Chapter 8 Addendum:
Benthic Subtidal & Intertidal Ecology

ORIEL WINDFARM
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ORIEL WIND FARM PROJECT

Environmental Impact Assessment Report - Addendum
Chapter 8 Addendum: Benthic Subtidal and Intertidal Ecology

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8 CHAPTER 8 ADDENDUM - BENTHIC SUBTIDAL AND INTERTIDAL ECOLOGY

8.1 Introduction

This Addendum provides information to supplement the assessment of benthic subtidal and intertidal ecology presented in chapter 8 of the Environmental Impact Assessment Report (EIAR)(2024). It has been prepared in response to a Request for Further Information (RFI) from An Coimisiún Pleanála (ACP) (formerly An Bord Pleanála) regarding the planning application (case reference 319799) for the Oriel Wind Farm Project (hereafter referred to as “the Project”).

Table 8A-1 outlines the specific information requested according to the referencing used in the ‘Schedule-Further Information Request’ provided by ACP (e.g. 8.A which refers to Baseline Characterisation and Reef Habitat). Table 8A-1 also indicates where the corresponding information / responses can be found within this Addendum to chapter 8 and provides a concluding statement on any resulting updates or changes to the assessment presented in the EIAR (2024).

The section and subsection headings in this Addendum correspond to those used in chapter 8: Benthic Subtidal and Intertidal Ecology of the EIAR. However, within the ‘Assessment of Significance’ (section 8.10 of chapter 8: Benthic and Intertidal Ecology, EIAR volume 2B), one additional impact has been assessed in response to the RFI. This assessment covers ‘electromagnetic fields (EMF) from subsea electrical cabling’ (section 8.10.9). Consequently, the numbering of the subsequent subheadings, including ‘mitigation and residual effects’ and ‘future monitoring,’ has been adjusted. The reader is directed to review the information presented in this Addendum alongside the assessment presented in the EIAR chapter.

Table 8A-1: Further information requested on Benthic Subtidal and Intertidal Ecology and details of Applicant's response.

Reference	Request for Further Information	Response / Reference to where information is presented	Concluding statement
Benthic Subtidal and Intertidal Ecology	While it is acknowledged that best practice in the preparation of the EIAR has been applied, there remains a degree of uncertainty, in particular in relation to the baseline characterisation of the Offshore Cable Corridor (OCC). The applicant is requested to submit the following further information:	-	-
Baseline Characterisation and Reef Habitat			
8.A	There is uncertainty around the presence, location and extent of hard substate habitats within the OCC, and in addition if these habitats represent rocky reef (stony and /or bedrock). The applicant includes evidence from EMODnet in their EIAR to show predicted habitats across the study area, and this predicts areas of 'circalittoral rock and biogenic reef' overlapping the Offshore Wind Farm Area and OCC (EIAR Chapter 8: Benthic Subtidal & Intertidal Ecology, Figure 8-2). However, it is noted that the EMODnet map in the EIAR differs in terms of levels of classification and spatial extent of habitats from that seen on the EMODnet website. It also appears that the broad scale habitat mapping based on the Ireland Marine Atlas and reproduced in the EIAR varies from that of EMODnet, with differences in extent of these rocky habitats[3]. The applicant is requested to detail how the habitat maps used in the EIAR were created (source of layers, methods to amalgamate layers, if any), and to review any outputs containing EMODnet data to ensure that the correct habitat mapping is used within the EIAR.	See section 8.7.	Chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B) provided a comprehensive review of desktop sources characterisation of the wider western Irish Sea region as well as the Benthic Subtidal and Intertidal Ecology Study Area. Additionally site-specific data provided consistent and reliable characterisation of the sediments, species and habitats within the offshore wind farm area and offshore cable corridor. Therefore, it is unlikely that there are any other sensitive habitats present in the Benthic Subtidal and Intertidal Ecology Study Area which would change the conclusion of the EIAR i.e. that there would be no significant impact on the identified habitats. The updates provided in section 8.7 of this Addendum in response to the request for clarification and confirmation that habitat mapping used to characterise the baseline was accurate and has not resulted in any changes to the approach taken to the assessment included in the EIAR of benthic ecology, or the conclusions reached in the assessment included in the EIAR.
8.B	Project-specific survey data is used to ground-truth these wider modelled habitat predictions. The Board notes that two site-specific surveys were undertaken for the Oriel Windfarm project, in 2006 and 2019. Due to the cable corridor design changing between these two campaigns, the 2019 survey campaign undertaken across the OCC did not fully spatially replicate the earlier 2006 survey. There, therefore, seems to be a data gap within the current OCC due to lack of coverage (see Chapter 8, Figure 8-4). The nearshore benthic data provided by the Marine Institute unfortunately does not provide coverage across the OCC itself (Chapter 8; Figure 8-3). Data collected during these 2019 surveys reported rocky habitats as present at some stations, as shown in the drop-down video	See section 8.7. Appendix 8-3 Addendum:- Sediment Chemistry Results. This report provides 2024 sediment survey chemistry results. Appendix 8-4 Addendum: Benthic Ecology 2025 Survey Report. This report	The Applicant has reviewed all available project-specific survey data collected and can confirm that there is no data gap regarding the offshore cable corridor. The data collected as part of the 2019 survey campaign allowed for accurate characterisation. The results of this survey have been validated by further sampling undertaken in 2024 (see appendix 8-3: Sediment Chemistry Results) (EIAR volume 2B Addendum) (which was not available when the EIAR was submitted) and a review of the 2022 geophysical survey (survey data is supplementary to the 2019/2020 geophysical surveys and therefore was not presented in the EIAR, 2024), which confirmed sediment characterisation aligned with the 2019

Reference	Request for Further Information	Response / Reference to where information is presented	Concluding statement
	images within EIAR Appendix 8-02: Benthic Survey Report (e.g. Figures 2.6, 2.7, 2,12). In Chapter 8 it is noted that "*The offshore cable corridor contained mostly sandy muds with some sample stations reporting sand sediments and infralittoral rock*". While it is stated that the site-specific benthic subtidal surveys did not indicate the presence of biogenic reef, there is no confirmation of either the presence (or absence) of rocky reef. The applicant is requested to review all available project-specific survey data collected to confirm if additional information is available (or not) to inform the presence and extent of hard substrates.	provides results of the 2025 benthic survey.	surveys, further demonstrating the stability of these habitats. The results from the 2025 surveys, including drop down video (DDV) sampling in the offshore cable corridor, further validated the previous survey results. As noted above, the 2024 and 2025 datasets were not presented in the EIAR as they were not available at the time of submission and the 2022 geophysical dataset was not presented as it was considered supplementary to the 2019/2020 geophysical survey data. The Applicant confirms that the 2019 site-specific surveys found no evidence of biogenic reefs. Three sample stations with rocky habitat however were identified within the offshore cable corridor in the 2019 survey which could potentially be characterised as rocky reef. Based on the information provided in appendix 8-2: Benthic Survey Report (EIAR volume 2B), the substrate and faunal communities observed as a result of DDV data these stations were assigned the kelp and red seaweeds (moderate energy infralittoral rock) biotope. This biotope was assessed throughout the EIAR and no significant effect was identified as a result of the Project. This assessment was validated by the 2022 geophysical survey of the offshore cable corridor which was composed primarily of coarse sediment and boulder fields (XOcean, 2023). Furthermore, the pre-construction DDV survey (as proposed Table 8-12 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B) will examine the offshore cable corridor at pre-construction phase and should any Annex I rocky reef be identified, appropriate mitigation will be implemented. This has not resulted in any changes to the approach taken to the assessment included in the EIAR for benthic subtidal and intertidal ecology, or the conclusions reached in the assessment included in the EIAR.
8.C	In both Appendix 8-02 and Chapter 8 of the EIAR, it is not clear how biotopes were ascribed. As such, the applicant is requested to detail the approach for ascribing rocky biotopes to the imagery data collected.	See section 8.6.2	A combination of physical and biological characteristics obtained from the grab samples and DDV imagery were compared to the JNCC Marine Habitat Classification to determine the appropriate biotope for each situation. The detailed approach set out in section 8.6.2 has not resulted in any changes to the approach taken to the assessment

Reference	Request for Further Information	Response / Reference to where information is presented	Concluding statement
			included in the EIAR of benthic ecology, or the conclusions reached in the assessment included in the EIAR (2024).
8.D	It is understood that "*a pre-construction phase survey will be undertaken to identify areas of reef habitat. Should reef areas be identified, appropriate measures will be agreed with regulatory and nature conservation bodies to avoid direct impact on these features*" (see EIAR Chapter 8; Section 8.14; Table 8-25). The applicant is requested to provide sufficient information on the proposed scope of the pre-construction surveys (data collection, analysis and assessment) to ensure that the current purported data gaps seen in the OCC are fully considered, allowing a coverage of habitats to support the impact assessment.	See section 8.8.2	The Applicant maintains that there is no data gap regarding the offshore cable corridor as set out in preceding rows of this table. Further details on pre-construction surveys of potential reef habitats have been provided, including details of data collection methods and analysis and assessment of Annex I reefs following the latest best practice guidelines (see section 8.8.2). This has not resulted in any changes to the approach taken to the assessment included in the EIAR of benthic ecology, or the conclusions reached in the assessment included in the EIAR (2024).
Receptor Groupings and Impact Assessment			
8.E	It is noted that within the description of Important Ecological Features (IEFs), subtidal coarse sediment is defined as including biotopes from both coarse sediments and mixed sediments (see EIAR Chapter 8, Table 8-10). The applicant is requested to review the impact assessment for coarse sediments (for all project phases) and consider mixed sediments and coarse sediments as separate IEFs, to ensure that the full range of sensitivity and magnitudes are considered for understanding significance.	See section 8.10	Throughout section 8.10 the sensitivity assessment for the Subtidal Mixed Sediment and Subtidal Coarse Sediment IEFs have been split out. This has not changed the sensitivity or significance conclusions and therefore has not resulted in any changes to the approach taken to the assessment included in the EIAR of benthic ecology, or the conclusions reached in the assessment included in the EIAR (2024).
Scoping of Impacts			
8.F	It is noted that electromagnetic field (EMF) emissions are not discussed as an impact for benthic ecology. Given that it is scoped in for Fish and Shellfish Ecology, it is considered that it should be scoped in for benthic ecology. The applicant is requested to submit a clear audit trail of the pressures arising and associated impacts to the benthic ecology, including noise related potential effects.	See section 8.10	An assessment of the potential impacts resulting from EMF has been added to section 8.10. This assessment concluded that there will be no significant effects on any of the IEFs as a result of EMF from the Project.
Landfall Construction Methodologies			
8.G	In terms of minimising the impacts on intertidal sediment communities, the Board notes that the use of dredge/cut construction methods with regard to the onshoring of the cable is not consistent with best practice, and that horizontal directional drilling (HDD) is considered to be more appropriate. The applicant is requested to submit a justification for the proposal to use dredging in this instance while ensuring the protection of	See chapter 5 Addendum: Project Description for justification to use open cut methods to install the cable in the intertidal sediment.	There is no change to the proposed construction of the offshore cable corridor using open cut trenching and therefore this has not resulted in any changes to the approach taken to the assessment included in the EIAR of benthic ecology, or the conclusions reached in the assessment included in the EIAR (2024), which concluded

Reference	Request for Further Information	Response / Reference to where information is presented	Concluding statement
	existing eroding cliffs or alternatively update application documentation to provide for HDD at the point of landfall.		slight adverse effects on temporary intertidal habitat loss/disturbance.

