9 Biodiversity

9.1 Introduction

This chapter describes the likely effects on biodiversity from the proposed development, both during its construction and operational phases, and ultimately decommissioning. Mitigation measures are also described, where required, that avoid or minimise adverse biodiversity effects.

This report was prepared by Carl Dixon MSc. (Ecological Monitoring) and Ian McDermott MSc. (Ecological Monitoring). Carl is a senior ecologist who has over 20 years' experience in ecological and water quality assessments with particular expertise in freshwater ecology. He also has experience in mammal surveys, invasive species surveys and ecological supervision of large-scale projects.

Ian is an experienced ecologist with particular expertise in surveying for invasive species, as well as mammal and bird surveys. He has carried out ecological surveys for a range of projects including industrial developments, pipelines, quarries and agricultural units.

Refer to **Appendix 1.1** for further details of the authors' qualifications and experience.

9.1.1 Overview of the proposed development

The proposed development (encompassing the onshore elements in Ireland only) will comprise:

Landfall Compound – a temporary landfall compound at Baginbun, where the high voltage direct current (HVDC) cable will be installed underground, below the beach and cliff at Baginbun Beach, by horizontal directional drilling (HDD);

HVDC Cables – two HVDC electricity cables with a nominal capacity of 500 megawatts (MW), installed underground from the landfall at Baginbun to the proposed converter station, including jointing bays and ground level marker posts at intervals along the route;

Converter Station – a converter station situated close to the existing Great Island substation in Wexford;

Tail Station - a 220kV substation located beside the proposed converter station. The tail station connects the HVAC 220kV cable into the 220kV grid via the existing Great Island substation.

Converter Station Construction compound - a temporary compound for the construction of the converter station and tail station at Great Island

Contractor Compounds – three temporary cable contractor compounds will be required. There will be one at each end of the route (i.e. the landfall site close to Baginbun Beach and the proposed converter station) and one along the onshore route in the townland of Lewistown, near Dollar Bay;

HDD Compounds – temporary HDD contractor compounds are required. One will be located close to the cable contractor compound at Baginbun Beach and launch and reception compounds will be located at each side of the Campile River Estuary crossing;

High Voltage Alternating Current (HVAC) Cables – one 220 kV HVAC electricity cable circuit consisting of three cables, installed underground connecting the proposed converter station via the tail station to the existing Great Island substation;

Fibre Optic Cables – fibre optic cables for operation and control purposes, laid underground with the HVDC and HVAC cables;

Community Gain Roadside Car Parking near Baginbun Beach – in consultation with Wexford County Council, circa 54 roadside car parking spaces will be constructed; and

Community Gain in Ramsgrange Village – in consultation with Wexford County Council, extension to existing footpaths, four new street lights and a speed activated sign at Ramsgrange.

9.2 Assessment Methodology

This appraisal is based on a review of desktop data and surveys of the proposed site and surrounding area (refer to **Figure 1.2** *Overview of the Proposed Development*). Ecological surveys were carried out on the 29th March, 20th April, 23rd May, 19th June, 18th of September 2018, 1st February,20th May and 16th December 2019. Winter bird surveys were carried out on 23 November 2015, 15 December 2015, 20 January 2016, 10 February 2016, 3rd March 2016, 23/3/2016. Winter bird surveys were also carried out on the 11th October, 2018, 20th November 2018, 4th December 2018, 15th January 2019, 13th February 2019 and 27th March 2019.

The assessment follows the structure and protocols detailed in the following:

- *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2017),*
- *Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003 and revised draft 2015)*
- *Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002).*
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (*EU Commission, 2013*).

The appraisal of effects follows the protocols outlined in guidelines for *Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009*) and *CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition* and *CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland*

Potential effects on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Natura Impact Statement (NIS) which has been

submitted as part of the application for planning consent for the proposed development.

9.2.1 Desktop Review

A desktop study was used to identify features of ecological value occurring within the proposed development and those occurring near it. A desktop review also allows the key ecological issues to be identified early in the appraisal process and facilitates the planning of appropriate surveys. Sources of information utilised for this report include the following:

- National Parks and Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre – www.biodiversityireland.ie
- County Wexford Biodiversity Action Plan 2013-2018;
- Bat Conservation Ireland - http://www.batconservationireland.org
- Birdwatch Ireland - http://www.birdwatchireland.ie/
- British Trust for Ornithology (BTO)-www.BTO.ie
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011)
- Guidance on integrating climate changes and biodiversity into environmental impact assessment (EU Commission, 2013)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009). This provides a standardised method for assessing the value of habitats in Ireland.
- EPA Geoportal

Reference was also made to the following key legislation and documents:

European

- European Communities (Birds and Natural Habitats Regulations; S.I. No. 477 of 2011)
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Council Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (The Environmental Liability Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or

improvement in order to support fish life (The Fish Directive (consolidated)).

Republic of Ireland

- The Wildlife Act 1976-2018 *CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland*
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) as amended by S.I. No. 355/2015;
- The Flora (Protection) Order, 2015 (S.I. No. 356/2015);
- The Planning and Development Act, 2000 (as amended);
- Wexford County Development Plan, 2013 - 2019
- National Biodiversity Action Plan 2017-2021.

9.2.2 Surveys Overview

Surveys were carried out at the site in 2015, 2016, 2018 and 2019, which covered the full extent of the proposed development as illustrated in **Figure 1.2**. The following surveys were carried out:

- Habitats were mapped according to the classification scheme outlined in the Heritage Council Publication *A Guide to Habitats in Ireland (Fossitt, 2000)* and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011)*. Habitats were cross referenced with Habitats Directive Annex 1 habitats. Alternative sites, site compounds and routes of the proposed development were also surveyed by Dixon.Brosnan. Given that the habitats potentially affected by the proposed development are common, specific detailed surveys for species such as bryophytes were not considered necessary.
- The proposed route, converter station site and landfall site and contractor compounds were surveyed for invasive species.
- All bird species recorded during the habitat survey were recorded. In addition, specialised bird surveys were conducted as follows:
    - Winter Bird usage of potential coastal sites which may be utilised as the landfall for the proposed Greenlink project in County Wexford (2015 and 2016) – this included a survey of the landfall location which was finally selected at Baginbun Beach.
    - Winter Bird Survey to assess bird usage of the proposed landfall site and HDD locations (Campile River Estuary and landfall site at Baginbun Beach) (refer to **Appendix 9.4**)

  - Breeding Bird Survey at two locations in May and June 2018; the proposed converter station location within an agricultural field and Baginbun beach (refer to **Appendix 9.3**)
  - Barn owl (*Tyto alba*) survey of an abandoned building, in proximity to the proposed converter station beside the existing Great Island substation (refer to **Appendix 9.3**)

- A general mammal survey with an emphasis on otters and badgers was carried out in conjunction with the habitat surveys.
- A bat emergence survey was undertaken on the 18th of September 2018 at Dunbrody Bridge using a Batbox Duet bat detector and Echo Meter Touch 2 PRO bat detector. In addition, an onsite day-time preliminary roost assessment of external and internal structures of the bridge was conducted during daylight hours on the 20th of April 2018. A crossing of the Campile River Estuary via Dunbrody Bridge was considered as a potential route option and it was for this reason the bat survey at this location was completed. Although this option does not form part of the preferred cable route, the bat survey results are indicative of bat activity along this section of the estuary.
- An onsite day-time roost assessment/winter hibernation survey of an abandoned building in proximity to the Great Island substation was also undertaken in February 2019 (refer to **Appendices 9.2** and **9.3).**
- An arboricultural survey of the cable route was completed on 24th May and 02nd June 2019 (refer to **Appendix 9.5**).
- The only significant freshwater habitat that may be affected is the Newtown River which will be crossed using mini-HDD technology, with no direct interaction with the watercourse. In the unlikely event that mini-HDD technology is not used, an open cut methodology will be implemented. A visual survey in 2018 and 2019 indicated that the Newtown River is a small, highly modified habitat which does not provide high value habitat for fish. A fish stock survey was not considered necessary and this was discussed and agreed with Inland Fisheries Ireland (Donnachadh Byrne IFI pers. comm. December 2019).

Site visits and surveys were carried out in accordance with best practice and in the expert opinion of the author, are considered sufficient to assess all potential significant ecological effects associated with the project. The survey scope and timing was considered sufficient to establish the use of habitats.

9.2.3 Consultation

All key stakeholders, including the public, have been consulted with to ensure that their views were addressed in the development process. Organisations consulted are referenced in **Section 1.11** of **Chapter 1- Introduction and Background** and included NPWS, IFI and Birdwatch Ireland, among others**.** Meeting were held with the NPWS in 2018 and 2019 to identify potential ecological issues. The IFI were consulted by phone in 2019.

Submissions regarding the EIA scoping report are included in **Appendix 1.3.** No submissions were received in relation to the ecological aspects of the proposed development.

Findings of the consultations are integrated into the assessment.

9.3 Baseline Environment

9.3.1 European (Natura 2000) Sites

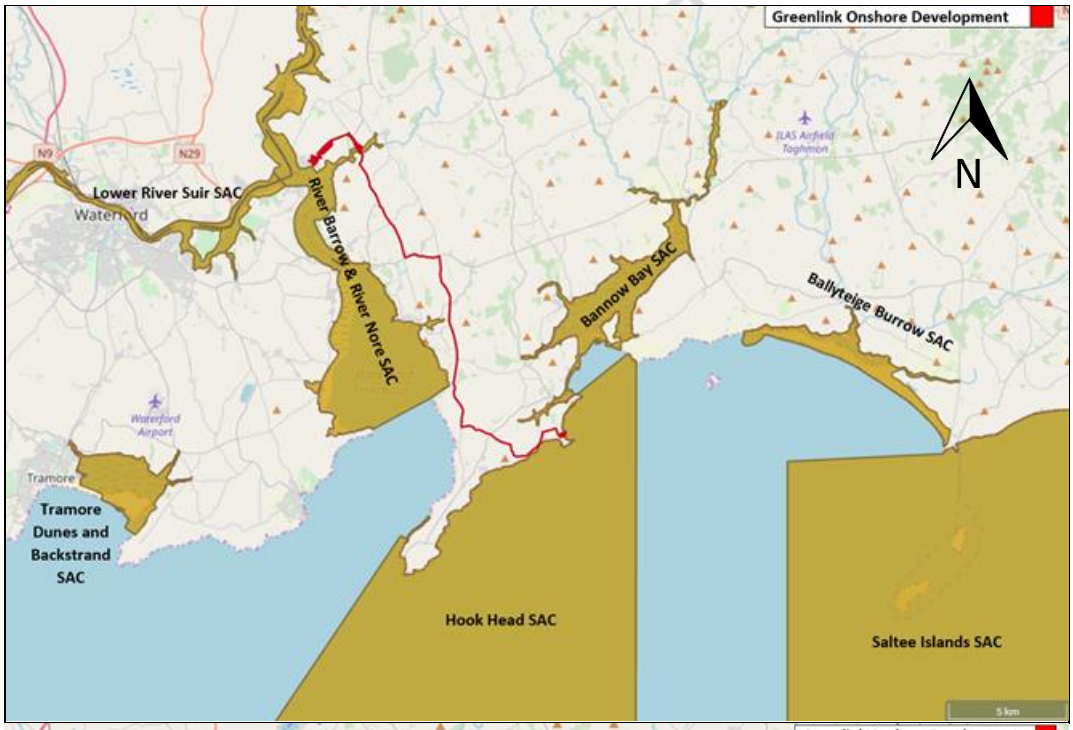
Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European Sites.

