs of these SPAs in relation to the Conservation objectives, attributes and targets stated in **Table 4-170**, above.

Proposed mitigation

5941. No specific mitigation is proposed, or required, in respect of changes in prey availability impacts during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5942. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5943. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to changes in prey availability impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Operation and maintenance impact 4 – Collision

Array site

5944. The following SCIs of these SPAs were screened in in relation to operation and maintenance phase collision impacts associated with the array site: lesser black-backed gull, Mediterranean gull, common scoter, black-headed gull, herring gull, common gull, red-throated diver, cormorant and little gull. The SCIs considered in relation to each SPA are outlined in **Table 4-169**.

Project-only assessment

5945. Impacts arising from collision with WTGs have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-170**, above; specifically those relating to the favourable maintenance of population trends and abundances of SCIs within the given SPA.

5946. Given the large separation distances between the array site and those SPAs surrounding the Irish Sea listed in **Table 4-169** which have lesser black-backed gull, herring gull, black-headed gull, common gull, Mediterranean gull, little gull, common scoter, red-throated diver or cormorant designated as SCIs (minimum separation distance = 62.61 km to River Nanny Estuary and Shore SPA, which is designated for herring gull SCI), the potential for connectivity is considered to be extremely limited.

5947. Should these SCIs from those SPAs identified in **Table 4-169** occur within the array site during the operation and maintenance phase, it is considered that-only a very small proportion of the populations of those SPAs may do so. Should these SCIs from those SPAs identified in **Table 4-169** occur within the array site during the operation and maintenance phase, it is considered that-only a negligible

proportion of the populations of those SPAs may do so. As such, any collision impacts within the array site during the operational phase would not have the potential to lead to population level consequences to those distant SPAs identified in **Table 4-169**. Therefore, there is assessed to be no potential for collision mortality to result in AESI in relation to the Conservation Objectives and attributes and targets for SPAs of these SCIs as stated in **Table 4-170**, above.

Proposed mitigation

5948. No specific mitigation is proposed, or required, in respect of collision impacts during the operation and maintenance phase, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5949. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5950. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-170**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-169.**

Terrestrial migrant SPAs

4.42 SPAs designated in relation to non-seabird and non-wildfowl or wader migrants

5951. A number of sites within Ireland (ROI) have been screened into the NIS in relation to potential impacts to migratory breeding or non-breeding non-seabird and non-wildfowl or wader SCIs (hereafter referred to as 'terrestrial migrant SCIs'). The rationale for this inclusion is that a limited number of the SCIs from these SPAs may pass through the array site during migration periods and potentially experience barrier effects (additional energetic cost should they choose to deviate around the turbine array and thus increase migratory flight distances) or collision effects (should they choose not to deviate to avoid the turbine array).

5952. All the relevant receptors of all of these SPAs are shown in **Table 4-174** below, and assessed in relation to:

- Construction phase impacts
  - Construction phase impact 1 – Disturbance and displacement – Array site (barrier effects) and OECC (intertidal landfall)
- Operation and maintenance phase impacts
  - Operation and maintenance phase impact 1 – Disturbance and displacement – Array site (barrier effects) and OECC (intertidal landfall)
  - Operation and maintenance impact 2 – Collision – Array site

5953. The Conservation Objectives, attributes and targets of each of these SPAs and their SCIs are detailed in **Table 4-174**, below.

Table 4-174: Non-overlapping SPAs terrestrial migrant SCIs listed, their distance to the array site, and link to Conservation Objectives in Table 4-175. Unless stated SCI designations relate to breeding populations.