8.2 Purpose of this chapter

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.3 Study area

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.4 Policy context

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.5 Consultation

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.6 Methodology to inform the baseline

8.6.1 Desktop study

Three additional key sources were used to inform the response to RFI 8.A and 8.B. These include:

- Results from the 2022 geophysical survey within the offshore wind farm area and offshore cable corridor in 2022 (XOcean, 2023a; XOcean, 2023b);
- Results from site specific sediment chemistry sampling undertaken in 2024 (Aquafact, 2024) (see appendix 8-3: Sediment Chemistry Results)(EIAR volume 2B Addendum); and
- Benthic surveys (DDV and grab sampling) of the offshore wind farm area and offshore cable corridor in 2025 (see appendix 8-4: Benthic Ecology 2025 Survey Report (EIAR volume 2B Addendum)) (Aquafact, 2025).

The 2024 sediment chemistry results were not presented in the assessment included in the EIAR as they were not available prior to the submission date. The Benthic survey was undertaken in 2025 since the application submission date. The 2022 geophysical survey data was not presented in the assessment included in the EIAR as it was considered supplementary to the 2019/2020 geophysical surveys, described in chapter 7: Marine Processes (EIAR volume 2B), as the results of these surveys were considered very similar.

8.6.2 Site-specific surveys

In response to RFI 8.C further details on how biotopes were ascribed has been provided in this section.

As outlined in appendix 8-2: Benthic Survey Report of the EIAR the PRIMER statistical analysis programme was used to carry out multivariate analyses on the station-by-station faunal data. The aim of this analysis was to find “natural groupings’ of samples, i.e. samples within a group that are statistically more similar to each other, than they are similar to samples in different groups. The species responsible for the grouping of samples in cluster and ordination analyses were identified using the statistical test Similarity Percentage (SIMPER), within the PRIMER programme. These SIMPER groups along with the sediment characterisation data were compared to the EUNIS biotope classification (and the equivalent JNCC Marine Habitat classifications) to determine which biotope most closely matched the community. This process only applied to communities where grab sampling has taken place. Where only DDV and seabed imagery have been collected (i.e. due to ground conditions preventing grab sampling) the locations of habitats and/or associated flora and faunal communities were noted as well as the physical characteristics of the seabed. These locations are shown in Figure 2.1 of appendix 8-2: Benthic Survey Report (EIAR volume 2B). These data were then used in a similar way to the SIMPER groups and compared to biotope classifications (i.e. JNCC and EUNIS) to determine which biotope most closely matched the community.

Based on this analysis, the Subtidal Rock with Kelp biotope (IR.MIR.KR) was identified in the nearshore part of the offshore cable corridor and defines the Subtidal Infralittoral Rock IEF.

Additionally, benthic ecology surveys have been undertaken in the offshore cable corridor including both DDV and grab sampling in 2025. These surveys included five sampling stations across the offshore cable corridor as well as one new sample station in the offshore wind farm area and revisiting five previous offshore wind farm area sample stations. The results of this survey further validated the findings of the baseline characterisation (as discussed in section 8.7 below) with DDV sampling identifying predominantly mixed sediment (primarily composed of sand and mud) based communities in the offshore cable corridor. This included the identification of biotopes such as *Levinsenia gracilis* and *Heteromastus filifirmis* in offshore circalittoral mud and sandy mud (SS.SMu.OMu.LevHet) and *Amphiura filiformis* and *Ennucula tenuis* in circalittoral and offshore sandy mud (SS.SMu.CSaMu.AfilEten), as well as more general mixed and muddy sand biotopes which were also identified in the 2019 survey. DDV data alone is sufficient to determine the general sediment classification and importantly whether hard substrate, which would represent a notably different community than those assumed to populate the wind farm and much of the offshore cable corridor, is present within the area. In nearshore areas, the seabed habitats were found to be characterised by mixed sediments with a greater number of cobbles and boulders compared to offshore areas. This is consistent with a grading or transition between soft sediment habitats and areas of rocky habitats in inshore areas of the offshore cable corridor, as presented in the baseline characterisation in the EIAR (section 8.7.2.1 of chapter 8: Benthic Subtidal and Intertidal Ecology; EIAR volume 2B) and therefore validates the baseline characterisation presented.

8.7 Baseline environment

In response to RFI 8.A and 8.B further clarification on the baseline characterisation has been provided in this section.

The Applicant maintains that the baseline has been adequately characterised in chapter 8: Benthic Subtidal and Intertidal Ecology of the EIAR. The baseline environment as characterised in section 8.7 of the chapter includes data from a variety of sources including desktop data which was used to characterise the habitats in the region as well as the more specific characterisation of the benthic subtidal and intertidal ecology study area. Data was used from a variety of sources such as EMODnet (2023) which contains broadscale seabed sediment and habitat mapping and includes data from Ireland's Marine Resource (INFOMAR) programme. Other desktop data sources include published literature such as generalised maps of the faunal communities in the Irish Sea which were produced by Dickson in 1987 and later updated (Mackie, 1990) which provided details regarding communities found within the western Irish Sea. Data from the Marine Institute has also been incorporated which provided detail regarding the local *Nephrops norvegicus* functional units as well as the habitats and communities found within this area.

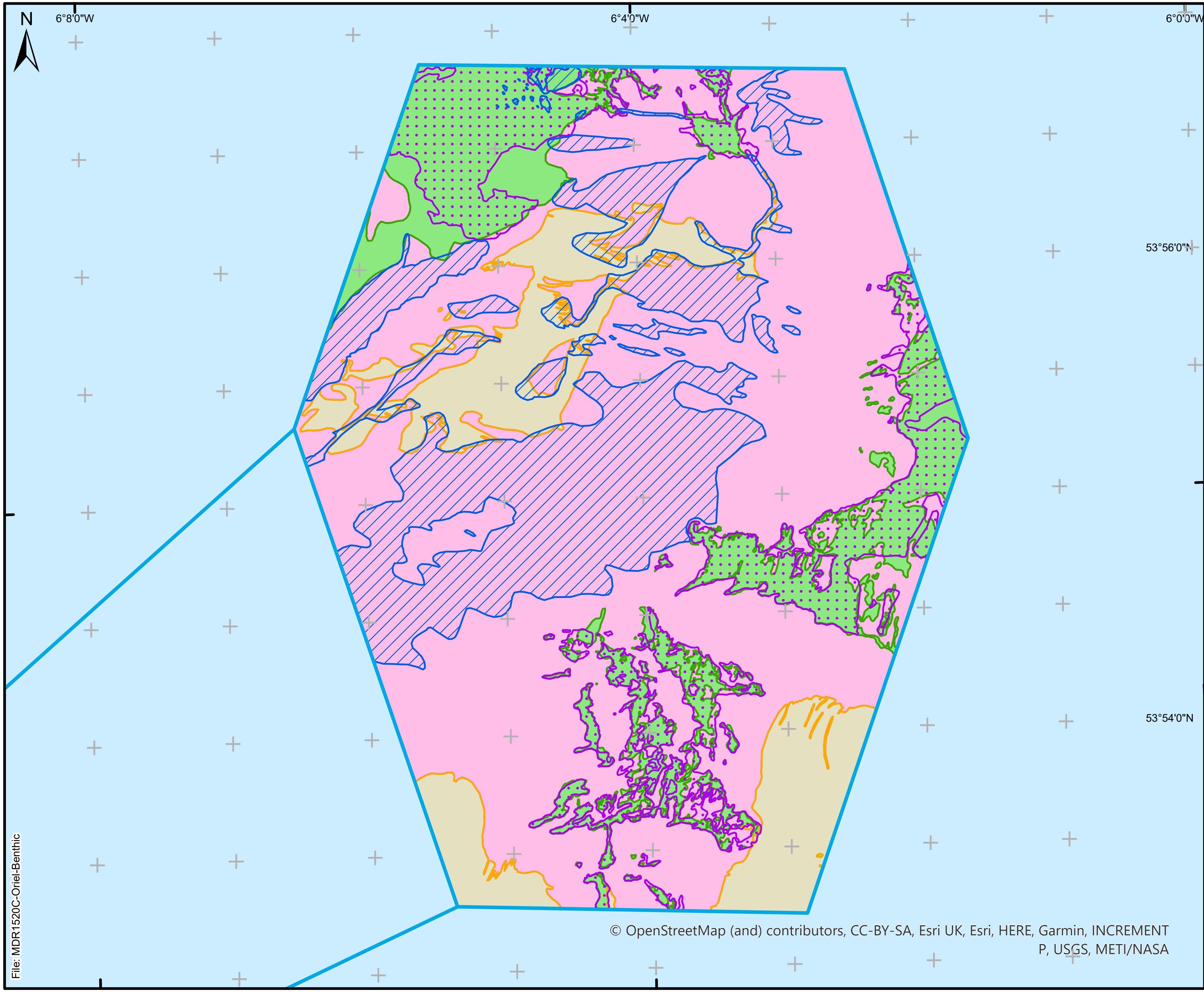
The desktop data sources, as provided in chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B), identified that the western Irish Sea is dominated by mud and muddy sand. The mud habitats are well documented areas, found in a deep basin with low tidal energy with the Marine Institute surveys within the *Nephrops norvegicus* functional units recording soft mud in the centre of the western Irish Sea with burrowing species present such as *N. norvegicus*, *Calocaris macandreae* and *Goneplax rhomboides* (Clements *et al*., 2018; Lundy *et al*., 2019). Inshore areas of the western Irish Sea, the predominant substrates are sand and coarse sediments with occasional patches of mixed sediment and rocks and boulders. Mackie (1990) identified five distinct communities in the Irish Sea (shallow venus, deep venus, amphiura, brissopsis and hard ground). Benthic data collected by the Marine Institute within the Benthic Subtidal and Intertidal Ecology Study Area found polychaete and bivalve dominated communities in mainly fine sand with areas of sandy mud, coarse sand, mud and gravely mud sediment types.