In accordance with the European Commission Methodological Guidance (EC2001), a list of Natura 2000 Sites that could be potentially affected by the proposed development has been compiled. Use of a 15km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant aqueous emissions. All candidate SACs (cSAC) and SPAs sites potentially affected by the proposed development were assessed and are listed in **Table 9.1**, and illustrated in **Figure 9.1.**

Table.9.1 Designated sites and location relative to the proposed development

Site	Code	Distance at the closest point (approx.)
Special Area of Conservation (SAC)		
River Barrow & River Nore	002162	0m. The crossing point downstream of Campile under the Campile River Estuary is located within this SAC HDD compounds are outside the SAC boundary. The southern HDD compound is located approximately 18.5m from the SAC boundary and 71m from the estuary channel. The northern HDD compound is located 119m from the SAC boundary and 151m from the estuary channel. The Kilmannock/ Newtown River flows into the SAC approximately 375m downstream of the proposed crossing point. The construction compound at Lewistown is located approximately 340m east of the SAC. The stormwater discharge point from the converter station site, to the Newtown River, is approximately 150 m east and upstream of the SAC.
Hook Head	000764	0m. The offshore cable to the landfall site is located within Hook Head SAC. The HDD compound is located 162m from the SAC boundary and the proposed carpark is approximately 10m west of the SAC boundary.
Bannow Bay	000697	300m north of onshore cable route near Baginbun Beach.

Lower River Suir	002137	1.2km west of the proposed converter station.
Ballyteige Burrow	000696	8.7km east of Baginbun beach in Coolcull townland.
Saltee Islands	000707	9.7km south east of Baginbun Beach landfall site.
Tramore Dunes and Backstrand	000671	11.6km west of the onshore cable route.
Special Protection Area (SPA)		
Bannow Bay SPA	004033	1km north of Baginbun Beach landfall site.
Keeragh Islands	004118	6.2km east of Baginbun Beach landfall site.
Ballyteige Burrow SPA	004020	9.2km east of Baginbun beach in Coolcull townland.
Tramore Back Strand	004027	11.7km west of the onshore cable route.



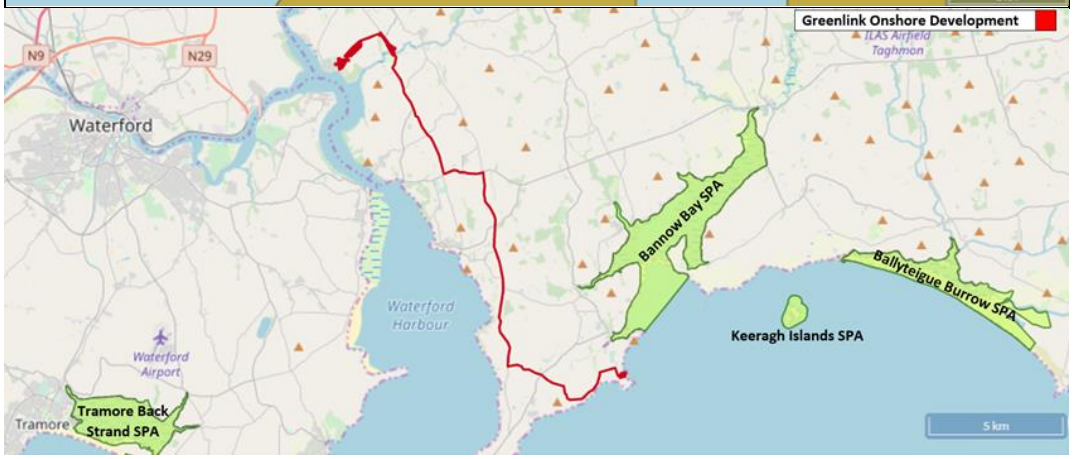


Figure 9.1 Natura 2000 sites within 15km of the proposed development | not to scale

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in the NIS which has been submitted as part of this application.

The NIS noted that following a comprehensive evaluation of the potential direct, indirect and cumulative effects on the qualifying interests and conservation objectives for Natura 2000 sites, it has been concluded that the proposed development, either alone or in combination with other plans or projects, will not have an adverse effect on the integrity of Natura 2000 sites. Potential impacts on the ecology of Natura 2000 sites are also assessed in this chapter of the EIAR where relevant.

9.3.2 Nationally Protected Sites

Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. An NHA is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Consultation with the NPWS is still required if any development is likely to impact on a pNHA.

The western and southern boundaries of the converter station site are close to the proposed Natural Heritage Area Barrow River Estuary (Site code: 000698). The estuary crossing point downstream of Campile is also located within this pNHA. The southern HDD compound for the Campile River Estuary is located within low value agricultural grassland within the Barrow River Estuary pNHA. The Baginbun Beach landfall site is located approximately 250m north of the Hook Head pNHA (Site code: 000764).

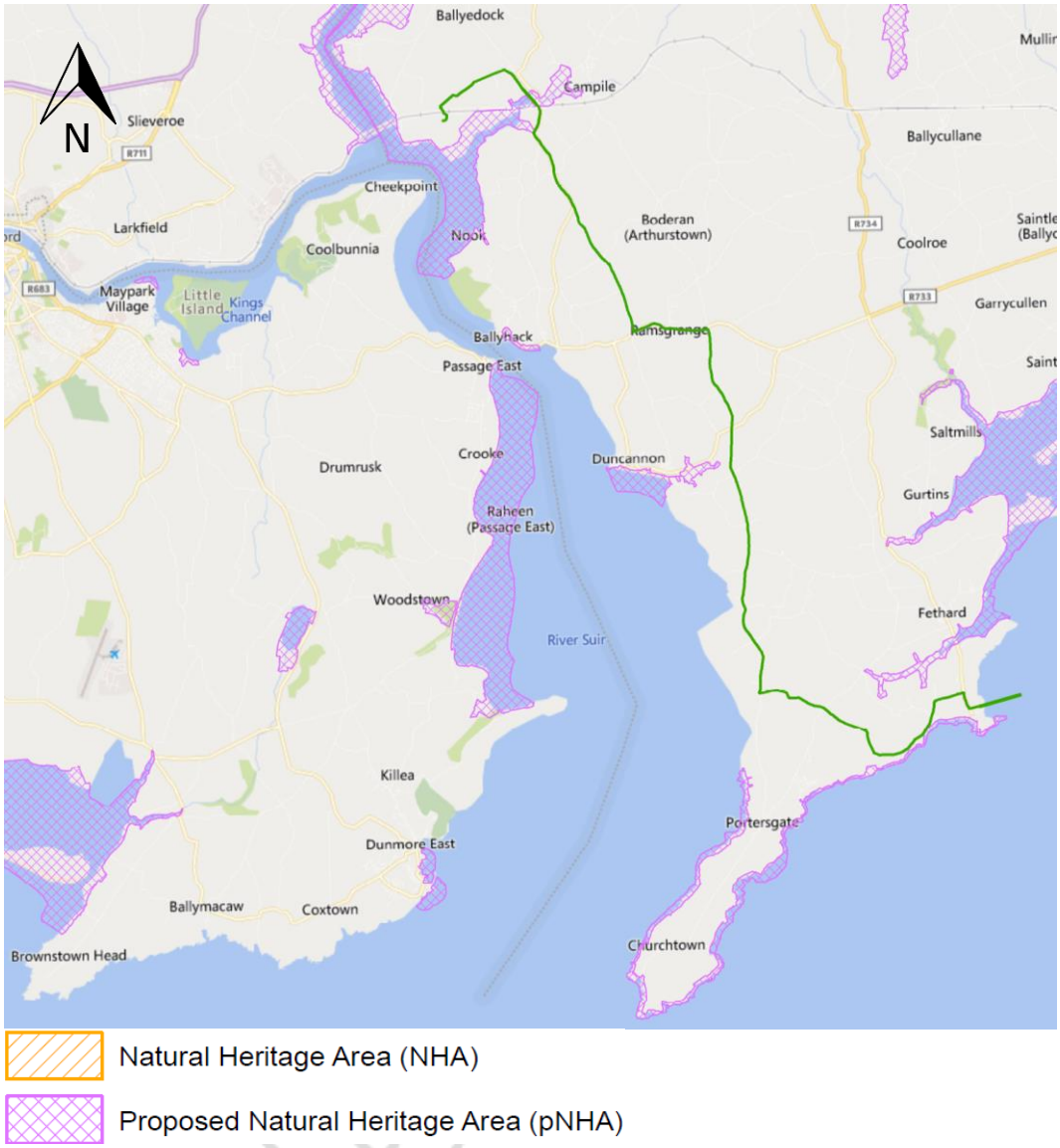


Figure 9.2 NHAs and pNHAs near the proposed development | not to scale

The Duncannon Sandhills pNHA overlaps the River Barrow and River Nore SAC and is located 360m from the proposed development (along the cable route). The Barrow River Estuary pNHA also falls within the River Barrow and River Nore SAC and the Hook Head pNHA falls within the Hook Head SAC. Both NHAs are so designated for a similar range of habitats and species to their respective SAC sites and thus the impact assessment documented in the NIS is considered relevant. Potential impacts on the ecology of these sites are also assessed in this chapter of the EIAR where relevant.

9.3.3 Ramsar Sites

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International

Importance. Bannow Bay is listed as a Ramsar site, which is a non-statutory designation.

9.3.4 Important Bird Areas – Bannow Bay

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or nationally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the IBA Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The proposed landfall site at Baginbun Beach 1.3km south of the Bannow Bay IBA (Site Code: IE096).

The Bannon Bay IBA is an extensive, sheltered sea bay and estuary, situated in County Wexford, 20 km east of Waterford city (refer to **Figure 9.3**).

Figure 9.3 Bannow Bay IBA | not to scale Source: http://datazone.birdlife.org/

At low tide over 75% of the bay is exposed mud and sand with some saltmarsh. The Ownduff and Corock rivers discharge into the head of the bay which is constricted at its mouth by sandbars and a dune system on either side. This wetland supports a wide range of wintering waterfowl. Several additional species occur in numbers of national importance (See **Table 9.2**).

There is intertidal shellfish cultivation within the site which is a possible threat to habitat quality, while wildfowling causes disturbance to birds.

Habitat quality is reduced by the spread of non-native cord-grass *Spartina*. In 1997, unauthorised mechanical cockle-harvesting caused damage to the intertidal mudflats.

The site qualifies for designation under the following IBA Criteria (2000):

- B1i - The site is known or thought to hold ≥ 1% of a flyway or other distinct population of a waterbird species.
- C3 - The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (not listed on Annex 1 of The Birds Directive).
- C6 - The site is one of the five most important in the European region (NUTS region) in question for a species or subspecies considered threatened in the European Union (i.e. listed in Annex I of the EC Birds Directive).

Table 9.2: Bannow Bay IBA trigger species

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Brent Goose (*Branta bernicla*)	Least Concern (LC)	Winter	2002-2006	577-1,045 individuals	B1i, C3
Little Egret *(Egretta garzetta)*	Least Concern (LC)	Winter	2003-2007	12-51 individuals	C6

9.3.5 Terrestrial and Aquatic Habitats

Ecological surveys were carried out on the 29th March, 20th April, 23rd May, 19th June, 18th of September 2018, 1st February,20th May and 16th December 2019. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011). Refer to **Figures 9.4** *et seq*. The terrestrial and aquatic habitats within or adjacent to the proposed development were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex 1 Habitats where required. No rare species were noted during the site surveys. The survey results are representative of the habitats within the application site and include the dominant and characteristic species of flora.

9.3.6 Habitat surveys

The cable route from the converter station and tail station to the landfall site near Baginbun Beach is approximately 23 kilometres long. The entire route will be underground and where possible will follow the existing roads. Works within the road will be at locations which are already subject to persistent intermittent noise. However, there are areas along the route where the

underground cables are routed off-road and traverse agricultural lands, principally at the northern end of the route near the converter station site. Where the route diverts off-road the construction activities will impact on more natural habitats and therefore there is potential for greater ecological impacts at these areas. Selection of joint bay locations in these areas will have regard to constraints such as trees, to avoid unnecessary felling.

Habitat descriptions of the route focus on the off-road diversion areas, as set out below. The main elements of the proposed development described in Section 9.1.1, and in more detail in **Chapter 3** *Proposed Development* of this EIAR.