SPA	Site Code	Distance to array site (km)	Conservation objectives reference (Table 4-175, below)	SCIs		
				Corncrake	Hen harrier	Merlin
Connemara Bog Complex SPA	IE004181	232.4953	SS1			X
Derryveagh and Glendowan Mountains SPA	IE004039	242.75634	GEN			X
Falcarragh to Meenlaragh SPA	IE004149	266.88461	GEN	X		
Fanad Head SPA	IE004148	261.02943	GEN	X		
Inishbofin, Inishdooey and Inishbeg SPA	IE004083	271.52494	GEN	X		
Inishbofin, Omey Island and Turbot Island SPA	IE004231	289.04502	GEN	X		
Killarney National Park SPA	IE004038	269.70212	GEN			X

SPA	Site Code	Distance to array site (km)	Conservation objectives reference (Table 4-175, below)	SCIs		
				Corncrake	Hen harrier	Merlin
Lough Corrib SPA	IE004042	213.31255	SS2		X*	
Lough Nillan Bog SPA	IE004110	235.87724	GEN			X
Malin Head SPA	IE004146	264.04943	GEN	X		
Middle Shannon Callows SPA	IE004096	139.26109	GEN	X		
Mullaghanish to Musheramore Mountains SPA	IE004162	239.2987	GEN		X	
Mullet Peninsula SPA	IE004227	300.80917	GEN	X		
Owenduff/Nephin Complex SPA	IE004098	263.3258	GEN			X
Slieve Aughty Mountains SPA	IE004168	167.20857	SS3		X	X
Slieve Beagh SPA	IE004167	154.06972	SS4		X	
Slieve Bloom Mountains SPA	IE004160	105.18047	SS5		X	
Slievefelim to Silvermines Mountains SPA	IE004165	153.77552	SS6		X	
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	IE004161	225.28999	SS7		X	
Tory Island SPA	IE004073	280.38716	GEN	X		
West Donegal Islands SPA	IE004230	270.62844	GEN	X		
Wicklow Mountains SPA	IE004040	10.58194	GEN			X
Wexford Harbour and Slobs SPA	IE004076	74.82164	SS8		X*	

** SCI designation relates to a non-breeding population*

Table 4-175: Conservation Objectives, attributes and targets of terrestrial migrant SCIs of non-overlapping SPAs

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
GEN	Derryveagh and Glendowan Mountains SPA Falcarragh to Meenlaragh SPA Fanad Head SPA Inishbofin, Inishdooey and Inishbeg SPA Inishbofin, Omey Island and Turbot Island SPA Killarney National Park SPA Lough Nillan Bog SPA Malin Head SPA Middle Shannon Callows SPA Mullaghanish to Musheramore Mountains SPA Mullet Peninsula SPA Owenduff/Nephin Complex SPA Tory Island SPA West Donegal Islands SPA Wicklow Mounts SPA	All	To maintain or restore the favourable conservation condition of the SCI	Population dynamics data on the SCI indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.	
				The natural range of the SCI is neither being reduced nor is likely to be reduced for the foreseeable future.	
				There is, and will probably continue to be, a sufficiently large habitat to maintain the SCI's populations on a long-term basis.	
SS1	Connemara Bog Complex SPA	Merlin	To restore the favourable conservation condition of the SCI in the SPA	Population size	Breeding population is increasing
				Productivity rate	Sufficient to meet the population size target
				Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
				Extent and condition of suitable open habitats for foraging	Sufficient availability of suitable foraging habitat across the SPA to support targets relating to population size, productivity rate and distribution
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS2	Lough Corrib SPA	Hen harrier (non-breeding)	To restore the favourable conservation condition of the SCI in the SPA	Roost attendance: individual hen harriers	Long term winter population trend within the SPA is stable or increasing
				Forage area spatial distribution, extent and abundance	Sufficient extent of suitable habitats and biomass of available prey items across the site to help support the population
				Roost spatial distribution and extent	Sufficient number of locations, area of suitable roosting habitat to support the population
				Disturbance at the roost site	Human activities occur at levels that do not significantly impact upon wintering hen harrier
SS3	Slieve Aughty Mountains SPA	Hen harrier	To restore the favourable conservation condition of the SCI in the SPA	Population size	Restore numbers to at least 14–24 confirmed breeding pairs
				Productivity rate	Restore to at least 1.0–1.4 fledged young per confirmed pair
				Spatial utilisation by breeding pairs	Restore the spatial utilisation of the SPA by breeding pairs to at least 68–92%
				Extent and condition of heath and bog and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Extent and condition of low intensity managed grasslands and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of hedgerows	Maintain at least the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Age structure of forest estate	Achieve an even and consistent distribution of age-classes across the forest estate
				Disturbance to breeding sites	Disturbance occurs at levels that does not significantly impact upon breeding SCI
		Merlin	To maintain the favourable conservation condition of the SCI in the SPA	Population size	Breeding population is stable or increasing
				Productivity rate	Sufficient to at least maintain population
				Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
				Extent and condition of suitable open habitats for foraging	Sufficient availability of suitable foraging habitat across the SPA to support the targets relating to population size, productivity rate and range
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS4	Slieve Beagh SPA	Hen harrier	To restore the favourable conservation condition of the SCI in the SPA	Population size	Maintain numbers at or above 3–4 confirmed breeding pairs
				Productivity rate	Restore to at least 1.0–1.4 fledged young per confirmed pair
				Spatial utilisation by breeding pairs	Maintain the spatial utilisation of the SPA by breeding pairs at 100%
				Extent and condition of heath and bog and associated habitats	Maintain the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of low intensity managed grasslands and associated habitats	Maintain extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of hedgerows	Maintain the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Age structure of forest estate	Maintain an even and consistent distribution of age-classes across the forest estate
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS5	Slieve Bloom Mountains SPA	Hen harrier	To restore the favourable conservation condition of the SCI in the SPA	Population size	Maintain numbers at or above 5–10 confirmed breeding pairs
				Productivity rate	Maintain at least 1.0–1.4 fledged young per confirmed pair
				Spatial utilisation by breeding pairs	Maintain at least 82–97% spatial utilisation of the SPA by breeding pairs