In addition to the desktop data the Applicant undertook a variety of surveys to make sure the characterisation of the benthic subtidal and intertidal ecology study area was up to date and was suitably accurate. These surveys included boat based benthic grab samples taken in 2006 as well as in 2019 to provide particle size analysis and infaunal data. The 2006 survey primarily covered the offshore wind farm area as well as small section of the offshore cable corridor closest to the offshore wind farm area (no further than 1.5 km from the offshore wind farm area). The 2019 survey also surveyed the offshore wind farm area and also included sampling stations along the full length of the offshore cable corridor to ensure there were no data gaps. A seabed imagery survey was also undertaken in 2019 to provide data on sediment types and epifauna. Data on the seabed morphology and seabed features were also gathered in geophysical and geotechnical surveys conducted in 2019 and 2020 (as described in chapter 7: Marine Processes (EIAR volume 2B)) (Gavin Doherty Geosolutions, 2020).

The results of the site-specific surveys in 2006 and 2019 largely confirmed the findings of the desktop data review. The 2006 grab surveys found the majority of the sediment samples within the offshore wind farm area taken were classified as silt-clay sediments graduating through to medium sand and then to gravel at the northwest corner of the offshore wind farm area. The 2019 surveys found sediments in the north and east of the offshore wind farm area as dominated by mixed and coarse sediments, whereas sediments in the southwest of the offshore wind farm area were dominated by sandy muds. The offshore cable corridor contained mostly sandy muds with some sample stations reporting sand sediments and infralittoral rock. This was largely confirmed by EMODnet data which showed that the offshore wind farm area was composed primarily of sand and sandy mud with coarse sediment in the northwest. The 2019/2020 geophysical data (as described in chapter 7: Marine Processes (EIAR volume 2B)) (Gavin Doherty Geosolutions, 2020) also identified some areas of rock which the ground truthing found to be primarily sedimentary. The offshore cable corridor was also found to be composed primarily of sand and sandy mud with coarse sediment (including areas of cobbles, boulders and infralittoral rock) closer to the shore.

Further validation was provided more recently by site-specific geophysical surveys undertaken within the offshore wind farm area and offshore cable corridor in 2022 (XOcean, 2023a; XOcean, 2023b). This information was not included in the assessment in the EIAR as it was considered to be supplementary to the 2019/2020 survey, which is described in chapter 7: Marine Processes (EIAR volume 2B), as the results of these surveys were considered very similar. Within the offshore wind farm area the survey interpreted a variety of sediment types. Low reflectivity sediment (interpreted as muddy sand or fine sand) was identified in the south east and southwest corners of the offshore wind farm area as well as sporadically throughout the north west section of the offshore wind farm area (Figure 8A-1). Coarse sediment (likely to be a mixture of reworked coarse sand, gravels and boulders) was identified as present in the north west corner of the offshore wind farm area as well as a patchy distribution in the south and central east portions of the site (Figure 8A-1). Primarily the survey identified medium reflectivity sediment (interpreted as sand) throughout the offshore wind farm area. Ribbon features are the dominant mobile feature and are found within the north and southwest parts of the offshore wind farm area. Small pockets of mega ripples were also observed within the northern coarse sediment areas. Boulder fields were generally associated with the coarse sediment areas and were identified predominantly in the northwest and southeast of the offshore wind farm area. Scarring features were also observed in the offshore wind farm area, likely caused by fishing activity.

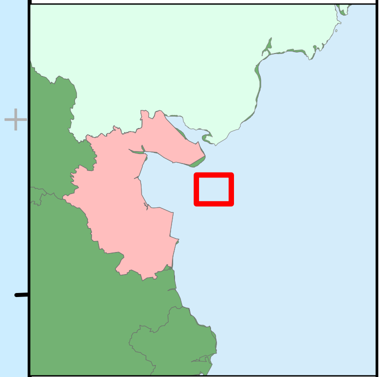
The offshore cable corridor can be classified as mostly featureless with only a small area in the northern area showing ribbons of sediment (Figure 8A-2). The rest of the offshore cable corridor is predominantly made up of medium reflectivity sediment, which has been interpreted as sand, and coarse sediment/boulder fields/till. A small section of low reflectivity sediment, which has been interpreted as muddy sand, in the southern offshore area of the offshore cable corridor was also identified (Figure 8A-2). Extensive boulder fields were recorded across the inshore part of the offshore cable corridor and along the northern boundary of the offshore cable corridor, which aligned with the findings of 2019 site specific survey of the offshore cable corridor discussed above. Scarring features were observed in the south-east of the offshore cable corridor, likely caused by fishing activity.



Legend

- Application Boundary
- Boulder Fields
- Coarse Sediment
- Low Reflectivity Sediment
- Medium Reflectivity Sediment
- Mobile Features

Data Sources: Client. Xodus



Client

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Project

Oriel Wind Farm Project

Title Figure 8A-1
Geophysical seabed interpretation within the offshore wind farm area

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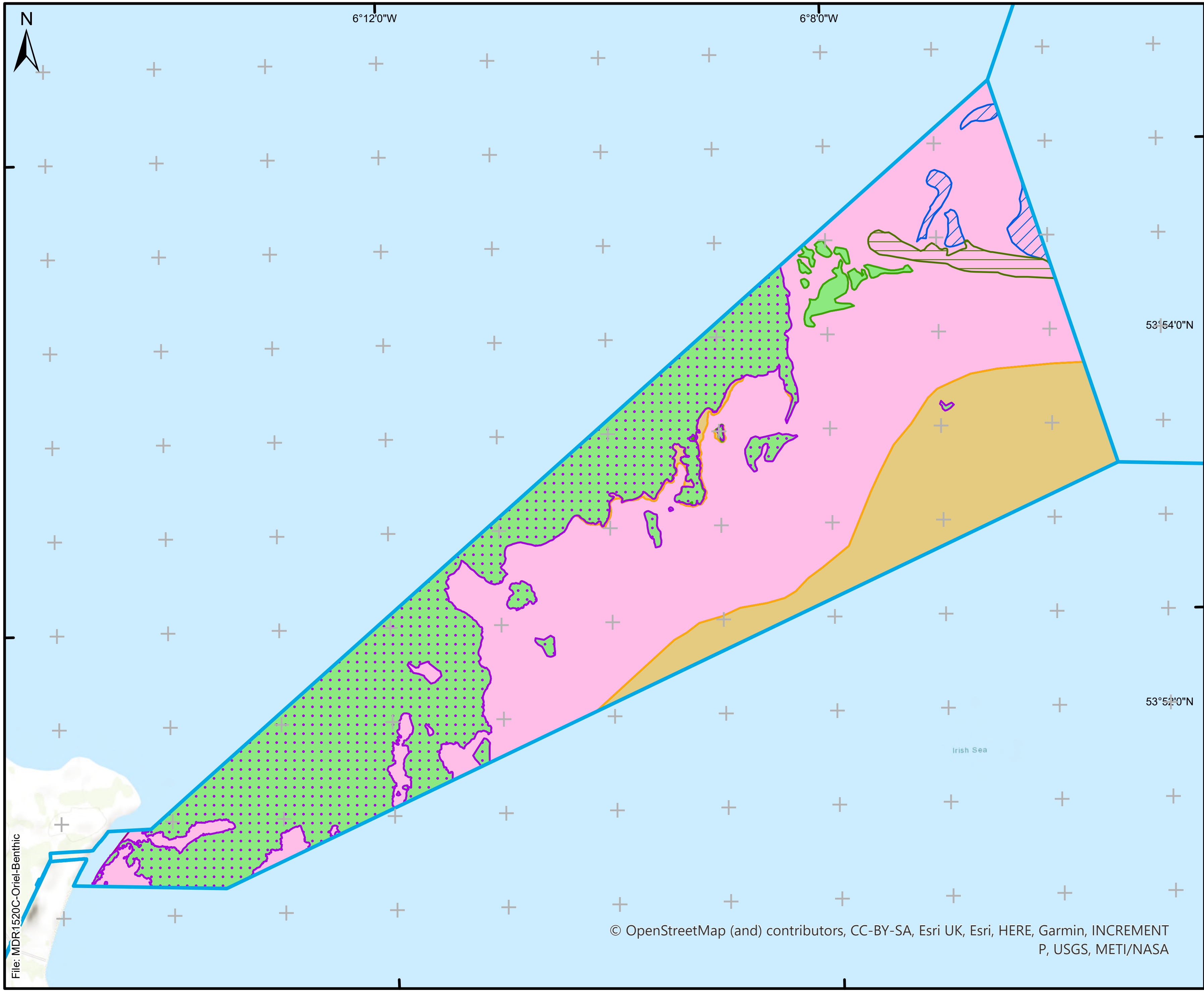
Issue Details

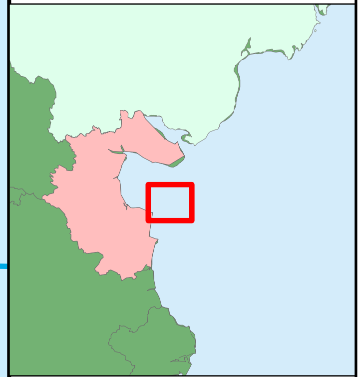
Drawn By: MJ	**Project No.** MDR1520C
Checked By: TH	**File Ref:**
Approved By: TH	MDR1520C-BEN-002.A1C01
Scale: 1:40,000 @ A4	**Projection:** ITM (IRENET95)
Date: 05/09/2025	Geographic Co-ordinates: ETRS89



Legend

- Application Boundary
- Boulder Fields
- Coarse Sediment
- Depressions
- Low Reflectivity Sediment
- Medium Reflectivity Sediment
- Mobile Features

Data Sources: Client. Xodus



Client

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Project

Oriel Wind Farm Project

Title Figure 8A-2
Geophysical seabed interpretation within the offshore cable corridor

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Issue Details

Drawn By: MJ	**Project No.** MDR1520C
Checked By: TH	**File Ref:**
Approved By: TH	MDR1520C-BEN-003.A1C01
Scale: 1:50,000 @ A4	**Projection:** ITM (IRENET95)
Date: 05/09/2025	Geographic Co-ordinates: ETRS89

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2. All levels are referred to Ordnance Datum, Malin Head.