9.3.6.1 Converter Station and Tail Station Site

The converter station and tail station will be constructed close to the existing power station and substation at Great Island. An overview of the proposed development at this location is provided in **Chapter 3** of this EIAR *Proposed Development*. The habitats within the site of the proposed converter station and tail station site and in proximity to same, are shown in **Figure 9.4.** The proposed converter station will impact on improved agricultural grassland (GA1) and gorse scrub (WS1). A cable contractor's compound, main contractor's compound and main contractor's plant and equipment laydown area will be established within the boundary of the Great Island power station. These will be located within areas of recolonising bare ground (ED3) and will impact on a small area of scrub (WS1) dominated by gorse.

Within the Great Island substation site there is a band of immature broadleaved woodland (WS2) which was planted to visually screen the existing Great Island substation. A large agricultural field (GA1), currently used as pasture exists to the east of the immature woodland. Rye-grass (*Lolium spp*.) dominates the sward with herbaceous species limited in extent. Noted within the agricultural field is a large area of Scrub (WS1) dominated by Gorse (*Ulex europaeus*).

A second, smaller field of improved agricultural grassland (GA1) exists to the south of the proposed converter station site. The two fields are separated by a mixture of scrub and treeline (WL2) / hedgerow (WL1) habitat, composed of Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Sycamore (*Acer pseudoplatanus*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*) and Bramble (*Rubus fruticosus agg).* The site is bordered to the north by a railway line which is not currently operational and is classified as buildings & artificial surfaces BL3. Some small pockets of dry meadow and grassy verge GS2 were noted.

An abandoned and dilapidated former dwelling (BL3) exists to the southwest of the converter station within an area of mixed broadleaved woodland (WD1) and scrub (WS1). A treeline of semi-mature Sycamore (*Acer pseudoplatanus*) runs north of the building. The dwelling is overgrown with scrub and immature trees.

An attenuation pond will be constructed within a field of improved agricultural grassland (GA1) to the south of the converter station. The discharge pipeline from the attenuation pond will run parallel to an existing hedgerow (WL1) of hawthorn, blackthorn with some immature ash. The pipeline will cross through the hedge (Wl1) and pass through an existing pathway and a mosaic of scrub

(WS1)and dry meadow and grassy verge (GS2) before discharging to the Newtown/ Kilmannock River (CW2).

Bank side vegetation in proximity to the discharge point include a mature oak, dense bramble scrub and a small area of broadleaved woodland. This section of the river may support a brown trout population and flounder and mullet may also occur. No alluvial woodland was recorded.

Kingfisher were also recorded along this river approximately 1km upstream of the discharge location.

The preferred methodology for crossing the Newtown River is by micro-HDD, which will result in no direct effects on the watercourse. In the unlikely event that an open cut methodology is used, the following appraisal applies. Although no signs of otter were recorded at along this watercourse, a visual survey of the Newton River was carried out to assess habitat value for fish as this watercourse will be directly affected by site works and thus there could be an impact prey availability. At the crossing point, which will be crossed via an open cut methodology, the river is tidal with a mud substrate. It is a small stream, part of a network of drains within this area, which has been highly modified and has low potential as fish habitat. Detailed fish stock assessments of tidal habitats are not carried out as standard as they do not provide habitats for sensitive receptors such as salmonid spawning habitat or juvenile lamprey habitat. The distribution of certain estuarine species, such as Grey Mullet and Flounder which could be present, will vary with the tidal cycle which makes assessment problematic. Taking the worst-case scenario, the crossing of the Newtown River will result in a temporary loss of potential habitat and a temporary barrier to fish movement.

The Newtown River is a small highly modified habitat which does not provide high value habitat for fish species and a fish stock assessment was not considered necessary. Likewise given the limited scale of the potential impact from the discharge of surface water via an attenuation pond and the strongly tidal nature of the receiving environment no significant impact on the Newtown River at the discharge location for surface water during operation will occur. This was discussed and agreed with Inland Fisheries Ireland (Donnachadh Byrne IFI pers. comm. December 2019).

The presence of Kingfisher along the Newtown River indicates that there may be some fish stocks within the overall river. Some species such as Stickleback may occur. Although stocks of European Eel are threatened this species still commonly occurs in small drains and streams. The habitat value for brown trout is low although the presence of occasional individuals cannot be completely discounted. Post construction there will be no residual ecological impact on fisheries habitat. A salvage operation will be carried out during construction and if fish are captured during the crossing works fish will be safely relocated.

The river is bounded by small, vegetated earth banks (BL2) and arable fields. Extensive growth of green algae was noted in sections. Species noted growing along the banks of the river include Great Willowherb (*Epilobium hirsutum*), Horsetail (*Equisetum spp.*), Reed Sweet-grass (*Glyceria maxima*), Meadowsweet (*Filipendula ulmaria*), Creeping Thistle (*Cirsium arvense*), Common Fleabane (*Pulicaria dysenterica*), Hard Rush (*Juncus inflexus*) and Sea Club-rush (*Bolboschoenus maritimus*). A Kingfisher (*Alcedo atthis*) was recorded flying in

a southernly direction, along the river. Downstream of the railway the river widens with a more pronounced tidal influence (see **Photograph 9.3 and 9.4**).

Figure 9.4: General overview of habitats at the proposed converter station and tail station site | not to scale [mapping: © Google 2020]

Green: Improved agricultural grassland GA1, Red: Immature broadleaved woodland WS2, Yellow: Scrub WS1, Black: Buildings and artificial surfaces BL3, Pink: Treeline WL2/ Mixed broadleaved woodland WD1/ Scrub WS1, Orange: Recolonising bare ground ED3/ Buildings and artificial surfaces BL3/ Scrub WS1, Purple: Hedgerow WL1/ Scrub/ WS1/ Dry meadows and grassy verge GS2, Blue: Tidal river CW2/ Earth Banks (BL2).

9.3.6.2 Northern Off-road Route Between Great Island and Campile Estuary

The habitats within the off-road sections of the cable route and in proximity to it are indicated below in **Figure 9.5.** This section of the cable route will primarily impact on agricultural lands that are used for pasture (GA1) and arable crops (BC1) – refer to **Photographs 9.1** and **9.2**. Pasture and arable crop fields are highly modified habitats of low ecological value Small strips of transitional habitats, some of which loosely correspond to dry meadows and grassy verge (GS2) habitat, are which are low ecological value, can be found along the edges of the agricultural fields. Farm tracks within these habitats are classified as spoil and bare ground (ED2) and are of low ecological value.

Photographs 9.1 and 9.2: Examples of heavily-grazed, improved agricultural grassland and arable crops

A mosaic of habitats were noted growing along the railway embankment including mixed broadleaved woodland (WD1), with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Willow (Salix spp.), Sycamore (*Acer pseudoplatanus*) and Elder (*Sambucus nigra*). Areas of scrub (WS1), treeline (WL2) and hedgerow (WL1) habitats are also present. Small pockets of low-value, dry meadows and grassy verge (GS2) habitat were also noted. No direct interaction with the railway embankment is proposed, therefore a detailed botanical survey of this area was not carried out.

Fields within the off-road diversion areas have linear habitats along their boundaries. Treeline (WL2) and hedgerow (WL1) habitats dominate, with a range of species noted e.g. Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Elm (*Ulmus spp.*), Holly (*Ilex aquifolium*), Common Lime (*Tilia x europaea (T. cordata x platyphyllos*)), Beech (*Fagus sylvatica*), Pine (*Pinus spp.*), Cypress (*Cupressus spp.*), Elder (*Sambucus nigra*) and Oak (*Quercus spp.*). Only one large mature treeline (WL2) was noted. Blocks of mixed broadleaved woodland (WD1) were recorded at various locations, including a section on steep ground adjoining the Campile Estuary. Species noted include Oak (*Quercus spp.*), Beech (*Fagus sylvatica*), Alder (*Alnus glutinosa*), Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Birch (*Betula spp.*), Poplar (*Populus spp.*) and a small number of conifers. Large, mature trees were

recorded within the woodland and along an entrance track to a farm yard (Buildings and artificial surfaces BL1).

Old stone walls (BL1), which were also recorded along the farm tracks, can provide a habitat for plants, mosses and lichens and can provide a habitat for insects, small birds and small mammals.

Within the off-road diversion area there are several drainage ditches (FW4). They are particular evident in the wider landscape, close to the converter station site, as much of this land is low lying and was reclaimed. These drainage ditches are artificial in origin and have been excavated to enhance drainage and control the flow of water within the agricultural land. The width and depth vary. The majority of these drainage ditches had at least some standing or running water and support aquatic vegetation including Water-starwort (*Callitriche spp.*), Fools Water-cress (*Apium nodiflorum*), Branched Bur-reed (*Sparganium erectum*), Water Dock (*Rumex hydrolapathum*) and Common Reed (*Phragmites australis*). Stickleback (*Gasterosteus aculeatus*) were noted within a section of a drainage ditch to the southwest of the proposed cable route. A number of these drainage ditches have a hydrological connection to the Newtown River (Kilamannock Stream) (Tidal river - CW2).

Photograph 9.3: Newtown River in summer 2018 with sluggish flow noted.

Photograph 9.4: Newtown River crossing point in December 2019. Note greater depth due to heavy rainfall and high tide and die back of vegetation.

Figure 9.5: General overview of habitats – northern off-road area between Great Island and Campile River Estuary | not to scale [background mapping © Google 2020]

Dark green: Improved agricultural grassland GA1, Yellow: Arable crops BC1, Red: Hedgerow WL1/ Treeline WL2, Light green: Mixed broadleaved woodland WD1/ Treeline WL2, White: Stone walls and other stonework BL1/ Spoil and bare ground ED2, Light blue: Tidal river CW2/ Earthbank BL2, Blue dashed line: Drainage ditches FW4, Black: Buildings and artificial surfaces BL1, small pockets of Dry meadows and grassy verge GS2 of insufficient size to be mapped.

9.3.6.3 Campile River Estuary Crossing

It is proposed to use HDD to cross under the Campile River Estuary, at a depth of more than 10m below the river bed. This methodology will avoid any direct effects on the river. HDD contractor compounds are proposed at either end of the Campile River Estuary crossing. See **Figure 9.6**.

Figure 9.6 Location of HDD crossing at the Campile River Estuary | not to scale [mapping: Bing Maps (c) Microsoft 2020]

The HDD compounds will be set back above mean high water springs (MHWS), within areas of improved agricultural grassland (GA1) used as pasture. The habitats within the proposed development area and in proximity to it are indicated in **Figure 9.7.**

The river channel has been considerably modified over time with the development of embankments (BL2) along the southern bank of the river to the west of Dunbrody Bridge. The river channel embankments were created to allow for the reclamation of intertidal habitats.

Photographs 9.5 and 9.6: The proposed crossing area underneath the Campile River estuary with associated habitats, west of Dunbrody Bridge and north of the railway line

The embankment along the southern bank of the river to the west of Dunbrody Bridge separates the Campile River from an area of improved, heavily grazed agricultural grassland (GA1). The embankment itself, while showing some signs of grazing, is more diverse with Sea Couch (*Elytrigia atherica*), False Oat-grass (*Arrhenatherum elatius*), Nettle (*Urtica dioica*), Bindweed (*Calystegia spp.*) and Bramble (*Rubus spp.*) recorded.

This section of the Campile River Estuary, which is tidal (CW2), with regular fluctuations in salinity and turbidity, and in the rate and direction of water flow, is located within the River Barrow and River Nore SAC. Upper salt marsh (CM2) habitat, which will be unaffected by the proposed development, is present along the Campile River channel (**Photographs 9.5** and **9.6**) in association with areas of mudflat habitat. Floral composition varies. The invasive species Common Cord-grass (*Spartina anglica*) which can cause habitat loss and degradation has become abundant in places. Other species noted include Sea Club-rush (*Bolboschoenus maritimus*), Creeping Bent (*Agrostis stolonifera*), Sea Aster (*Aster tripolium*), Orache (*Atriplex spp.*) and Sea Plantain (*Plantago maritima*). There is some evidence of grazing by cattle within this habitat.