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Extent and condition of heath and bog and associated habitats	Maintain the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of low intensity managed grasslands and associated habitats	Maintain extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of hedgerows	Maintain the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Age structure of forest estate	Achieve an even and consistent distribution of age-classes across the forest estate
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS6	Slievefelim to Silvermines Mountains SPA	Hen harrier	To restore the favourable conservation condition of the SCI in the SPA	Population size	Maintain numbers at or above 4–8 confirmed breeding pairs
				Productivity rate	Maintain at least 1.0–1.4 fledged young per confirmed pair
				Spatial utilisation by breeding pairs	Maintain at least 74–94% spatial utilisation of the SPA by breeding pairs
				Extent and condition of heath and bog and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of low intensity managed grasslands and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of hedgerows	Maintain the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Age structure of forest estate	Achieve an even and consistent distribution of age-classes across the forest estate
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS7	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	Hen harrier	To restore the favourable conservation condition of the SCI in the SPA	Population size	Restore the numbers of confirmed breeding pairs to at least 38–39 confirmed breeding pairs
				Productivity rate	Maintain at least 1.0–1.4 fledged young per confirmed pair
				Spatial utilisation by breeding pairs	Restore the spatial utilisation of the SPA by breeding pairs to at least 97–98%
				Extent and condition of heath and bog and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Extent and condition of low intensity managed grasslands and associated habitats	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation

Conservation Objectives reference	SPA(s)	SCI(s)	Conservation Objective	Attribute	Target
				Extent and condition of hedgerows	Maintain the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation
				Age structure of forest estate	Achieve an even and consistent distribution of age-classes across the forest estate
				Disturbance at breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding SCI
SS8	Wexford Harbour and Slobs SPA	Hen harrier (non-breeding)	To maintain the favourable conservation condition of SCI in the SPA	Roost attendance: individual hen harriers	No significant decline
				Suitable foraging habitat	No significant decline
				Roost site: condition	The roost site should be maintained in a suitable condition
				Disturbance at the roost site	Human activities should occur at levels that do not adversely affect the SCI winter roost population

Construction phase impacts

Construction phase impact 1 – Disturbance and displacement

Array site (Barrier effects)

Project-only assessment

5954. Disturbance and displacement impacts to these migrant SCIs arising from the array site during operation and maintenance are limited to barrier effects, i.e. the possibility they need to fly around the turbines during their annual migrations.

5955. For the purpose of this assessment disturbance and displacement impacts through barrier effects to migratory species are conservatively treated as being the same as during the operational phase (albeit spanning a much shorter duration than those during the operational phase; 16 months, from initial turbine erection to operational, compared to a 25-year operational).

5956. These disturbance and displacement impacts (via barrier effects) have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-175**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance.