These two datasets and the desktop data are largely aligned regarding the sediment characterisation information. This characterisation has remained consistent over time throughout the site-specific and desktop data. This stability in sediment characterisation provides a strong basis for limited change in the biological communities which inhabit these substrates, as would be expected for this part of the Irish Sea.

Additionally, sampling was undertaken in 2024 to collect sediment chemistry data throughout the offshore wind farm area and offshore cable corridor This survey provided further sediment characterisation and reported that the sample stations composed of sand and silt, with one station in the north east of the offshore wind farm area which included a gravel component, further demonstrating the stability of these habitats. With regard to sediment contamination the survey recorded that all stations had contaminant loads below the lower limits for trace metals, as determined by Cronin *et al*. (2006) in the ‘Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters’, with the exception of arsenic (concentration of 27.2 mg/kg) at one station in the offshore wind farm area which exceeded the lower limit for Arsenic (20 mg/kg) however was well below the upper limit (Cronin *et al*., 2006) (70 mg/kg). All stations were below their respective limits (Cronin *et al*., 2006) for organotins, polychlorinated biphenyls, total extractable hydrocarbons, tributylin, dibutylin and polycyclic aromatic hydrocarbons.

In addition to the subtidal biotopes and habitats described above, section 8.7.2.1 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B) outlines evidence surrounding the presence of reef habitat within the Benthic Subtidal and Intertidal Ecology Study Area. This includes consideration of data from both the 2006 and 2019 surveys. No evidence of biogenic reef was found during the site-specific benthic subtidal surveys. Any reef that may be present in this area is likely ephemeral, however, there is potential for these habitats to develop over time. Infralittoral rock was identified at three stations in the offshore cable corridor. These stations were characterised as the kelp and red seaweeds (moderate energy infralittoral rock) biotope following the methods summarised in section 8.6.2 above, which accurately reflects the substrate and communities found at these stations. This habitat was assumed to be present in the nearshore section of the offshore cable corridor and impacts assessed on the Subtidal Infralittoral Rock IEF throughout the EIAR. This assessment was validated by the 2022 geophysical survey of the offshore cable corridor which was composed primarily of coarse sediment and boulder fields (XOcean, 2023; see Figure 8A-2). It was concluded that the Project would not have a significant impact on this IEF (or any other benthic subtidal and intertidal IEFs). The pre-construction DDV survey will collect further data on the extents and locations of any potential reef habitats (biogenic and rocky reefs) within the offshore cable corridor. An Annex I rocky reef assessment will be undertaken for any sites where potential reefs are identified (see section 8.8.2 of this Addendum).

These datasets have identified a consistent pattern in faunal communities within the offshore wind farm area and offshore cable corridor, indicating temporal stability in these communities over the period that these surveys cover. In the absence of any major disturbance events within the Benthic Subtidal and Intertidal Ecology Study Area it is highly likely that these habitats as described within the 2019 subtidal survey will persist in the locations described. This is supported by the sediment characterisation from the 2024 sediment chemistry survey which indicates the continued presence of the characteristic substrates, and it is therefore likely the characteristic communities remain the same.

The purpose of this baseline is to characterise the benthic habitats present within the Benthic Subtidal and Intertidal Ecology Study Area, for the purpose of the EIAR, by identifying these key habitats and species so their sensitivity can be accurately assessed in the EIAR. This approach has been successfully applied within the Project EIAR as the habitats assessed have been proven to be stable within the Benthic Subtidal and Intertidal Ecology Study Area ensuring an accurate and reliable assessment of the impact of the Project. As a result of the site-specific surveys, and the abundance of desktop data in this area, the Applicant is confident that there is a low likelihood of sensitive habitats being present within the Benthic Subtidal and Intertidal Ecology Study Area.

8.7.1 Western Irish Sea

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.7.2 Benthic Subtidal and Intertidal Ecology Study Area

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.7.3 Designated sites

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.7.4 Important ecological features

In response to RFI 8E the IEFs within the Benthic Subtidal Study Area have been split out for the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs in Table 8A-2. The resulting Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs have then been considered separately in the sensitivity assessments in section 8.10.

Table 8A-2: Important Ecological Features (IEFs) within the Benthic Subtidal and Intertidal Ecology Study Area.

IEF	Description and Representative biotopes	Protection status	Conservation interest	Importance within the Benthic Subtidal and Intertidal Ecology Study Area
Subtidal Sandy Mud Sediment	Subtidal sandy mud sediments with rich infaunal communities SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	None	Of local conservation interest	Local
Subtidal Sand Sediment	Subtidal sandy sediments with moderately diverse infaunal communities SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	None	Of local conservation interest	Local
Subtidal Coarse Sediment	Subtidal coarse sediments of sand and gravels with moderately diverse infaunal and epifaunal communities. SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	None	Of local conservation interest	Local
Subtidal Mixed Sediment	Subtidal mixed sediments with moderately diverse infaunal and epifaunal communities SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	None	Of local conservation interest	Local
Subtidal Infralittoral Rock	Subtidal Rock with Kelp IR.MIR.KR	None	Of local conservation interest	Local
Annex 1 Habitat Features of SACs				
Estuaries	A mosaic of subtidal and intertidal habitats, which are closely associated with surrounding terrestrial habitats. They are the downstream part of a river valley, subject to the tide and extending from the limit of brackish water.	Annex I Habitats Directive	QI of the Dundalk Bay SAC and Dundalk Bay Ramsar.	International – part of European designated site (Dundalk Bay SAC and Ramsar).
Mudflats and sandflats not covered by seawater at low tide	Intertidal mudflats and sandflats are submerged at high tide and exposed at low tide. They can occur on mobile, coarse-sand beaches on wave-exposed coasts to stable,	Annex I Habitats Directive	QI of the Dundalk Bay SAC.	International – part of European designated site (Dundalk Bay SAC).

IEF	Description and Representative biotopes	Protection status	Conservation interest	Importance within the Benthic Subtidal and Intertidal Ecology Study Area
	fine-sediment mudflats in estuaries and other marine inlets.			
Intertidal Habitats				
Littoral Sand	LS.LSa.MuSa.MacAre / LS.LSa.MuSa.Lan	None	Qualifies as an Annex I habitat under the Habitats Directive although not within a SAC.	National
Eulittoral Rock	LR / LR.LLR.F.Fves / LR.FLR.Eph.EntPor	None	Local	Local
Dunany Point pNHA	Proposed NHA (overlapping the proposed landfall location) proposed to be designated for a range of coastal habitats from cliff habitats through to intertidal habitats, including: • Sandy sediments; • Mudflats; • Rocky outcrop; and • Shingle banks.	National	Proposed NHA	National

8.7.5 Future baseline scenario

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.7.6 Data validity and limitations

Chapter 8: Benthic Subtidal and Intertidal Ecology of the EIAR outlines a variety of desktop and site-specific sources which describe the sedimentary and ecological baseline of the offshore wind farm area and offshore cable corridor. These sources range in age from the survey in 2006 to more recent site-specific surveys such as the DDV and grab sampling undertaken in 2019 and the geophysical survey undertaken in 2022. Although there is potential for the benthic communities to have developed and evolved in the intervening period since the site-specific surveys, as noted in section 8.7.1, the communities associated with the Benthic Subtidal and Intertidal Ecology Study Area are generally stable over time, with consistency in the communities recorded over time. This consistency will continue to be tested via pre-construction surveys which will examine specific habitats (e.g. reef habitats).

Despite the limitations described above, the Applicant maintains that the benthic subtidal and intertidal ecology data from 2006 and 2019, and subsequent analysis conducted, is valid and adequately informs the baseline environment of the Project for the purposes of the EIAR (as described in section 8.7).

The results of the 2006 and 2019 surveys were further validated by the benthic ecology surveys (including DDV and grab sampling) conducted in 2025 at five sampling stations in the offshore cable corridor and six stations in the offshore wind farm area. The DDV survey findings confirm the predominantly sandy nature of the offshore wind farm area and offshore cable corridor as well as the rocky communities in the nearshore offshore cable corridor. This included the identification of biotopes such as SS.SMu.OMu.LevHet and SS.SMu.CSaMu.AfilEten, as well as more general mixed and muddy sand biotopes which were also identified in the 2019 survey. DDV data alone is sufficient to determine the general sediment classification and importantly whether hard substrate, which would represent a notably different community than those assumed to populate this area, is present within the area.

8.8 Key parameters for assessment

8.8.1 Project design parameters

Table 8A-3 below outlines the project design parameters that have been used to inform the assessment of potential impacts from electromagnetic fields (EMF) (RFI 8.F) from subsea electrical cabling on benthic receptors as set out in section 8.10.9 below. All other impacts and project design parameters are unchanged from chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

Table 8A-3: Project design parameters considered for the assessment of potential impacts on benthic ecology.