A band of mixed broadleaved woodland WD1/ Treelines WL2/ Hedgerows WL1, and Scrub WS1 occur to the south of the river. This woodland does not correspond to the Annex I habitat alluvial woodland. Situated to the north of this section of the Campile River Estuary is a band of Mixed broadleaved woodland (WD1/ conifer woodland WD3. Species noted include Ash (*Fraxinus excelsior*), Oak (*Quercus spp.*), Birch (*Betula spp.*), Scots Pine (*Pinus sylvestris*), Sycamore (*Acer pseudoplatanus*) and Hawthorn (*Crataegus monogyna*). Scattered throughout the habitat are several large mature trees (conifer and broadleaved) which have nesting and bat roost potential. Many of these trees contain natural holes, cracks/splits in major limbs, loose bark, hollows/cavities and dense epicormic growth. Trees, especially native ones, also play host to numerous insect species which are prey items for both bird and bat species. Large mature trees within a woodland habitat are of importance as they can provide essential refuge and breeding sites for many species of mammals and birds, as well as for many invertebrates.

By virtue of size, large mature trees provide more food resources and nesting resources than younger trees. Further detail is provided in the tree survey report which is attached as **Appendix 9.5.** A small area of Recolonising bare ground (ED3)/ Scrub (WS1) was recorded on the northern periphery of the woodland.

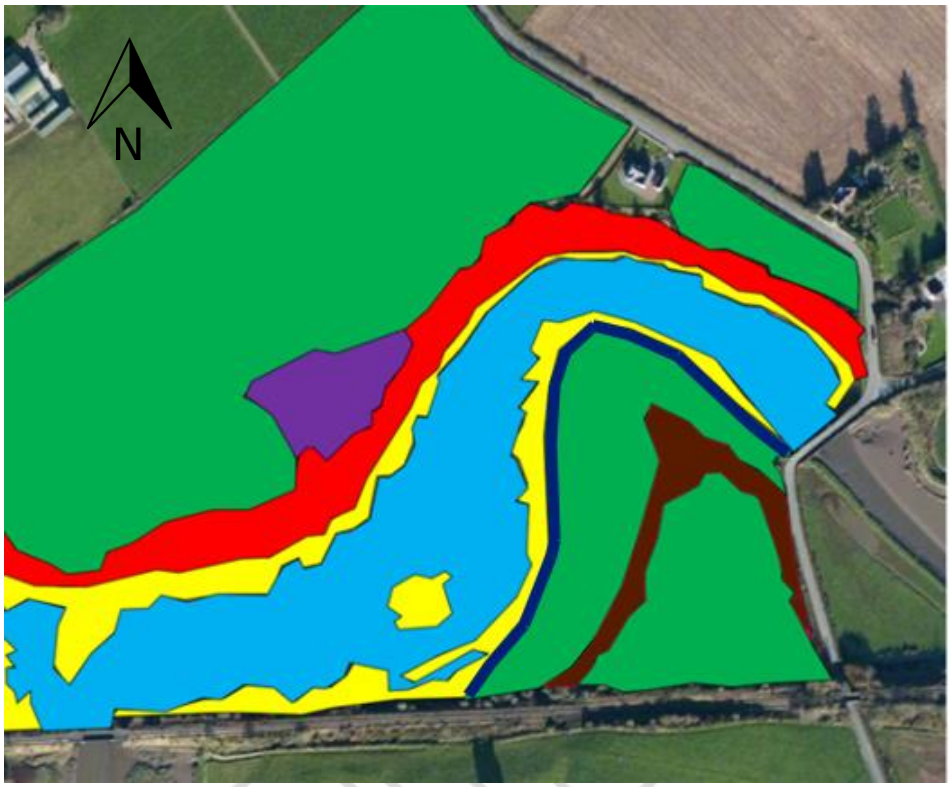


Figure 9.7: General overview of habitats at the Campile River Estuary | not to scale [background mapping © Google 2020]

Light blue: Tidal river CW2, Yellow: Upper salt marsh CM2, Red: Mixed broadleaved/ Conifer Woodland WD2, Purple: Recolonising bare ground ED3/ Scrub WS1, Brown: Mixed broadleaved woodland WD1, Treelines W2, Hedgerows WL1/ Scrub WS1, Dark green: Improved agricultural grassland GA1, Dark blue: Embankment BL2

9.3.6.4 Baginbun Beach Landfall Site and Roadside Car Parking Area

Baginbun Beach is located to the north of Carnivan Bay on the Baginbun peninsula facing north east and accessed via a 'cul-de-sac' access road, approximately four metres wide and 450 metres in length. Five private properties, improved agricultural grassland (GA1) and arable land(BC1) are accessed from this road. At the end of the access road there is space for approximately three vehicles and a gravel access track leading to the beach. The access track is approximately 3.5m wide with grass verges. The proposed works in this area are described in detail in **Chapter 3** *Proposed Development* and **Chapter 4** *Construction Activities*. The habitats within the proposed development area and in proximity to it are indicated in **Figure 9.8.**

Baginbun beach itself is a sand shore (LS2) which is sheltered by Baginbun Head. Patches of bedrock with fucoids are exposed during low tide, while some small scattered patches of Sea Sandwort (*Honkenya peploides*) occur near the strandline.

Sea cliffs can be broadly divided into two categories: hard (or rocky) cliffs and soft (or sedimentary) cliffs, both of which are covered by the Annex I habitat '*vegetated sea cliffs of the Atlantic and Baltic coasts*'. Hard cliffs are composed of rocks such as limestone, sandstone, granite or quartzite which are hard and relatively resistant to mechanical erosion. Soft cliffs are composed of softer rock, such as shale, or unconsolidated material, such as glacial till. Vegetation of hard sea cliffs in exposed situations exhibits a strong maritime influence and is relatively stable. Soft cliff habitats are more prone to slope failure, which results in the presence of fast-colonising pioneer species.

The offshore cable to the landfall site is located within Hook Head SAC for which Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] are listed as a qualifying interest. Sea cliffs on the Irish coast approximately correspond to the EU Annex I habitat Vegetated sea cliffs of the Atlantic and Baltic coasts (1230). HDD drilling under the cliffs is proposed and no effect on sea cliffs will occur.

The beach is flanked by sea cliffs to the west and south, with the coastal waters of the Celtic Sea to the east and north. The southern cliff faces that extend along Baginbun Head are categorised as hard cliffs (CS1) with exposed rock faces evident. The splash zone is characterised by fucoids and lichens, including Black Tar lichen (*Verrucaria spp.*), Yellow Leafy lichen (*Xanthoria spp.*) and Orange Sea lichen (*Caloplaca spp.*) patches. Higher up, vascular plants become more prevalent within the crevice and ledge community; however exposed rock still dominates. Species noted include Thrift (*Armeria maritima*), Sea Mayweed (*Tripleurospernum maritima*), Sea Beet (*Beta vulgaris ssp. Maritima*), Sea Plantain (*Plantago maritima*) and Common Scurvygrass (*Cochlearia officinalis agg.*). The top of the sea cliff is dominated by low-lying scrub (WS1) habitat composed of Bramble (*Rubus fruticosus agg.*), Bracken (*Pteridium aquilinum*) and spinose plants such as Blackthorn (*Prunus spinosa*) and Gorse (*Ulex europaeus*). Ivy (*Hedera helix*) is also abundant.

To the north along the western periphery of the beach, the cliff transitions to a soft (sedimentary) cliff (CS3) for approximately 150m.

This section of cliff is generally more unstable than the surrounding cliff faces. A large section shows signs of recent slope failure. This area of soft cliff is entirely vegetated and is largely dominated by Bramble and Bracken. Hogweed (*Heracleum sphondylium*) is abundant in places. Other species noted include the non-native amber listed invasive species Montbretia *(Crocosmia* × *crocosmiflora*), Honeysuckle (*Lonicera periclymenum*), patches of stunted Blackthorn and Gorse scrub and Horestails (*Equisetum spp.*).

North of the slipway, sea cliff habitat includes grasses e.g. Red fescue (*Festuca rubra*), and patches of Ivy and Bramble scrub. Other species noted include Thrift, Silverweed (*Potentilla anserine*), Sea Mayweed, Sea Plantain, Knapweed (*Centaurea spp.*) and umbellifer species.

Adjoining the beach are heavily vegetated cliffs of moderate height (<15m) with only minor signs of erosion on the northern side of the beach. At the base of the cliffs on the southern side, there is the remains of a large stepped concrete structure (**Photographs 9.7** to **9.10**).

During consultations with Wexford County Council, Greenlink Interconnector Limited agreed to construct car-parking facilities near Baginbun Beach as an element of community gain for the project. A strip of land on the north side of the approach road will be purchased which will allow the road to widened to an overall width of 12m. There will be a 3m wide parking bay on both sides and two 3m wide vehicular lanes. Approximately 54 parking spaces will be provided, with parallel parking along both sides of the road. This will impact on low-value habitats, namely a narrow strip of Improved grassland GA1 and narrow band of bramble scrub WS1 on a raised bank running alongside the road.

Photographs 9.7 to 9.10: Photograph 9.7 shows the Sand shore (LS2) at Baginbun Beach. Photograph 9.8 shows an area of hard cliff (CS1) along Baginbun Head.

Photograph 9.9 shows a soft (sedimentary) sea cliff (CS3) section south of the slipway. Photograph 9.10 shows the section of cliff north of the slipway (CS1/CS3).

Figure 9.8: General overview of terrestrial/ intertidal habitats at Baginbun Beach | not to scale

Red: Rocky sea cliff CS1/ Sedimentary sea cliff CS3, Yellow: Sand shores LS2, Orange: Buildings and artificial surfaces BL3/ Spoil and bare ground ED2, Green: Improved agricultural grassland GA1, Purple: Arable crops BC1.

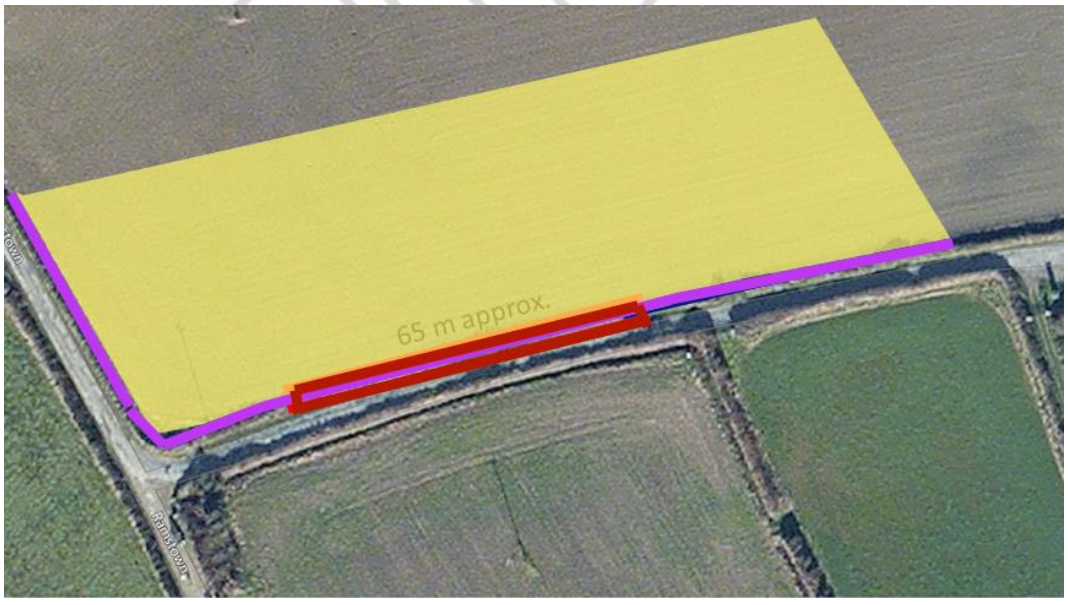


Figure 9.10 Proposed roadside parking area near Baginbun Beach | not to scale
Yellow=Improved agricultural grassland GA1, Pink= Scrub WS1

9.3.6.5 Minor off-road areas adjacent to roads

There will be impacts on small areas of farmland in proximity to the proposed route where it runs within the existing road network. These small off-line areas facilitate the cable route at difficult locations such as tight corners. Generally, these areas are small and do not support habitats of particular value. A temporary contractor's compound will also be constructed in the townland of Lewistown, near Dollar Bay. As indicated in **Figures 9.9** to **9.12**, the habitats (Improved agricultural grassland GA1 and Arable crop BC1) within these areas are common and of low ecological value.