5957. For migratory species, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during typically large migratory movements are considered to be inconsequential in relation to energy reserves recruited for migration (Masden et al., 2009).

5958. Therefore, the potential magnitude of impact on birds that-only migrate through the array site (including migratory terrestrial species) is considered negligible.

5959. Consequently, there is assessed to be no potential for AESI to result from disturbance and displacement in the form of barrier effects during the construction phase at the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-175**, above.

Proposed mitigation

5960. No specific mitigation is proposed, or required, in respect of disturbance and displacement during operation and maintenance, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5961. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5962. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-175**, above. With regards to disturbance and displacement impacts during the construction phase of the CWP Project, it can be concluded that there is no impediment to the

Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-174.**

Operation and maintenance phase impacts

Operation and maintenance phase impact 1 – Disturbance and displacement

Array site (Barrier effects)

Project-only assessment

5963. Disturbance and displacement impacts to these migrant SCIs arising from the array site during operation and maintenance are limited to barrier effects, i.e. the possibility they need to fly around the turbines during their annual migrations.

5964. These disturbance and displacement impacts (via barrier effects) have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-175**, above; specifically those relating to the favourable maintenance of population trends, abundances, distributions and minimisation of disturbance.

5965. Over the 25-year operational period of the project for migratory species, one-off energetic costs associated with relatively small deviations (such as travelling around the array site, rather than straight through) during typically large migratory movements are considered to be inconsequential in relation to energy reserves recruited for migration (Masden et al., 2009).

5966. Therefore, the potential magnitude of impact on birds that-only migrate through the array site (including migratory terrestrial species) is considered negligible.

5967. Consequently, there is assessed to be no potential for AESI to result from disturbance and displacement in the form of barrier effects during the operation and maintenance phase at the array site in relation to the Conservation Objectives and attributes and targets for these SCIs as stated in **Table 4-175**, above.

Proposed mitigation

5968. No specific mitigation is proposed, or required, in respect of disturbance and displacement during operation and maintenance, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5969. As per project-only assessment, above.

5970. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-175**, above. With regards to disturbance and displacement impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-174.**

Operation and maintenance impact 2 – Collision

Array site

Project-only assessment

5971. Impacts arising from collision with WTGs have the potential to impact on the relevant conservation objectives, attributes and targets listed in **Table 4-175**, above; specifically those relating to the favourable maintenance of population trends and abundances of SCIs within the given SPA.

5972. Estimated collision mortality apportioned to populations of Irish SPAs for terrestrial migrant SCIs which may pass through the array site during migratory movements, are presented as a percentage of the designated population of each site (taken from Natura 2000 designation forms) in **Table 4-176**. Estimated collision mortality apportioned to populations of Irish SPAs for terrestrial migrant SCIs which may pass through the array site during migratory movements, are presented as a percentage of the designated population of each site (taken from Natura 2000 designation forms) in **Table 4-176**. Apportioned collision mortality values for each SCI of each SPA were derived from total collision mortality figures for each species (as determined in **Appendix 10.3 Collision Risk Modelling** of the EIAR), apportioned on the basis of the designated SPA population as a proportion of the wider regional flyway population (as defined in **Appendix 10.3: Collision Risk Modelling** of the EIAR).

Table 4-176: Collision impacts apportioned to terrestrial migrant SCIs of non-overlapping Irish SPAs as a percentage of SPA designated population