Potential impact	Phase[1] C	O	D	Project design parameters	Justification
Electromagnetic Fields (EMF) from subsea electrical cabling	x	✓	x	**Operational and Maintenance Phase** Presence of inter-array cables and offshore cables: • 41 km of 66 kV AC inter-array cables; • 16 km of 220 kV offshore cable; • Burial depths of between 0.5 m and 3 m; and • 50% of inter-array cable route and 50% of offshore cable corridor may require cable protection. Operational phase of 40 years.	Maximum length of cables and minimum burial depth (the greater the depth the more the EMF is attenuated).

8.8.2 Measures included in the Project

In response to RFI 8.D the scope of the DDV pre-construction survey (a proposed measure included in Table 8-12 of chapter 8: Benthic Subtidal and Intertidal Ecology in EIAR volume 2B) has been provided as further information below.

Drop Down Video Survey

The DDV pre-construction survey will determine the presence of any reef habitats in the vicinity of the Project. Biogenic reef habitats have been identified as having the potential to occur in the offshore wind farm area, however previous sampling in 2006 and 2019 found no evidence of biogenic reef habitats within the area. This was further validated by the DDV results from the 2025 survey (see appendix 8-4: Benthic Ecology 2025 Survey Report). The 2025 survey identified similar biotopes as identified in the 2019 survey (see section 8.7) primarily characterised mainly by mixed and sandy mud biotopes. Boulder fields have been identified within the offshore cable corridor, which could indicate the presence of bedrock and/or stony reefs. The DDV pre-construction survey will determine the extent, distribution and quality/condition of rocky or biogenic reef habitats across the Project. The findings of the pre-construction survey will inform if there is a requirement for appropriate mitigation measures to avoid impacts, where possible, on these habitats (particularly biogenic reefs) during the construction phase.

Details of the survey methodologies are set out below, following the latest industry best practice guidelines, including, Department of Communications, Climate Action and Environment (DCCAE) Marine Baseline Ecological Assessments and Monitoring Guidelines (DCCAE, 2018) and Joint Nature Conservation Committee (JNCC) Epibiota Remote Monitoring Operational Guidelines (Hitchin *et al*., 2015).

Location selection

The sampling locations within the offshore wind farm area and offshore cable corridor will be selected using best practice guidelines and the most up to date evidence available at the time, including site specific geophysical data sets (2022), interpretation reports and habitat maps. From this evidence areas of potential reef habitat across the Project will be identified and DDV transects and/or drop down locations will be planned to ground truth and map the identified features.

Data collection

The DDV system will be deployed at the pre-determined locations and the footage/stills used to ground truth the areas identified as having potential for reef habitat. Seabed imagery (simultaneous video and stills) will be captured with a camera that supports a minimum of 1080p High Definition (HD) video and good quality still images. The system will also have suitable lighting and/or flash units, and a laser scaling array. All DDV will be accompanied with USBL positioning via a beacon on the camera system for accurate positioning of seabed images. It is recommended that a freshwater lens (FWL) will be available for use in the event that high turbidity would otherwise prevent clear capture of images using the camera alone.

All DDV stations will be sampled with consideration of best practice guidelines (including Joint Nature Conservation Committee (JNCC) epibiota remote monitoring operational guidelines; Hitchin *et al*., 2015). Specific deployment procedures will be vessel dependent. Once the drop down camera is deployed to depth, it will be towed just above the seabed with an optimal speed of 0.5 knots to ensure good quality video and stills are captured. Where potential rocky and/or biogenic reefs are encountered in the field, DDV transects will be extended to delineate the edges of the feature as required.

There will be repeated quality checks/quality assurance of footage in the field, to ensure a robust data set is obtained that effectively summarises the seabed features and habitats across the survey area.

Analysis

The seabed imagery from the DDV survey will be analysed using Bio-Image Indexing and Graphical Labelling Environment (BIIGLE1) annotation platform (Langenkämper *et al*., 2017) and in line with the JNCC epibiota remote monitoring interpretation guidelines (Turner *et al*., 2016).

The first stage of analysis will be to assign labels for the still images, before then assigning percentage cover of habitat types by drawing polygons onto these images to inform the habitat assessment process. This analysis will produce a list of discrete taxa identified and their abundance (number of individuals), or percentage cover for colonial organisms, within each image at each sampling station.

Assessment

Stony reef assessment

Where coarse/stony and/or rocky substrate is observed in the DDV footage a stony reef assessment will be conducted according to the appropriate guidance (Irving, 2009; Golding *et al*., 2020). The assessment will comprise a measure of elevation and patchiness, and extent where possible, as outlined in Table 8A-4. The scoring system proposed by Irving (2009) and the ‘reefiness’ matrix described in Jenkins *et al*. (2015) will be used to interpret the ‘reefiness’ of stony features (Table 8A-4).

The Irving (2009) guidance concludes that a reef should be elevated above the sea floor, have an area of at least 25 m^2 and have a composition of no less than 10% coverage of the seabed. Irving (2009) also recommends that, when determining whether an area of the seabed should be considered as Annex I stony reef, if a ‘low’ is scored in any of the four characteristics (composition, elevation, extent or biota), then a strong justification would be required for this area to be considered as contributing to the Marine European Sites with qualifying reef features. Golding *et al.* (2020) provides further guidance on the interpretation of the guidance set out in Irving (2009) and will therefore be reviewed alongside Irving (2009).

Table 8A-4 Stony Reef Assessment Matrix (based on Irving, 2009 and Golding *et al*., 2020).

Characteristic	Resemblance to being a stony reef			
		Low	Medium	High
Composition (% cover)[1]	<10%	10% to 40% Matrix supported	40% to 95%	>95% Clast supported
Elevation[2]	Flat seabed	<64 mm	64 mm to 5 m	>5 m

Extent	<25 m^2	>25 m^2		
Biota	Dominated by infaunal species			>80% of species present composed of epifaunal species

[1] Minimum height (64 mm) relates to the minimum size of constituent cobbles. This Characteristic could also include 'distinctness' from the surrounding seabed.

[2] Note that two units (mm and m) are used here.

Bedrock reef assessment

Where bedrock is present in the DDV footage a rocky reef assessment will be undertaken. Unlike for stony reefs, there is no specific guidance for classifying bedrock reef as they are often grouped with stony reefs as they are both hard substrate habitats therefore the same guidance for stony reef will be applied to this habitat.

Biogenic reef assessment – *Sabellaria spinulosa*

The "reefiness" scale will be used to quantify *S. spinulosa* reefs, which is based largely on results of an inter-agency workshop run by JNCC to help define and manage *S. spinulosa* reefs and reported in Gubbay (2007). This range of elevations, area coverage and patchiness metrics identified from this workshop will be used to compare against potential *S. spinulosa* reefs, with definitions of "Not a reef", "Low", "Medium", and "High" resemblance of reefs, as shown in Table 8A-5. The DDV footage will be analysed and metrics assigned when *S. spinulosa* individuals or aggregations are found, from which their 'reefiness' can be estimated.

Table 8A-5: Range of measures to define *S. spinulosa* 'Reefiness'.

Measure of 'reefiness'	Not a Reef	Low	Medium	High
Elevation (cm) (average tube height)	<2	2 to 5	5 to 10	>10
Area (m^2)	<25	25 to 10,000	10,000 to 1,000,000	>1,000,000
Patchiness (% cover)	<10	10 to 20	20 to 30	>30

Biogenic reef assessment - *Modiolus modiolus*

According to Morris (2015), *M. modiolus* is the foundation species in diverse biogenic reefs that are characterised by clumped mussels and shell covering more than 30% of the substrate, which may be infaunal or embedded reefs, semi-infaunal (with densities of greater than five live individuals per m^2) or form epifaunal mounds (standing clear of the substrate with more than 10 live individuals per clump), all of which support communities with high diversity compared to the surrounding area.

To assess for presence of mussel reef, assessment criteria established from an inter-agency workshop relating to *M. modiolus* reef (Morris, 2015) will be used. Morris (2015) identified three primary (Stage 1) factors, all of which must be met before assessing the confidence for Annex I designation:

- Presence of live adult *M. modiolus* individuals;
- The biota/communities are distinct from the surrounding habitat; and
- The distinct region containing *M. modiolus* is greater than 25m^2 in extent.

If the three Stage 1 factors are met, the Stage 2 assessment involves defining percentage cover, the number of individuals of *M. modiolus*, and the elevation of reef structures relative to the surrounding substrate to confirm if the structure can be classified as an Annex I biogenic reef.

8.8.3 Impacts scoped out of the assessment

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.9 Impact assessment methodology

8.9.1 Overview

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.9.2 Impact assessment criteria

The methodology set out in section 8.9.2 of EIAR chapter 8: Benthic Subtidal and Intertidal Ecology is unchanged, however as set out in Table 8A-2, in response to RFI 8.E, the sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs have been split out in the relevant impact assessments. Updates to these are set out in section 8.10 below.

8.9.3 Identification of designated sites

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.10 Assessment of significance

EIAR chapter 8: Benthic Subtidal and Intertidal Ecology sections 8.10.1 to 8.10.8 have been updated to respond to RFI 8.E.

In response to RFI 8.F an assessment of EMF has been undertaken as outlined below in section 8.10.9.

8.10.1 Temporary subtidal habitat loss/disturbance

Construction phase

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to temporary subtidal habitat loss/disturbance has been split out for coarse and mixed sediments in Table 8A-6. Sensitivity of other IEFs is unchanged from section 8.10.1 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

The Subtidal Coarse Sediment IEF has medium sensitivity to temporary subtidal habitat loss (Table 8A-6). The communities that characterise coarse sediment include polychaetes such as *Mediomastus fragilis*, *Spiophanes bombyx*, *Lumbrineris* spp., and *Glycera lapidum*. Polychaetes are generally resilient, with recovery expected within months due to larval dispersal and adult mobility. *M. fragilis* and *S. bombyx* are opportunistic, with short lifespans and high reproductive rates, allowing for rapid recolonisation. Bivalves such as *Timoclea ovata* and *Glycymeris glycymeris* also characterising these communities can re-burrow efficiently following disturbance, whilst *G. glycymeris* can even relocate following displacement (Thomas, 1975). Tube worms such as *Spirobranchus triqueter*, barnacles and bryozoan crusts also make up the community and typically have rapid growth and colonise quickly. Therefore, recovery following short-term construction-related disturbance is expected to be relatively rapid and typically within one to two years, although full recovery of community structure may take up to ten years.