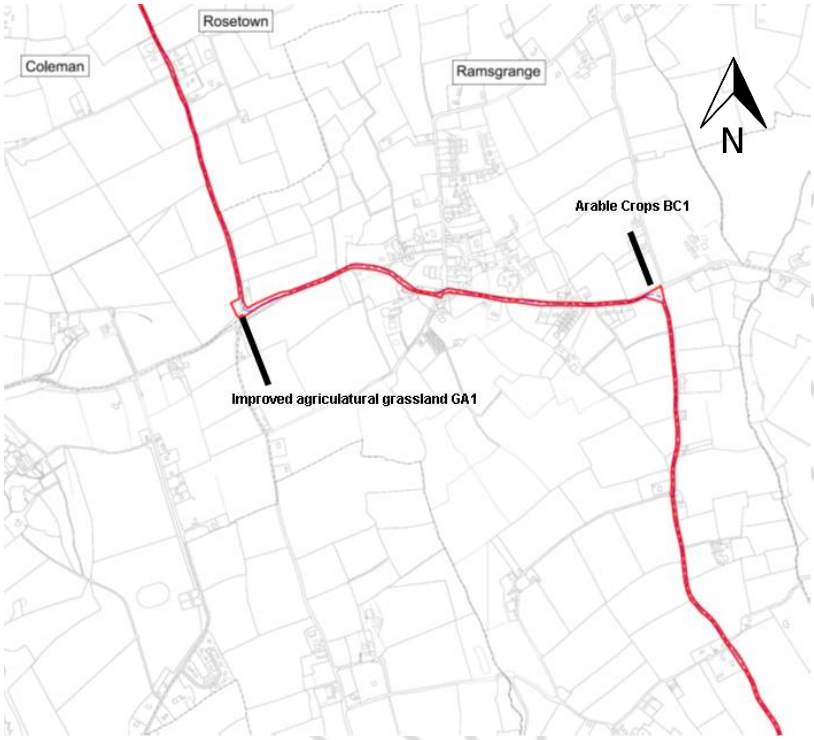


Figure 9.9 Minor off-road diversions near Ramsgrange | not to scale

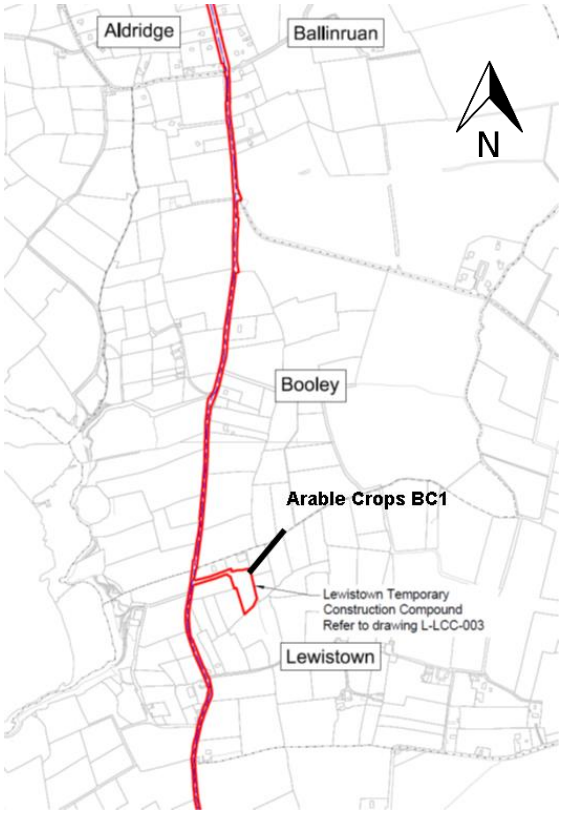


Figure 9.10 Off-road area - contractor's compound at Lewistown | not to scale

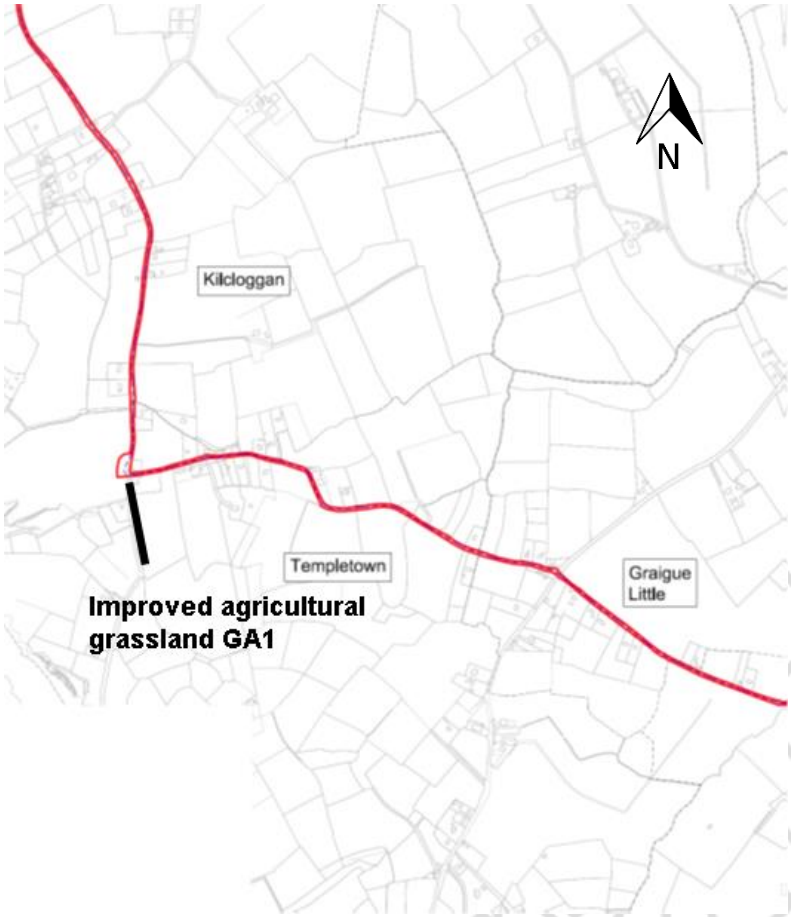


Figure 9.11 Off-road area at Templetown | not to scale

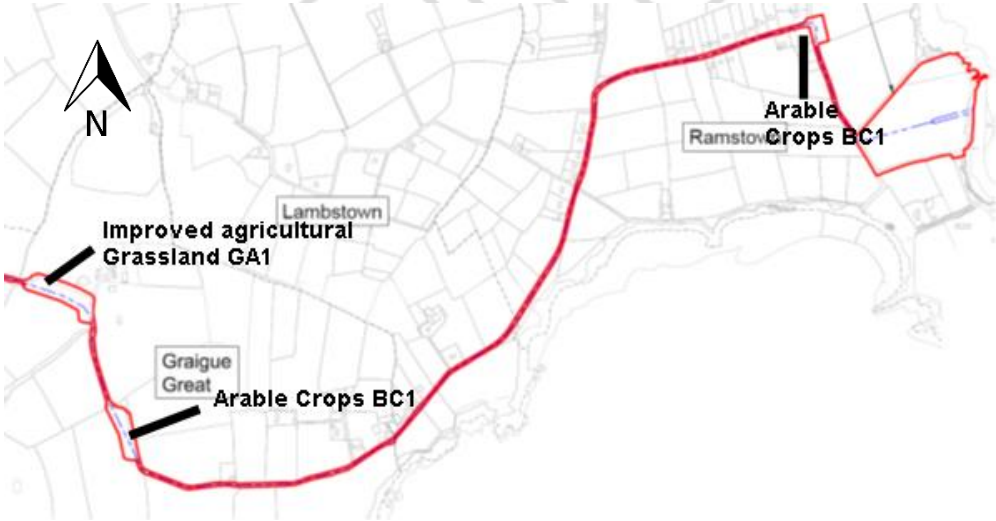


Figure 9.12 Off-road area - Graigue Great and Ramstown | not to scale

9.3.6.6 Cable route within roads, footpaths and verges

The proposed cable route will primarily affect existing public roads (BL3). Most of the proposed route will be laid within the local road networks including the R733, L4050 and the L4045. Refer to **Chapter 3** *Proposed Development* for the location and extent of the cable route along the roadway.

The width and length of each road varies, as do the adjoining habitats (See **Photographs 9.1** and **9.2**). Roads are man-made features with minimal ecological value and the usage of existing roads will ensure that ecological effects are minimised. This is a 'mitigation by avoidance' measure.

The roads are bordered by linear habitats, with hedgerows (WL1), which were planted to provide stock-proof barriers and field boundaries, the dominant linear feature along the local roads. Height, width, structure, composition and ecological value varies throughout (See **Photographs 9.11** and **9.12**). In general, the hedgerows are machine cut and over managed which limits their ecological value. The most common species are Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus agg*.), Ash (*Fraxinus excelsior*), Ivy (*Hedera helix*), Gorse (*Ulex europaeus*) and Elder (*Sambucus nigra*). Many occur on raised banks of earth that derived from the excavation of adjoining drainage ditches (FW4). The invasive species Winter Heliotrope (*Petasites fragrans*) is very common along road verges.

Although less common there are examples of well-managed, mature, hedgerow habitats, that provide a range of habitats for invertebrates, birds and mammals. Higher numbers of passerine bird species were noted in these hedges. These higher value sections support older hedgerow trees which are of a greater ecological value due to their potential to provide nesting and roosting habitat.

The disturbances of roadside hedgerows, if it were to occur, could potentially cause disruption to hedgerow root systems. However, most of the hedgerows potentially affected are of a moderate value at a local level and any potential effect can be avoided with proper planning and implementation of mitigation measures.

Photographs 9.11 and 9.12: Variation in the linear hedgerow structures and management encountered along the cable route. Photograph 9.12 shows well-managed, mature, hedgerow habitat, that provides ideal habitat for a range invertebrate, bird and mammal species

Several generally small to moderate sized treelines (WL2) were also recorded along the periphery of roads. Generally, these treelines are composed of native deciduous semi-mature trees such as Ash (*Fraxinus excelsior*). However, several spruce treelines were also noted. There are a small number of woodland habitats adjoining roads along the route.

Examples include a broadleaved woodland (WD1) composed of a mosaic of plantation and naturally occurring mature trees at grid reference N52˚13'30.5", W006˚54'07.0". Treelines and woodland edge of which are of local significance are mapped in the tree survey report which is attached as **Appendix 9.5**.

Modern and older stone walls (BL3/BL1) were recorded along sections of the proposed route. These varied in terms of physical structure and composition (type of stone, presence of mortar), age and the degree of maintenance. These habitats are of low value for wildlife and will either be avoided or rebuilt post construction.

A mature stand of Japanese knotweed was recorded approximately 35m east of the Templars Inn carpark, within a hedgerow habitat located along the road verge. Details on the distribution of invasive species is provided in **Section 9.3.9.7**.