SPA	SCI	SPA pop	Regional population	Percentage of regional population	Total impact		Impact apportioned to SPA		Impact as proportion of SPA mean peak	
					Option A	Option B	Option A	Option B	Option A	Option B
Connemara Bog Complex SPA	Merlin	16	4128	0.388%	0.072	0.063	0.00028	0.00024	0.002%	0.002%
Derryveagh and Glendowan Mountains SPA	Merlin	22	4128	0.533%	0.072	0.063	0.00038	0.00034	0.002%	0.002%
Falcarragh to Meenlaragh SPA	Corncrake	14	16960	0.083%	0.099	0.088	0.00008	0.00007	0.001%	0.001%
Fanad Head SPA	Corncrake	6	16960	0.035%	0.099	0.088	0.00004	0.00003	0.001%	0.001%
Inishbofin, Inishdooey and Inishbeg SPA	Corncrake	26	16960	0.153%	0.099	0.088	0.00015	0.00013	0.001%	0.001%
Inishbofin, Omey Island and Turbot Island SPA	Corncrake	18	16960	0.106%	0.099	0.088	0.00011	0.00009	0.001%	0.001%
Killarney National Park SPA	Merlin	10	4128	0.242%	0.072	0.063	0.00017	0.00015	0.002%	0.002%
Lough Corrib SPA	Hen harrier	8	1088	0.735%	0.008	0.006	0.00006	0.00004	0.001%	0.001%
Lough Nillan Bog SPA	Merlin	10	4128	0.242%	0.072	0.063	0.00017	0.00015	0.002%	0.002%
Malin Head SPA	Corncrake	6	16960	0.035%	0.099	0.088	0.00004	0.00003	0.001%	0.001%
Middle Shannon Callows SPA	Corncrake	120	16960	0.708%	0.099	0.088	0.00070	0.00062	0.001%	0.001%
Mullaghanish to Musheramore Mountains SPA	Hen harrier	10	1088	0.919%	0.008	0.006	0.00007	0.00006	0.001%	0.001%
Mullet Peninsula SPA	Corncrake	8	16960	0.047%	0.099	0.088	0.00005	0.00004	0.001%	0.001%
Owenduff/Nephin Complex SPA	Merlin	16	4128	0.388%	0.072	0.063	0.00028	0.00024	0.002%	0.002%
Slieve Aughty Mountains SPA	Hen harrier	54	1088	4.963%	0.008	0.006	0.00040	0.00030	0.001%	0.001%
	Merlin	10	4128	0.242%	0.072	0.063	0.00017	0.00015	0.002%	0.002%
Slieve Beagh SPA	Hen harrier	8	1088	0.735%	0.008	0.006	0.00006	0.00004	0.001%	0.001%
Slieve Bloom Mountains SPA	Hen harrier	12	1088	1.103%	0.008	0.006	0.00009	0.00007	0.001%	0.001%
Slievefelim to Silvermines Mountains SPA	Hen harrier	14	1088	1.287%	0.008	0.006	0.00010	0.00008	0.001%	0.001%
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	Hen harrier	90	1088	8.272%	0.008	0.006	0.00066	0.00050	0.001%	0.001%
Tory Island SPA	Corncrake	68	16960	0.401%	0.099	0.088	0.00040	0.00035	0.001%	0.001%
West Donegal Islands SPA	Corncrake	50	16960	0.295%	0.099	0.088	0.00029	0.00026	0.001%	0.001%
Wicklow Mountains SPA	Merlin	20	4128	0.484%	0.072	0.063	0.00035	0.00031	0.002%	0.002%
Wexford Harbour and Slobs SPA	Hen harrier	5	1088	0.460%	0.008	0.006	0.00004	0.00003	0.001%	0.001%

5973. Although terrestrial migrant SCIs from these SPAs may pass through the array site, any collision mortality to these SCIs would be negligible (0.002% or less than designated population sizes). Collision impacts will therefore not result in an AESI in relation to the Conservation Objective and attributes and targets for these SCIs of these SPAs as stated in **Table 4-175**, above. Specifically, any such negligible increase to baseline mortality is considered not to affect the long-term population trend of these SCIs in such a way as to result in its decline. Thereby, collision impacts to these SCIs of these SPAs will not adversely affect the Conservation Objectives of the SPAs to maintain the favourable conservation condition of the SCIs.

Proposed mitigation

5974. No specific mitigation is proposed, or required, in respect of disturbance and displacement during operation and maintenance, as this impact will not give rise to any AESI in relation to the SCIs of these SPAs.

Residual effect

5975. As per project-only assessment, above.

Project-only effect on site integrity conclusion for impact

5976. The Conservation Objectives, attributes and targets for each of the SCIs of for these SPAs are presented in **Table 4-175**, above. With regards to collision impacts during the operation and maintenance phase of the CWP Project, it can be concluded that there is no impediment to the Conservation Objective being met for these SCIs and, in turn, that there is **no project-only AESI for each SPA SCI listed in Table 4-174.**

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