The Subtidal Mixed Sediment IEF has medium sensitivity to temporary subtidal habitat loss (Table 8A-6). Brittle stars are characterising epifaunal species and have fragile arms, they are therefore likely to be directly exposed and damaged by abrasion. They can however tolerate considerable damage to arms and even the disk without suffering mortality and are capable of arm and even some disk regeneration (Sköld, 1998). Hydroids such as *Hydrallmania falcata* also in the Subtidal Mixed Sediment IEF are tolerant to periodic burial and scour by sediment (Connor *et al*., 2004), whilst the bryozoan *Flustra foliacea* can repair damaged fronds in a matter of days where holdfasts remain (Silén, 1981) or new colonies can reach maturity in 1 to 2 years (Tillin and Tyler-Walters, 2014). Therefore, recovery is expected after short term discrete disturbance. Recovery of these habitats would occur following the construction phase (i.e. in line with the timescales for recovery of the seabed sediments as outlined in section 8.10.1 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B)). Full recovery may take between two to a maximum of ten years.

Table 8A-6: Sensitivity of the benthic subtidal IEFs to temporary subtidal habitat loss/disturbance.

IEF	Representative biotopes	Sensitivity to defined MarESA pressure	
		Abrasion/disturbance at the surface of the substratum or seabed	Penetration and/or disturbance of the substratum subsurface
Subtidal Sandy Mud Sediment	SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	Medium	Medium
Subtidal Sand Sediment	SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	Low	Low
Subtidal Coarse Sediment	SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	Low	Low
Subtidal Mixed Sediment	SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	Medium	Medium
Subtidal Infralittoral Rock	IR.MIR.KR.Lhyp.GzFt[1]	Medium	N/A

[1] IR.MIR.KR.Lhyp.GzFt has been selected as a suitable biotope to use as a proxy for the IR.MIR.KR biotope identified in appendix 8-2: Benthic Survey Report (Aquafact, 2020). This is a suitable proxy due to similar sediment, water depths and fauna present however there are difference e.g. the presence of *Laminaria hyperborea*.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (low to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-6). Therefore, there is no change from **slight adverse significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

Operational and maintenance phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment and Table 8A-6 above.

Significance of the effect

The magnitude of impact (negligible) and sensitivity of the receptors (low to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-6). Therefore, there is no change from **imperceptible or slight adverse** significance as predicted in the assessment included in the EIAR.

Decommissioning phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment and Table 8A-6 above.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (low to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-6). Therefore, there is no change from **slight adverse significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

8.10.2 Temporary intertidal habitat loss/disturbance

No changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology as the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs will not be affected by intertidal habitat loss/disturbance.

8.10.3 Increased suspended sediment concentrations and associated sediment deposition

Construction phase

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to increased suspended sediment concentrations and associated sediment deposition has been split out for Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs in Table 8A-7. Sensitivity of other IEFs is unchanged from section 8.10.3 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

The Subtidal Coarse Sediment IEF was deemed to be not sensitive to low sensitivity to changes in suspended solids (water clarity) and low sensitivity to smothering and siltation rate changes (light) (Table 8A-7). Bijkerk (1988, as cited in Essink, 1999), reported that small bivalves such as *Donax* are capable of vertical migration through sediment layers up to 20 cm in sandy substrates, whilst characterising *Tellina* spp. can migrate through approximately 40 cm of mud and 50 cm of sand. Powilleit *et al*. (2009) demonstrated that the polychaete *Nephtys hombergii* can emerge from till or a sand-till mixture sediment deposits ranging between 32-41 cm. *S. bombyx* also characterises this habitat and was studied by Gittenberger and Van Loon (2011) alongside *Spio filicornis* and the bivalve *Tellina pygmaea*, who noted these taxa tend to recover rapidly following smothering events, with some populations even exhibiting significant post-disturbance increases in abundance.

The Subtidal Mixed Sediment IEF was found to be not sensitive to medium sensitivity to changes in suspended solids (water clarity) and smothering and siltation changes (light) (Table 8A-7). Characterising brittle stars are typically sensitive to elevated sedimentation, as excessive sediment can interfere with suspension feeding efficiency where particles accumulate on tube feet and arm spines resulting in impaired function and, in extreme cases, mortality due to suffocation (Schäfer, 1962, cited in Aronson, 1992). However, resuspension of fine sediments by tidal currents and wave action is likely to reduce the persistence of deposited material on feeding structures, thereby mitigating the severity of impact. Mobile species such as starfish *Asterias rubens,* urchin *Echinus esculentus* and edible crab *Cancer pagarus* are likely to move to adjacent areas and avoid persistent high turbidity. Visual perception in brittle stars is low in most species so an increase in turbidity is unlikely to directly impact behaviour (Tillin and Tyler-Walters, 2014), yet a reduction in light may temporarily limit phytoplankton photosynthesis and potentially limit food availability. *Ophiothrix fragilis* has been shown to exhibit a low metabolic rate and withstand significant reductions in body mass during reproductive periods (Davoult *et al*., 1990), indicating potential resilience to periods of limited food availability.

Table 8A-7: Sensitivity of the benthic subtidal and intertidal IEFs to increases in suspended sediment and associated deposition.

IEF	Representative biotopes	Sensitivity to defined MarESA pressure	
		Changes in suspended solids (water clarity)	Smothering and siltation rate changes (light)
Subtidal Sandy Mud Sediment	SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	Not Sensitive	Not Sensitive
Subtidal Sand Sediment	SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	Low	Low
Subtidal Coarse Sediment	SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	Not Sensitive to Low	Low
Subtidal Mixed Sediment	SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	Not Sensitive	Not Sensitive to Medium
Subtidal Infralittoral Rock	IR.MIR.KR.Lhyp.GzFt[1]	Medium	Not Sensitive
Intertidal Littoral Sand	LS.LSa.MuSa.MacAre LS.LSa.MuSa.Lan	Not Sensitive	Not Sensitive
Intertidal Eulittoral Rock	LR.LLR.F.Fves	Medium	Medium
	LR.FLR.Eph.EntPor	Not sensitive	Low

[1] IR.MIR.KR.Lhyp.GzFt has been selected as a suitable biotope to use as a proxy for the IR.MIR.KR biotope identified in appendix 8-2: Benthic Survey Report (Aquafact, 2020). This is a suitable proxy due to similar sediment, water depths and fauna present however there are difference e.g. the presence of *Laminaria hyperborean*.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (negligible (i.e. not sensitive) to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-7). Therefore, there is no change from **slight adverse significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

Operational and maintenance phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment and Table 8A-7 above.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (negligible to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-7). Therefore, there is no change from **slight adverse significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

Decommissioning phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment and Table 8A-7 above.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (negligible to medium) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-7). Therefore, there is no change from **slight adverse significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

8.10.4 Seabed disturbance leading to the potential release of sediment contaminants

Site specific sediment sampling for contaminants carried out in 2024 demonstrated transition elements, organo-metals, hydrocarbons, PAH compounds and synthetic compounds across the offshore wind farm area and offshore cable corridor are present in low concentrations (see section 8.7).

Construction Phase

Magnitude of impact

Site specific sediment chemistry sampling demonstrated that contaminant levels are very low across the offshore wind farm area and offshore cable corridor, therefore confirming the magnitude is negligible as previously predicted in the EIAR.

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to seabed disturbance leading to the potential release of sediment contaminants has been split out for coarse and mixed sediments. The sensitivity of other IEFs is unchanged from section 8.10.4 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

Subtidal Coarse Sediment IEF is considered to have high recovery potential, being dominated by opportunist species that rapidly colonise disturbed habitats and increase in abundance. These species have high larval dispersal and include characterising polychaetes *M. fragilis* and *S.bombyx*, the tubeworm *S. triqueter*, and barnacles *Balanus crenatus* and *B. balanus*. Larger and longer-lived species such as venerid bivalves and the polychaete *Owenia fusiformis* may be more abundant in an established, mature assemblage (Tillin, 2016c). These longer-lived species have a high potential rate of recolonisation of sediments, but the relatively slow growth-rate and long lifespan suggests that recovery of biomass following initial recolonisation by post-larvae is likely to take several years (MES Ltd, 2010). Therefore, Subtidal Coarse Sediment IEF is considered to have low sensitivity to the release of sediment contaminants.

Subtidal Mixed Sediment IEF is considered to have high recovery potential. Characterising hydroids exhibit rapid rates of recovery from disturbance through repair, asexual reproduction and larval colonization (Sparks, 1972). Many hydroid species also produce dormant, resting stages that are very resistant to environmental perturbation (Gili and Hughes, 1995). Brittle stars such as *O. fragilis* and *Ophiocomina nigra* form large dense beds, potentially associated with rich epifauna (including the *A. rubens*, *E. esculentus*, *C. Pagurus* and *Liocarcinus* spp.) and infauna (such as the bivalve *Abra alba*). Mixed evidence of bioaccumulation in echinoderms exists, with *O. fragilis* having been shown to rapidly expel heavy metals either ingested or absorbed (Gounin *et al*., 1995), whilst other brittle stars do appear to accumulate (Deheyn and Latz, 2006; Sbaihat *et al*., 2013). However, there is no evidence to suggest toxicity effects of accumulation in brittle stars. Therefore, Subtidal Mixed Sediment IEF is considered to have low sensitivity to the release of sediment contaminants.

Significance of the effect

The magnitude of impact (negligible) and sensitivity of the receptors (negligible to low) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately. Therefore, there is no change from **imperceptible significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

Operational and maintenance phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment above.

Magnitude of impact

Site specific sediment chemistry sampling demonstrated that contaminant levels are very low, therefore confirming the magnitude is negligible as previously predicted in the chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

Significance of the effect

The magnitude of impact (negligible) and sensitivity of the receptors (negligible to low) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately. Therefore, there is no change from **imperceptible significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

Decommissioning phase

Sensitivity of the receptor

The sensitivity of the receptors can be found in the construction phase assessment above.