9.3.7 Habitats - Ecological Value

The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 9.1.** It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value). The habitats to be potentially affected by the proposed development and their ecological value are described below in **Table 9.3.**

Table 9.3. Habitats potentially affected by the proposed development and their relative value

Converter Station and Tail Station Site and Adjacent Lands		
Habitat	**Comments**	**Ecological value (NRA guidelines)**
Buildings and artificial surfaces (BL3)	Derelict building. This is a man-made habitat, with low species diversity of minimal ecological value.	Local importance (Lower value).
Recolonising bare ground ED3/ Buildings and artificial surfaces BL3/ Scrub WS1	This is a modified habitat with limited value for local wildlife.	Local importance (Lower value).
Improved agricultural grassland (GA1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Immature woodland (WS2)	This habitat is of a low ecological value at local level and is largely fragmented from similar	Local importance (Lower value).

	habitats in the surrounding landscape.	
Scrub (WS1)	Scrub can be of value to wildlife by providing nesting sites for birds, cover for small mammals and foraging habitat for birds and invertebrates. Birds use scrub to nest or shelter in, birds feed on invertebrates found in scrub and feed on berries from hawthorn, blackthorn, elder, spindle and bramble; they also act as seed dispersers for these shrub species. The berries are particularly important as a source of winter food to both migratory species and resident species.	Local importance (Higher value).
Hedgerow (WL1)/Scrub (WS1)/ Dry meadow and grassy verge (GS2)	Native hedgerows provide habitats for local wildlife such as birds, insects, mammals and commuting routes and nesting habitat. They can also act as linking corridors between habitat patches. Dry meadow and grassy verge (GS2) corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows *(Alopecurus pratensis, Sanguisorba officinalis)* (6510)'. However, the dry meadow and grassy verge habitat within the site is very sporadic and small in size. It does not represent a valuable example of this Annex 1 habitat type.	Local importance (Low to Higher value).
Mixed broadleaved woodland (WD1)/ Scrub (WS1)/ Treeline (WL2)	Of value to wildlife particularly in an intensively farmed landscape.	Local importance (Higher value).
Tidal River CW2/ Earthbank (BL2)	Small heavily modified watercourse.	Local importance (Higher value).
Northern Off-road Area between Great Island and the Campile Estuary		
Habitat	**Comments**	**Ecological value (NRA guidelines)**

Improved agricultural grassland (GA1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Arable crop (BC1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Hedgerow (WL1)/ Treeline (WL2)	Hedgerows, particularly if native, provide important habitats for local wildlife such as birds, insects, mammals and commuting routes and nesting habitat. They also act as linking corridors between habitat patches. Generally, the hedgerows to be impacted are of poor quality. This habitat will be largely unaffected by the proposed works.	Local importance (Higher value).
Dry meadow and grassy verge (GS2) (of insufficient size to be mapped)	Dry meadow and grassy verge (GS2) corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows *(Alopecurus pratensis, Sanguisorba officinalis)* (6510)'. However, the dry meadow and grassy verge habitat within the site is very sporadic and limited in extent. It does not represent a valuable example of this Annex 1 habitat type.	Local importance (Lower value).
Buildings and artificial surfaces (BL3)	Existing farms and buildings. This is a man-made habitat, with low species diversity of minimal ecological value.	Local importance (Lower value).
Mixed broadleaved woodland (WD1) / Treeline (WL2)	Woodland can provide important habitats for local wildlife such as birds, insects, mammals including bats. This habitat also provides ecological corridors between features of higher ecological value. Large mature trees within a woodland habitat are of particular importance as they can provide essential refuge and breeding sites for many species of mammals and birds, as well	Local importance (Higher value).

	as for many invertebrates. By virtue of size, large mature trees provide more food resources and nesting resources than younger trees, in addition, to more protection for flora and fauna from inclement weather.	
Stone walls and other stonework (BL1)/ Spoil and other bare ground (ED2)	Farm tracks are of minimal ecological value. The stone walls vary in terms of physical structure and composition (type of stone, presence of mortar), age and the degree of maintenance. Older and more neglected structures are generally the most important for wildlife.	Local importance (Lower value)
Drainage ditch (FW4)	Man-made habitat associated with hedgerow/treeline habitats. It is a highly modified habitat which provides arterial drainage.	Local importance (Lower value)
Tidal river (CW2)/ Earthbanks (BL2)	The Newtown River acts as a natural wildlife corridor. Otter (Habitats Directive Annex II species) and Kingfisher (Birds Directive Annex I species) were recorded along the Newtown River. The river flows to the River Barrow & River Nore SAC approximately 375m downstream of the proposed crossing point. Tidal rivers correspond approximately to the annexed habitat, 'estuaries (1130)''. However, this is a relatively small stream which has been heavily modified.	Local importance (Higher value).
Campile River Estuary Crossing		
Habitat	**Comments**	**Ecological value (NRA guidelines)**
Tidal rivers (CW2)	The Campile River Estuary is located within the River Barrow and River Nore SAC and therefore is of international importance.	International importance.

Upper salt marsh (CM2)	This habitat is located within the River Barrow and River Nore SAC and therefore is of international importance. The habitat has links to the Annex I habitat 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330)'	International importance.
Mixed broadleaved woodland (WD2)/conifer woodland (WD3)	Woodland can provide important habitats for local wildlife such as birds, insects, mammals including bats. This habitat also provides ecological corridors. Large mature trees within a woodland habitat are of particular importance as they can provide essential refuge and breeding sites for many species of mammals and birds, as well as for many invertebrates. By virtue of size, large mature trees provide more food resources and nesting resources than younger trees, in addition, to more protection for flora and fauna from inclement weather. Badger (*Meles meles*), was recorded within this woodland habitat.	The River Barrow and River Nore SAC (where this habitat is located) is classified as being of international value. However, the habitat itself is relatively common and is not listed as a qualifying habitat for the SAC. Therefore it is classified as being of Local importance (Higher value).
Mixed broadleaved Woodland (WD1)/ Treelines (WL2)/ Hedgerows (WL1)/ Scrub (WS1)	This can provide important habitats for local wildlife such as birds, insects, and mammals including bats. This habitat also provides ecological corridors.	The River Barrow and River Nore SAC (where this habitat is located) is classified as being of international value. However, the habitat itself is relatively common and is not listed as a qualifying habitat for the SAC. Therefore, it is considered to be of Local importance (Higher value).
Improved agricultural grassland (GA1)	This is a highly modified habitat with limited value for local wildlife.	The River Barrow and River Nore SAC (where this habitat is located) is classified as being of international value. However, the habitat itself is not listed as a qualifying habitat for the SAC. Therefore,

		it is considered to be of Local importance (Lower value).
Recolonising bare ground (ED3)/ Scrub (WS1)	A relatively small area of modified habitat.	Although the area in which this species occurred is classified as being of national value (within the Barrow River Estuary boundary), the habitat itself is considered to be of Local importance (Lower value).
Embankment (BL2)	Dominated by grassland with some estuarine species.	The River Barrow and River Nore SAC (where this habitat is located) is classified as being of international value. However, the habitat is not listed as a qualifying habitat for the SAC. Therefore, it is considered to be of Local importance (Lower value).
Baginbun Beach Landfall Site and Car Parking		
Habitat	**Comments**	**Ecological value (NRA guidelines)**
Rocky sea cliffs (CS1) / Sedimentary sea cliffs (CS3)	This habitat occurs within the Hook Head SAC and corresponds to the EU Annex I habitat 'Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)'.	International importance.
Sand shores (LS2)	This habitat occurs within the Hook Head SAC	International importance.
Buildings and artificial surfaces (BL3) / Spoil and bare ground (ED2)	This is a highly modified habitat, with low species diversity and is of minimal ecological value.	Local importance (Lower value).
Improved agricultural grassland (GA1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Arable crop (BC1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Scrub (WS1)	Low-value habitat dominated by bramble.	Local importance (Lower value).
Minor off-road areas adjacent to Roads		
Habitat	Comments	Ecological value (NRA guidelines)
Arable crop (BC1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).

Improved agricultural grassland (GA1)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value).
Cable route within roads, footpaths and verges		
Habitat	Comments	Ecological value (NRA guidelines)
Buildings and artificial surfaces (BL3)/ Stone walls and other stonework (BL1)	This is a highly modified habitat, with low species diversity and minimal ecological value.	Local importance (Lower value).
Hedgerows (WL1)/ Treelines (WL2)	Can provide habitats for local wildlife such as birds, insects, and mammals including bats. This habitat also provides ecological corridors.	Local importance (Higher value).

9.3.8 Flora

The proposed development lies within Ordnance Survey National Grid 10km squares S61, S71, S70 and S80 as detailed below:

- Grid square S61 - proposed converter station site and the western section of cable route
- Grid square S71 - Eastern section of the off-road cable route (as described in **Chapter 3**), the Campile River Estuary crossing and the northern section of the cable route within artificial surfaces i.e. in roads, footpaths and verges.
- Grid square S70 - Southern section of the cable route within artificial surfaces i.e. in roads, footpaths, Lewistown Compound and verges.
- Grid square S80 - Baginbun Beach landfall site.

The NPWS rare plant database notes the presence of the following protected plant species within grid squares S61, S71, S70 and S80 **(Table 9.4)** These species were not recorded within the study area during site surveys. Refer to **Figure 9.13**. Site surveys were conducted during the optimum time period to record these species if present.

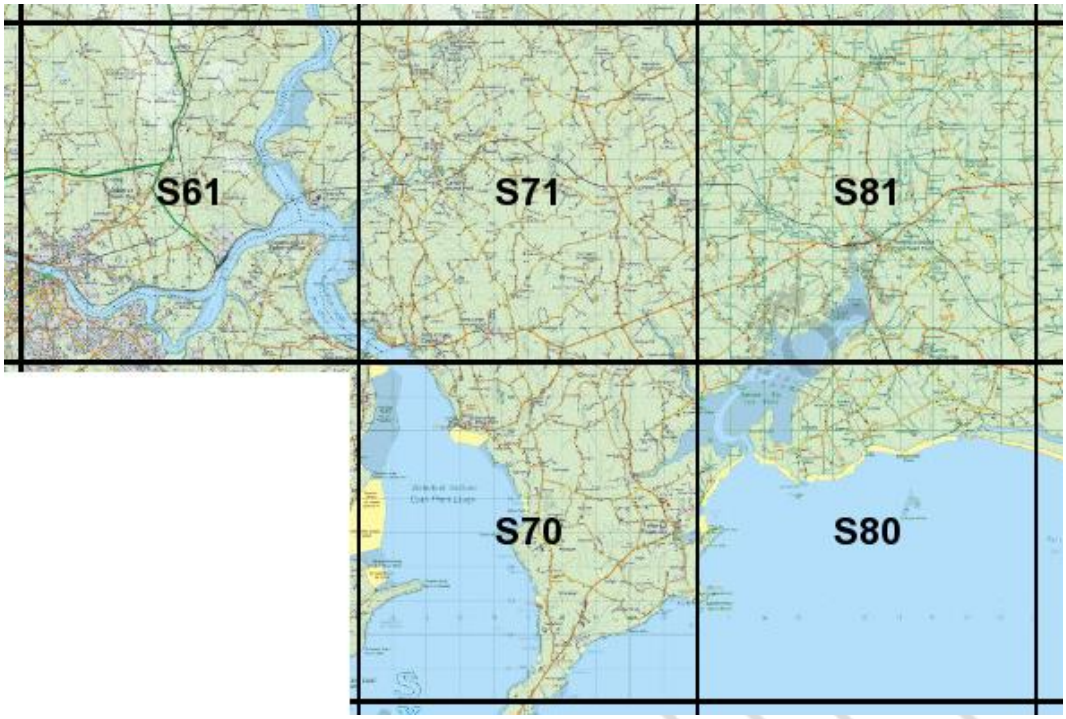


Figure 9.13 10km Grid Zones | source © OSi 2020 | not to scale

Table 9.4: Protected species listed by the NPWS as occurring within grid squares S61, S71, S70 and S80

Grid Square	Flowering plant Species	Latin Name
S61, S71	Tufted Salt-marsh Grass	*Puccinellia fasciculata*
S61	Opposite-leaved Pondweed	*Groenlandia densa*
S61, S71	Meadow Barley	*Hordeum secalinum*
S61, S71, S80	Betony	*Stachys officinalis*
S71, S70	Clustered Clover	*Trifolium glomeratum*
S71	Basil Thyme	*Acinos arvensis*
S70	Penny Royal	*Mentha pulegium*
S70	Lesser Centaury	*Centaurium pulchellum*
S80	Wild Asparagus	*Asparagus officinalis ssp. prostratus*
S80	Cottonweed	*Otanthus maritimus*