Magnitude of impact

Site specific sediment chemistry sampling demonstrated that contaminant levels are very low, therefore confirming the magnitude is negligible as previously predicted in the EIAR.

Significance of the effect

The magnitude of impact (negligible) and sensitivity of the receptors (negligible to low) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately. Therefore, there is no change from **imperceptible significance** as predicted in the assessment included in the EIAR, which is not significant in EIA terms.

8.10.5 Long-term subtidal habitat loss

Operational and maintenance phase

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to long-term subtidal habitat loss has been split out for coarse and mixed sediments in Table 8A-8. Sensitivity of other IEFs is unchanged from section 8.10.5 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

Both the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs have a high sensitivity to long term habitat loss as the sedimentary habitats which characterise these IEFs will be removed or covered as a result of the installation of the Project infrastructure.

Table 8A-8: Sensitivity of the benthic subtidal IEFs to long term subtidal habitat loss.

IEF	Representative biotope	Sensitivity to defined MarESA pressure Physical change (to another seabed type)
Subtidal Sandy Mud Sediment	SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	High
Subtidal Sand Sediment	SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	High
Subtidal Coarse Sediment	SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	High
Subtidal Mixed Sediment	SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	High
Subtidal Infralittoral Rock	IR.MIR.KR.Lhyp.GzFt[1]	High

[1] IR.MIR.KR.Lhyp.GzFt has been selected as a suitable biotope to use as a proxy for the IR.MIR.KR biotope identified in appendix 8-2: Benthic Survey Report (Aquafact, 2020). This is a suitable proxy due to similar sediment, water depths and fauna present however there are difference e.g. the presence of *Laminaria hyperborea*.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (high) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-8). Therefore, there is no change from **slight adverse significance** as predicted in the EIAR, which is not significant in EIA terms.

8.10.6 Colonisation of foundations, scour protection and cable protection

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs colonisation of foundations, scour protection and cable protection has been split out for the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs. The evidence set out in section 8.10.6 of EIAR chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B) is unchanged and therefore sensitivity of IEFs is as follows.

The Subtidal Sandy Mud Sediments, Subtidal Sand Sediment, Subtidal Coarse Sediment IEF, Subtidal Mixed Sediment IEF and Subtidal Infralittoral Rock IEFs are deemed to be of low resistance, medium recoverability and local value. The sensitivity of the receptors is therefore, considered to be low.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (low) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately. Therefore, there is no change from **slight adverse significance** as predicted in the EIAR, which is not significant in EIA terms.

8.10.7 Alteration of seabed habitats arising from effects of physical processes

Operational and maintenance phase

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to alteration of seabed habitats arising from effects of physical processes has been split out for the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs Table 8A-9. Sensitivity of other IEFs is unchanged from section 8.10.7 of EIAR chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

The Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are found where tidal flow varies between moderately strong (0.5 to 1.5 m/s) and weak (>0.5 m/s) (JNCC, 2015). Many of the characterising species of the Subtidal Coarse Sediment IEF occur in a range of sediment types, which suggests that these species are not sensitive to changes in water flow at the pressure benchmark. *T. ovata* occur in muddy sands in areas that are sheltered and where fine sediments are deposited. *Glycera* spp. are found in areas with strong tidal streams where sediments are mobile (Roche *et al*., 2007) and in extremely sheltered areas (Connor *et al*., 2004). *O. fusiformis* is found in front of river outlets in the Mediterranean and can be subject to a wide range of water velocities. Changes in water flow may alter the topography of these habitats and may cause some shifts in abundance. However, a change at the pressure benchmark (increase or decrease) is unlikely to affect biotopes that occur in mid-range flows.

The Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered to have lower sensitivity to relatively low level changes in physical processes. It should be noted that the predicted changes in physical processes associated with the Project are well below the MarESA benchmark levels and therefore all receptors were considered to have negligible sensitivity (i.e. not sensitive) to this impact (see Table 8A-9 below).

Table 8A-9: Sensitivity of the benthic subtidal IEFs to the alteration of seabed habitats arising from the effects of physical processes.

IEF	Representative biotope	Sensitivity to defined MarESA pressure	
		Changes in local water flow (tidal current)	Local wave exposure changes
Subtidal Sandy Mud Sediment	SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	Not Sensitive	Not Sensitive
Subtidal Sand Sediment	SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	Not Sensitive	Not Sensitive
Subtidal Coarse Sediment	SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	Not Sensitive	Not Sensitive
Subtidal Mixed Sediment	SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	Not Sensitive	Not Sensitive
Subtidal Infralittoral Rock	IR.MIR.KR.Lhyp.GzFt[1]	Not Sensitive	Not Sensitive

[1] IR.MIR.KR.Lhyp.GzFt has been selected as a suitable biotope to use as a proxy for the IR.MIR.KR biotope identified in appendix 8-2: Benthic Survey Report (Aquafact. 2020). This is a suitable proxy due to similar sediment, water depths and fauna present however there are difference e.g. the presence of *Laminaria hyperborean*.

Significance of the effect

The magnitude of impact (low) and sensitivity of the receptors (not sensitive) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately

(Table 8A-9). Therefore, there is no change from **imperceptible adverse significance** as predicted in the EIAR, which is not significant in EIA terms.

8.10.8 Increased risk of introduction and spread of invasive and non-indigenous species

Sensitivity of the receptor

In response to RFI 8E, the sensitivity of benthic subtidal IEFs to increased risk of introduction and spread of invasive and non-indigenous species has been split out for the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs in Table 8-10 included in chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B). Sensitivity of other IEFs is unchanged from section 8.10.7 of chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

As presented in Table 8A-10 there is a range in sensitivity of the IEFs present to the increased risk of introduction and spread of INIS. Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs have a medium to high sensitivity. Slipper limpets can smother bivalves in soft sediment communities where they can form dense carpets. *Didemnum vexillum* has been recorded on gravelly and more coarse substrates where it can cover more than 50% of the seabed in parts (Valentine *et al.*, 2007). It is commonly recorded in sheltered coastal locations but has been recorded in offshore habitats (e.g. at the Georges Bank fishing grounds off Long Island, New York) (Valentine *et al.*, 2007). If the Asian rapa whelk and oyster drill colonise this habitat they could negatively affect the characterising bivalve species, however, the most likely path of invasion for oysters is through contaminated aquaculture seed stock and equipment, rather than ballast water or presence of offshore infrastructure.

Table 8A-10: Sensitivity of the benthic subtidal and intertidal IEFs to the increased risk of introduction and spread of invasive and non-indigenous species.

IEF	Representative biotopes	Sensitivity to defined MarESA pressure Introduction or spread of invasive non-indigenous species
Subtidal Sandy Mud Sediment	SS.SMu.CSaMu.AfilKurAnit SS.SMu.OMu.LevHet	Not relevant[2]
Subtidal Sand Sediment	SS.SSa.CFiSa.EpusOborApri SS.SSa.CFiSa.ApriBatPo SS.SSa.IMuSa.FfabMag	High
Subtidal Coarse Sediment	SS.SCS.CCS.MedLumVen SS.SCS.CCS.SpiB	Not sensitive to High
Subtidal Mixed Sediment	SS.SMx.CMx.FluHyd SS.SMx.CMx.OphMx	Medium
Subtidal Infralittoral Rock	IR.MIR.KR.Lhyp.GzFt[1]	High
Intertidal Littoral Sand	LS.LSa.MuSa.MacAre	No evidence[3]
	LS.LSa.MuSa.Lan	High
Intertidal Eulittoral Rock	LR.LLR.F.Fves	Medium
	LR.FLR.Eph.EntPor	Not sensitive

[1] IR.MIR.KR.Lhyp.GzFt has been selected as a suitable biotope to use as a proxy for the IR.MIR.KR biotope identified in appendix 8-2: Benthic Survey Report (Aquafact, 2020). This is a suitable proxy due to similar sediment, water depths and fauna present however there are difference e.g. the presence of *Laminaria hyperborean*.

[2] the evidence base suggests that there is no direct interaction between the pressure and the biotope group (Tyler-Walters *et al.*, 2023).

[3] there is no evidence on which to base an assessment of the sensitivity of the specific feature/pressure combination, there is no suitable proxy information regarding the habitat (biotope) or species on which to base decisions, and expert judgement alone does not allow an assessment to be made with any confidence (Tyler-Walters *et al*., 2023).

Significance of the effect

The magnitude of impact (negligible) and sensitivity of the receptors (not sensitive to high) remains unchanged when sensitivities of the Subtidal Coarse Sediment and Subtidal Mixed Sediment IEFs are considered separately (Table 8A-10). Therefore, there is no change from **slight adverse significance** as predicted in the EIAR, which is not significant in EIA terms.

8.10.9 Electromagnetic fields (EMF) from subsea electrical cabling

The installation of inter-array cables and the offshore cable will conduct an Alternating Current (AC). The conduction of electricity through subsea power cables has the potential to emit a localised EMF which could potentially affect the sensory mechanisms of some benthic species (Gill and Desender, 2020). This impact will only occur in the operation and maintenance phase when electricity is being generated and transferred onshore. The cables will be passive during the construction and decommissioning phases, with no electricity being passed through there will be no EMF, therefore this impact is not relevant in these phases.

This impact was not included in the assessment included in chapter 8: Benthic Subtidal and Intertidal ecology in the EIAR (volume 2B) as it was not identified as a relevant impact at the scoping stage in 2019. This was determined due to the highly localised nature of the impact.

Operational and maintenance phase

Magnitude of impact

The presence and operation of inter-array cables and offshore cable within the offshore wind farm area and offshore cable corridor may lead to a localised EMF affecting benthic species. EMFs comprise both the electrical (E) fields, measures in volts per metre (V/m), and the magnetic (B) fields, measured in microtesla (µT) or milligauss (mG). Background measurements of the magnetic field in the North Sea, which are expected to be similar to the Irish Sea as they are within the same total field intensity contour as determined by the British Geological Survey (2024), are approximately 50 µT (500 mG), and the naturally occurring electric field in the North Sea is approximately 25 µV/m (Tasker *et al.*, 2010). It is common practice to block the direct electrical field (E) using conductive sheathing, meaning that the EMFs that are emitted into the marine environment are the magnetic field (B) and the resultant induced electrical field (iE). It is generally considered impractical to assume that cables can be buried at depths that will reduce the magnitude of the B field, and hence the sediment-sea water interface iE field, to below that at which these fields could be detected by certain marine organisms on or close to the seabed (Gill *et al.*, 2005, Gill *et al.*, 2009). By burying a cable, the magnetic field at the seabed is reduced due to the distance between the cable and the seabed surface as a result of field decay with distance from the cable (CSA Ocean Sciences Inc. and Exponent, 2019).

A variety of design and installation factors affect EMF levels in the vicinity of the cables. These include current flow, distance between cables, cable insulation, number of conductors, configuration of cable and burial depth. The flow of electricity associated with an AC cable (proposed for the Project) changes direction (as per the frequency of the AC transmission) and creates a constantly varying electric field in the surrounding marine environment (Huang, 2005).

The strength of the magnetic field (and consequently, induced electrical fields) decreases rapidly horizontally and vertically with distance from source. A recent study conducted by CSA (CSA Ocean Sciences Inc. and Exponent, 2019) found that inter-array and export cables buried between depths of 1 m to 2 m reduces the magnetic field at the seabed surface four-fold. For cables that are unburied and instead protected by thick concrete mattresses or rock berms, the field levels were found to be similar to buried cables. This study also found that EMF levels directly over live AC undersea power cables associated with offshore wind energy projects range between 65 mG and 5 mG for inter-array cables respectively and 165 mG and 10 mG for export cables, at heights of 1 m above the seabed and at the seabed surface, respectively. At lateral distances of between 3 m and 7.5 m from the cable, magnetic fields greatly reduced to between 15 mG and <0.1 mG for export cables at the seabed surface.

The induced electric fields directly over live AC undersea power cables ranged between 3.7 mV/m and 0.2 mV/m for export cables, at the seabed surface. At lateral distances of between 3 m and 7.5 m electric fields reduced to between 0.02 mV/m and 1.3 mV/m for export cables at the seabed surface (CSA Ocean Sciences Inc. and Exponent, 2019).

The impact is therefore considered to be of local spatial extent (restricted to within a few metres of the offshore cables within the offshore wind farm area and offshore cable corridor), long term duration (the lifetime of the Project), continuous and irreversible during the operation and maintenance phase (recoverability during decommissioning when the cables will no longer be operating). It is predicted that the impact has the potential to affect benthic receptors directly. The magnitude is therefore, considered to be low.

Sensitivity of the receptor

Electromagnetic fields generated by subsea power cables are increasingly recognised as a potential stressor for benthic marine organisms (Taormina *et al.*, 2018). While much of the early research focused on elasmobranchs and crustaceans, recent studies have begun to explore the responses of other benthic taxa, including polychaetes, molluscs, and echinoderms (Taormina *et al.*, 2018). For instance, some benthic invertebrates exhibit altered behaviour and physiological stress responses when exposed to EMFs (Bochert and Zettler, 2006, Schultz *et al.*, 2010, Woodruff *et al.*, 2012), although the magnitude and nature of these effects vary widely among taxa (Schultz *et al.*, 2010, Woodruff *et al.*, 2012).

Polychaetes, which are abundant in UK benthic habitats, have shown mixed responses to EMF exposure. Some species, such as *Hediste diversicolor*, appear relatively insensitive to low-frequency EMFs (Jakubowska *et al.*, 2019). Polychaetes are known to have a significant role in sediment bioturbation and nutrient cycling (Koo and Seo, 2017, Martins and Barros, 2022), which has the potential to be impacted if EMFs change behaviour or bioturbation rates. Further research is required for this to be determined experimentally or through observation of long term field data (Scottish Government, 2024).

Molluscs, particularly bivalves such as *Mytilus edulis* and *Cerastoderma edule*, have also been studied for EMF sensitivity. Laboratory experiments suggest that EMFs can non-significantly reduce the valve gaping rate of *M. edulis* (Albert *et al.*, 2022), which could potentially affect feeding and respiration. However, this study highlighted the need for further study due to the potential of these non-significant findings to be confounded by other environmental variables, such as temperature and salinity (Albert *et al.*, 2022).

Echinoderms, including species such as *E. esculentus* and *A. rubens*, are less well-studied in this context, but preliminary findings indicate non-significant disruptions in orientation and movement patterns under 500 µT EMF exposure for these species (Chapman *et al.*, 2023). Given their ecological roles as grazers and predators (Arnone *et al.*, 2015), sustained disruptions could have the potential to alter benthic community dynamics. More targeted research is needed to assess species-specific thresholds and adaptive capacities (Scottish Government, 2024).

While current evidence suggests that many common UK benthic species exhibit some sensitivity to EMFs from subsea cables, the responses are highly variable and context-dependent (Schultz *et al.*, 2010, Woodruff *et al.*, 2012). The lack of standardised methodologies and long-term ecological studies limits generalisations of findings across taxa or the ability to accurately predict ecosystem-level consequences.

All benthic receptors are deemed to be of low vulnerability and of local to international importance in the Benthic Subtidal and Intertidal Ecology Study Area. The sensitivity of these benthic receptors is therefore considered to be low.

Significance of the effect

Overall, the magnitude of the impact is deemed to be low, and the sensitivity of all benthic receptors is considered to be low. The effect will, therefore, be **imperceptible** to **slight adverse significance** as predicted in the EIAR, which is not significant in EIA terms.

8.10.10 Mitigation and residual effects

Following further assessment of the works at the landfall and further consultation with NPWS, the following additional measure has been proposed for the reinstatement of works in the intertidal area: Sediment/shingle to be removed will be reinstated by particle size and supervised by an ecologist.

8.10.11 Future monitoring

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

A monitoring programme is included as appendix 5-16: Monitoring Programme (EIAR volume 2A Addendum). This sets out details of proposed monitoring for the Project.

8.11 Cumulative Impact Assessment

An updated Cumulative Impact Assessment is provided in appendix 3-2: Cumulative Impact Assessment Report (EIAR volume 2A Addendum). The assessment concludes that there is no change to the cumulative assessment provided in chapter 8: Benthic Subtidal and Intertidal Ecology (EIAR volume 2B).

Due to the highly limited extent of impacts associated with EMF effects on benthic ecology (i.e. if effects occur, these would be limited to the immediate vicinity of cables) and the immobile nature of the receptors, there is no potential for cumulative effects with projects several kilometres from the offshore wind farm area and offshore cable corridor.

8.12 Transboundary effects

There is no potential for the Project to result in adverse effects on other states as a result of EMF from subsea electrical cabling. This impact is assessed in section 8.10.9 of this Addendum. The significance of effect has been assessed as imperceptible to slight adverse, which is not significant in EIA terms. This was due to the limited spatial range of this impact and therefore highly localised, with the EMF associated with subsea electrical cabling significantly reduced at a distance of 15 m. As such, there would be no transboundary effects from EMFs from the Project.

8.13 Interactions

There are no changes to EIAR chapter 8: Benthic Subtidal and Intertidal Ecology.

8.14 Summary of impacts, mitigation measures and residual effects

Table 8A-11 presents an updated summary of the potential impacts, mitigation measures and residual effects in respect to benthic subtidal and intertidal ecology. Changes are shown in blue text.

Table 8A-11: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Phase C	Phase O	Phase D	Measures included in the Project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional Measures	Residual effect	Proposed monitoring
Temporary subtidal habitat loss/disturbance	✓	✓	✓	An Environmental Management Plan (EMP) will be implemented. A pre-construction phase survey will be undertaken to identify any areas of reef habitat. Should reef areas be identified, appropriate measures will be agreed with regulatory and nature conservation bodies to avoid direct impact on these features.	C: Low O: Negligible D: Low	Low to Medium	C: Slight adverse O: Imperceptible or slight adverse D: Slight adverse	None	C: Slight adverse O: Imperceptible or slight adverse D: Slight adverse	N/A
Temporary intertidal habitat loss/disturbance	✓	✓	✓	Reinstatement of rock in the intertidal zone following cable installation.	C: Low O: Negligible D: Low	Low to High	C: Slight adverse O: Slight adverse D: Slight adverse	None	C: Slight adverse O: Slight adverse D: Slight adverse	N/A
Increased suspended sediment concentrations and associated sediment deposition	✓	✓	✓	N/A	C: Low O: Low D: Low	Not Sensitive to Medium	C: Slight adverse O: Slight adverse D: Slight adverse	None	C: Slight adverse O: Slight adverse D: Slight adverse	N/A
Seabed disturbance leading to the potential release of sediment contaminants	✓	✓	✓	N/A	C: Negligible O: Negligible D: Negligible	Negligible to Low	C: Imperceptible O: Imperceptible D: Imperceptible	None	C: Imperceptible O: Imperceptible D: Imperceptible	N/A
Long term subtidal habitat loss	×	✓	×	An Environmental Management Plan (EMP) will be produced and followed. A pre-construction phase survey will be undertaken to identify any areas of reef habitat. Should reef areas be identified, appropriate measures will be agreed with	O: Low	High	O: Slight	None	O: Slight	N/A

Description of impact	Phase C	Phase O	Phase D	Measures included in the Project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional Measures	Residual effect	Proposed monitoring
				regulatory and nature conservation bodies to avoid direct impact on these features.						
Colonisation of foundations, scour protection and cable protection	✗	✓	✗	N/A	O: Low	Low	O: Slight adverse	None	O: Slight adverse	N/A
Alteration of seabed habitats arising from effects of physical processes	✗	✓	✗	N/A	O: Low	Not Sensitive	O: Imperceptible adverse	None	O: Imperceptible adverse	N/A
Increased risk of introduction and spread of invasive and non-indigenous species	✓	✓	✓	A Marine Invasive Non-Indigenous Species Management Plan will be produced and agreed in consultation with statutory consultees.	C: Negligible O: Negligible D: Negligible	Not Sensitive to High	C: Slight adverse O: Slight adverse D: Slight adverse	None	C: Slight adverse O: Slight adverse D: Slight adverse	N/A
Electromagnetic changes	x	✓	x	N/A	O: Low	Low	O: Imperceptible	None	O: Imperceptible	N/A

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