The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10km grid squares. Some 796 flowering plants are listed by the NBDC as present in grid squares S61, 745 flowering plants are listed as present in the grid square S71, 686 flowering plants are listed as present in the grid square S70 and 564 flowering plants are listed as present in the grid square S80. **Table 9.5** lists threatened species and designations. Given that the habitat types within the proposed development area are common, no rare species would be expected to occur and no rare species were recorded during the site surveys

Table 9.5: NBDC flowering and endangered flowering plants

Grid Square	Flowering plant Species	Latin Name	Designations
S61, S71	Borrer's Saltmarsh-grass	*Puccinellia fasciculata*	Flora (Protection) Order, 2015. Threatened Species: Vulnerable
S61, S71	Chives	*Allium schoenoprasum*	Flora (Protection) Order, 2015. Threatened Species: Vulnerable
S61, S71	Divided Sedge	*Carex divisa*	Flora (Protection) Order, 2015. Threatened Species: Regionally Extinct
S61, S71	Meadow Barley	*Hordeum secalinum*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S61, S71, S70, S80	Sharp-leaved Fluellen	*Kickxia elatine*	Threatened Species: Endangered
S61	Weasel's-snout/ Lesser Snapdragon	*Misopates orontium*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S71	Betony	*Stachys officinalis*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S71, S70	Clustered Clover	*Trifolium glomeratum*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S71	Little-robin	*Geranium purpureum*	Threatened Species: Endangered
S71	Nettle-leaved Bellflower	*Campanula trachelium*	Threatened Species: Endangered
S70	Corky-fruited Water-dropwort	*Oenanthe pimpinelloides*	Threatened Species: Vulnerable
S70, S80	Henbane	*Hyoscyamus niger*	Threatened Species: Vulnerable
S70	Lesser Centaury	*Centaurium pulchellum*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S70	Pennyroyal	*Mentha pulegium*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S70, S80	Perennial Glasswort	*Sarcocornia perennis*	Flora (Protection) Order, 2015. Threatened Species: Endangered
S70	Wild Clary	*Salvia verbenaca*	Threatened Species: Vulnerable
S80	Corncockle	*Agrostemma githago*	Threatened Species: Regionally Extinct
S80	Cornflower	*Centaurea cyanus*	Threatened Species: Regionally Extinct
S80	Green-winged Orchid	*Orchis morio*	Threatened Species: Endangered
S80	Wild Asparagus	*Asparagus officinalis ssp. prostratus*	Flora (Protection) Order, 2015. Threatened Species: Vulnerable

9.3.9 Fauna

9.3.9.1 Otter (Lutra lutra)

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976-2018, as amended. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I 477 of 2011), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES). Otters are listed as a conservation objective for the River Barrow and River Nore SAC.

Although rare in parts of Europe, they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items.

Spraints are of value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable, the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called “couches” are formed. (NRA, 2005b). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of otters in the centre of Cork and Limerick City. Thus, otters can adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower. A review of existing records within the 10km radius grid squares (S61, S71, S70, S80) showed that otter or signs of otter have been recorded on numerous occasions. Otter activity was recorded near sections of the cable route i.e. at Baginbun Beach, at Cheekpoint and at Barrow Bridge close to the existing Great Island Power Station.

Dixon.Brosnan Environmental Consultants carried out otter surveys at the Campile River Estuary crossing and at Baginbun Beach in 2018 and 2019 within 150m of proposed site works. There is no optimum time period during which to carry out otter surveys.

Higher search effort was focused in areas that typically have a higher probability of otter activity (i.e. mature riparian treelines, bridge abutments, embankments, areas bounded by scrub, open grassy promontories, mud and sand habitat).

Surveys by DixonBrosnan recorded otter spraints at three locations in proximity to the Campile River Estuary. (**Figure 9.14**). A live otter was recorded during a bat survey at Dunbrody Bridge. Fresh otter tracks were noted along Baginbun Beach in March 2019 (**Photograph 9.13**). No holts or couches were recorded in proximity to the proposed site works.

Figure 9.14: Locations of otter spraint (blue shade) near and along the Campile River Estuary | not to scale

Photograph 9.13: Otter tracks recorded on Baginbun Beach

9.3.9.2 Bats

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species:

- Common *Pipistrellus pipistrellus*,
- Soprano *P. pygmaeus* and
- Nathusius' *P. nathusii*,

four *Myotids*:

- Natterer's *Myotis nattereri*,
- Daubenton's *M. daubentonii*,
- whiskered *M. mystacinus*,
- Brandt's *M. brandtii*,

the brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Whiskered and Natterer's bats are listed as 'Threatened in Ireland', while the other species are listed as 'Internationally Important' in the Irish Red Data Book 2: Vertebrates (Whilde, 1993). The population status of both Whiskered and Natterer's bats was considered '*indeterminate*' because of the small numbers known of each, a few hundred and approximately a thousand respectively.

Ireland is considered to be an international stronghold for Leisler's bat, whose global status is described as being at 'low risk, near threatened' (LR; nt) by the IUCN (Hutson, *et al.*, 2001).

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because it has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990s to present.

A review of existing bat records within a 10km radius of the study site (sourced from BCIreland's National Bat Records Database) showed that the Irish bat species listed in **Table 9.6**, have been recorded locally. Other species which have not been included within this database may also occur.

Table 9.6: Presence of Irish bat species recorded along or in proximity to the proposed Greenlink development (NBDC records).

Common name	Scientific name	Presence
Lesser Noctule	*Nyctalus leisleri*	S61, S71
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	S61, S70
Soprano Pipistrelle	*Pipistrellus pygmaeus*	S61, S71
Daubenton's Bat	*Myotis daubentonii*	S61, S71
Natterer's Bat	*Myotis nattereri*	S71
Brown Long-eared Bat	*Plecotus auritus*	S61, S70
Whiskered Bat	*Myotis mystacinus*	S71

While the remaining Irish bat species; Nathusius', Pipistrelle, Brandt's and Lesser Horseshoe Bat have not been recorded in the local area to date, Brown long-eared, Soprano and Common Pipistrelle and Whiskered bat may potentially occur as these species are widespread in the Irish countryside. Natterer's bat and Brandt's bat are rarer Irish species and are less likely to occur. Lesser Horse Bat does not occur in the eastern part of the country.

All bat species are protected under the Wildlife Acts (1976 to 2000, as amended) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS.

Furthermore, on 21st September 2011, the Irish Government published the European Communities (Birds and Natural Habitats) Regulations 2011 which include the protection of the Irish bat fauna and further outline derogation licensing requirements. **Table 9.7** summarises the protection given to bats by national and international legislation and conventions.

Table 9.7. Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
Wildflife Acts (1976 to 2018) as amended	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EU Habitats Directive The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. It also obliges parties to promote national policies for the conservation of wild fauna and natural habitats.
The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

Dixon.Brosnan conducted a bat survey at Dunbrody Bridge (refer to **Figure 9.8** for bridge location).

The focus of the survey was primarily to determine if bats were roosting in the bridge which as under consideration as part of the proposed cable route. The survey was conducted using standard heterodyne bat monitors (Batbox III and Batbox Duet) and an Echo Meter Touch 2 PRO bat detector on the 18th of September 2018. More detail on the methodology and the results of the survey are provided in **Appendix 9.2.** The proposed route will not affect the bridge.

Four species were identified during the emergence survey:

1. Soprano pipistrelle (*Pipistrellus pygmaeus*)
2. Brown Long-eared Bat (*Plecotus auratus)*
3. Daubenton's Bat (*Myotis daubentoni*)
4. Leisler's bat (*Nyctalus leisleri*).

No bats were recorded emerging from Dunbrody Bridge and only low numbers of Soprano pipistrelle, Brown long-eared and Leisler's bat were recorded. These findings suggest that the area in proximity to the bridge has low importance for bats, restricted to a site-specific level of importance only.

A bat survey at an abandoned building was carried out on the 1st of February 2019 (See **Appendix 9.2** and refer to **Figure 9.2).** The former dwelling is located in close proximity to the existing Great Island substation and proposed converter station.

The focus of the survey was primarily to determine if bats were roosting in the building. Therefore, an onsite day-time roost assessment/winter hibernation survey of external and internal structures was undertaken. No signs of bats were recorded within the building. Internally the building has some potential to provide an occasional roosting site for bats but the likelihood of a maternal and hibernation roost being present is low. It is considered unlikely that this building, which will not be directly affected by the proposed development, constitutes a critical resource for bats within the wider landscape.

Impacts on boundary habitats may have adverse effects on the local bat populations utilising the site, as these linear features are valuable in linking roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. A gap in a treeline of greater than 10m may force some species of bats to seek an alternative commuting route.

Bats also often use features such as hedgerows, treelines, woodland edges and waterways as commuting pathways between roosts and foraging areas. Sheltering vegetation, such as treelines and woodland, not only acts as cover from potential predators and the weather, but also provides structure for acoustic orientation and navigation. Sheltered areas also allow insects to gather and therefore support bat forging. Large mature trees are scattered throughout the proposed cable route. These are primarily found within off-road diversion areas. Several large mature trees were recorded within the mixed broadleaved/conifer woodland (WD2) at the Campile River Estuary and within a treeline to the north of the woodland. (**Figure 9.3**).

A tree forms an essential part of an often-complex ecosystem that provides a variety of habitats for a range of different wildlife species, including bats. Exactly which features are most important will depend on the woodland type and the species of bats present.

Although woodlands are used in some way by all Irish bat species, some bat species rely exclusively on trees for roost sites, whilst others use them for part of the year. All Irish bat species are known to forage in woodland and along woodland edges. Any tree can be used as a bat roost, as long as it provides shelter, e.g. in the form of splits, cracks, holes and cavities in the trunk and branches, loose bark and ivy cover. Roosts can be at any height in the tree, although upper trunk and branches are probably more common. Trees such as oak, beech and ash are particularly suitable for bats.

All bat species are nocturnal, resting in dark conditions in the day and emerging at night to feed. Many species of bats are known to sample the light levels before emerging from their roost; only emerging for their night's hunting when the light intensity outside reaches a critical level after sunset (Swift 1980). When bats emerge from roosts early in the evening, they tend not to echolocate but rely on eyesight to fly from the roost to adjoining treelines or hedgerows. Where there is too much luminance near exit points, a bats vision can be reduced resulting in disorientation. Light near a roost access point will delay bats from emerging and shorten the amount of time available to them for foraging. Any delays of emergence can reduce feeding periods and affect the overall survival rate of bats. Bright light may reduce social flight activity and cause bats to move away from the light area to an alternative dark area. Illuminating a bat roost can cause disturbance (Downs et al 2003) and this may result in the bats deserting the roost or even becoming entombed within it (Packman et al 2015). In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats. (Bat Conservation Trust, 2018). In most bat species, there is an evening period of activity followed by another at dawn. These two flights correlate with the peak flight times of nocturnal insect prey. Insects are attracted to light particularly if it is a single light source in a dark area. The effects of artificial lighting on drinking resources for bats has been recorded to be stronger than on foraging (Bat Conservation Trust, 2018). Artificial lighting can also increase the chances of predation. It is believed that Myotis species shun bright light as a predator avoidance strategy. Many avian predators will hunt bats which may be one reason why bats avoid flying in the day. Lighting can be particularly harmful to bat populations along river corridors, woodland edges, along hedgerows and treelines and at lake edges.

Overall, it is concluded that no structures which have the potential to be of value as bat roosts will be affected by the proposed development. The woodland area at the Campile River Estuary has the potential to provide roosting habitat for bats but will not be directly affected. Although indirect lighting due to nightime associated with the HDD works could occur however this woodland area is located 130m from the HDD compound and lights will be faced away from this woodland area. The Campile River Estuary has the potential to provide high value feeding habitat but likewise will not be directly affected. Therefore, potential effects on bats largely relate to limited effects on linear habitats within off road diversion areas and potential effects on individual mature trees.

9.3.9.2 Badger

Badger (*Meles meles*) and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to willfully interfere with or destroy the breeding site or resting place of a protected wild animal.

Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage to this protected species.

The size of the home range of a badger will vary depending on the local habitat, food availability, landscape features and local badger density. A home range may be as small as 30 hectares in a good rural habitat, but as large as 300 hectares in a poor habitat. On average a territory may be around 50 hectares.

Field signs are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where badgers have searched for insects and plant tubers.

Badger surveys were carried out at all of the off-road diversion areas in conjunction with habitat surveys on the 29th March, 20th April, 23rd May, 19th June, 18th of September 2018, 1st February and 24th May and 16th December 2019. The badger surveys were carried adhering to best practice guidance (TII, 2006b; 2008c) and involved a systematic search of all fence lines, woodland and scrub habitats for physical evidence of Badger, e.g. setts, latrines, badger paths.

Several different sett types are recognised and are categorised in **Table 9.8.** Whilst these four sett categories look clear cut, classification can be difficult in the field. Many badger social groups do not have an annex sett, whilst in poor badger habitat, large areas may be searched without finding a main sett.

Table 9.8 Sett Types

Sett type	Definition
Main	Several holes with obvious, large spoil heaps and obvious paths between the sett entrances
Annexe	Generally, less than 150m from the main sett and consisting of several holes. May be used periodically.
Subsidiary	Usually at least 50m from main sett with no obvious paths. May be used intermittently
Outlier	Little spoil and no obvious paths. Intermittent use only

A main badger sett was recorded within the woodland habitat approximately 220m southwest of the northern HDD Campile River Estuary compound **(Figure 9.15** and **Photographs 9.14** to **9.17).** The sett has 10 entrance holes, with large fresh spoil heaps in association with four of the holes. Obvious tracks link each sett entrance hole. Fresh bedding and foraging signs were noted within a small patch of bracken and bramble scrub habitat in immediate proximity to the sett entrances. Numerous badger tracks were recorded in the surrounding landscape. An active annexe sett was recorded approximately 50m west of the main sett along the northern periphery of the woodland habitat. A disused outlier sett was noted along the trackway within the woodland habitat, within 100m of the HDD site. No direct effect on these setts will occur. No other signs of badger were recorded within the proposed works area; however, a young badger was recorded as roadkill on the R733, approximately three kilometres northeast of the most northerly section of the cable route.

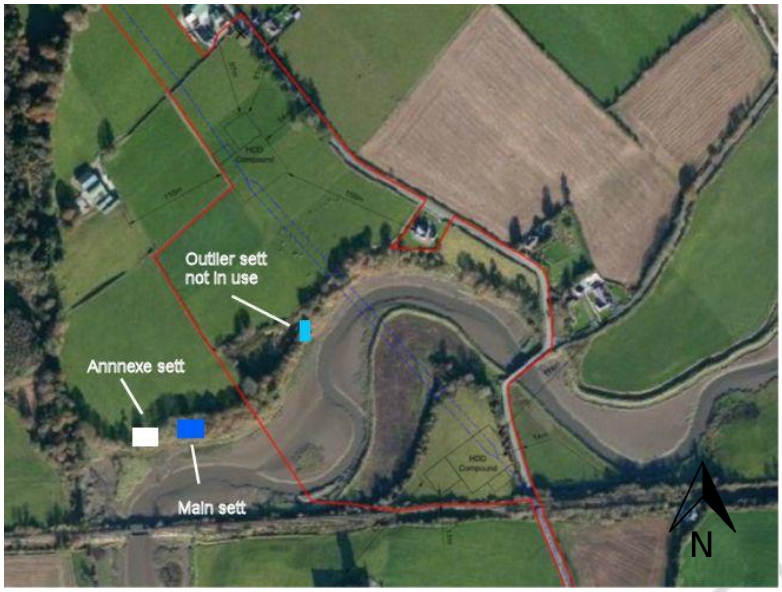


Figure 9.15: Sett Locations | not to scale

Photographs 9.14 to 9.17: Badger signs e.g. Sett entrances holes, pathways and drag marks.

9.3.9.3 Other terrestrial mammals

Seventeen other species of terrestrial mammal have been recorded by the NBDC within the study area, seven of which - Sika Deer, Pygmy Shrew, Hedgehog, Irish Hare, Irish Stoat, Pine Marten and Red Squirrel - are protected under the Irish Wildlife Act 1976 and 2000. Signs of fox were common within the proposed cable route and likewise rabbits are common.

Sika Deer (*Cervus nippon*)

Sika Deer prefer forest with dense understorey, thickets, natural woodlands and commercial plantations, but will also forage in open grassy areas with dense cover nearby. Sika Deer are highly opportunistic feeders, foraging on grasses to a range of shrubs and tree species. They have very large daily range, moving up to 2.5 km per day and are classified as intermediate grazer-browsers due to their highly opportunistic feeding patterns.

Signs of deer were noted approximately 350m southeast of the proposed converter station site, within an arable field. Tracks and an area of flattened vegetation, which may be used as a daytime resting area, were recorded.

Hedgehog (*Erinaceus europaeus*)

Hedgehog can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. Several factors are thought to influence the distribution of hedgehogs in a habitat, with nest sites, food availability and the presence of predators believed to be major contributory factors. Generally, hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas. Due to the habitats recorded within the study area, hedgehog is likely to occur.

Irish hare *(Lepus timidus hibernicus)*

Irish Hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC). Irish hare are adaptable and live in a wide variety of habitats. The species typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover. Irish Hares usually shelter in dense vegetation such as rushes, heather, tall grass and occasionally in hedgerows.

Three individuals, showing possible breeding behaviour, were recorded within the agricultural grassland field within the footprint of the proposed converter station just east of the existing Great Island substation.

Red Squirrel *(Sciurus vulgaris)*

Red Squirrel is listed on Appendix III of the Berne Convention and can be found throughout Ireland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland.

Sightings of live animals have been recorded in the wider landscape (NBDC).

While the majority of the habitats within the proposed cable route are considered sub-optimal for this species, a number of bands of woodland do occur which have higher potential. While no signs of Red Squirrel were recorded, the species could potentially occur.

Pygmy Shrew (*Sorex minutus*)

Pygmy Shrew is common throughout mainland Ireland and prefers habitats such as hedgerows and grasslands and stone walls. While no signs of pygmy shrew were observed this species is likely to occur within the proposed development.

Irish Stoat (*Mustela erminea hibernica*)

Irish stoats occur in most habitats with sufficient cover, including urban areas. Even though no evidence of Irish stout were noted it is likely that stoat will occur in the area given the presence of prey species.

Pine Marten (*Martes martes*)

Pine Marten are habitat specialists, requiring forest or scrub habitat to exist in an area. They are adept at climbing trees as they have powerful non-retractable claws. The species is primarily active at night and individuals live in territories that can vary in size from 50 hectares to 400 hectares.

Males typically have bigger territories than females and there can be partial overlap between adjacent territories.

Pine Marten has been recorded near the onshore cable route as roadkill (NBDC). Due to the habitats recorded within the study area, there is limited potential for Pine Marten to occur.

9.3.9.4 Reptiles (terrestrial) and Amphibians

According to records held by the NBDC, Common Frog (*Rana temporaria)* and Smooth Newt (*Lissotriton vulgaris*) are the only amphibians recorded along the proposed cable route. The species was not recorded during the site visit but there is the possibility of them occurring within the study area.

The Smooth Newt (*Lissotriton vulgaris),* is the only member of the Urodela (the tailed amphibians) found in Ireland. While commonly encountered near water bodies, adult newts are actually terrestrial, only returning to water bodies to breed. They tend to prefer habitats that offer protection from desiccation, such as long grass, woodland and scrubland. Newts will over-winter in refugia such as woodpiles and rotting logs, which offer them some protection from the elements. A single adult Smooth Newt was recorded near the existing Great Island substation in 2018 (NBDC). However, the species was not recorded during site surveys.

The Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands. Due to the habitats recorded within the study area it is likely that Common lizard occurs.

9.3.9.5 Birds

The National Biodiversity Centre online data base lists 129 species of bird recorded within grid square S61, 102 species within S71, 133 species within S70 and 141 species within grid square S80. Of these species, a number are listed under Annex I of the Birds Directive and are Red Listed Birds of Conservation Concern in Ireland (**Table 9.9**).

Table 9.9: Bird species listed under Annex I of the Birds Directive and/or classified as Red Listed Birds of Conservation Concern in Ireland recorded within the proposed development footprint (NBDC records).

Grid Square	Species	Birds Directive Annex	BOCCI
		I	Red List
S61, S71, S70	Barn Owl		X
S61, S71, S70, S80	Bar-tailed Godwit	X	
S61, S71, S70, S80	Black-headed Gull		X
S61, S70, S80	Common Goldeneye		X
S61, S71, S70	Kingfisher	X	
S61, S70	Pochard		X
S61, S71, S70, S80	Redshank		X
S80	Common Tern	X	
S61, S71, S70, S80	Corn Crake	X	X
S61, S70, S80	Dunlin	X	X
S61, S71, S70, S80	Eurasian Curlew		X
S61, S71, S70, S80	Eurasian Wigeon		X
S61, S80	Eurasian Woodcock		X
S61, S71, S70, S80	European Golden Plover	X	X
S70, S80	Great Northern Diver	X	
S61, S71, S70	Grey Partridge		X
S61, S71, S70, S80	Grey Wagtail		X
S61, S71, S70, S80	Hen Harrier	X	
S61, S71, S70, S80	Herring Gull		X
S61, S71, S70, S80	Little Egret	X	
S80	Little Tern	X	
S70	Little Gull	X	
S80	Long-tailed Duck		X
S61, S71, S70, S80	Meadow pipit		X
S71, S80	Mediterranean Gull	X	
S61, S71, S70, S80	Merlin	X	
S61, S71, S70, S80	Northern Lapwing		X

Grid Square	Species	Birds Directive Annex	BOCCI
		I	Red List
S70, S80	Northern Pintail		X
S61, S70, S80	Northern Shoveler		X
S61, S70, S80	Peregrine Falcon	X	
S70, S80	Red-billed Chough	X	
S70, S80	Red-throated Diver	X	
S70, S80	Sandwich Tern	X	
S61, S80	Short-eared Owl	X	
S61, S71	Tufted Duck		X
S61, S80	Whooper Swan	X	
S61, S71, S70, S80	Yellowhammer		X

Surveys for general bird usage were carried out in conjunction with habitat surveys within the entire development footprint on the 29th March, 20th April, 23rd May, 19th June, 18th of September 2018, 1st February and 24th May and 16th December 2019.

All birds utilizing habitats within the proposed development footprint and in proximity to it were recorded (See **Figure 9.16**) Specific breeding bird and Barn Owl and winter bird surveys were also carried out and these are discussed separately below.

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the proposed development footprint which were recorded during habitat surveys are shown in **Table 9.10**.

Table 9.10: Bird Species recorded during site surveys

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
Phalacrocorax carbo	Cormorant					X
Numenius arquata	Curlew		X		X	
Limosa limosa	Black-tailed Godwit					X
Tringatotanus	Redshank				X	
Tringa nebularia	Greenshank					

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
Anas penelope	Wigeon		X	X	X	
Anas crecca	Teal		X	X		X
Anas platyrhynchos	Mallard		X	X		
Sturnusvulgaris	Starling					X
Saxicolatorquata	Stonechat					X
Corvus corax	Raven					
Erithacus rubecula	Robin					X
Alcedo atthis	Kingfisher	X				X
Larus ridibundus	Black-headed Gull				X	
Streptopelia decaocto	Collared Dove					
Larus marinus	Great black-backed Gull					X
Accipiter nisus	Sparrowhawk					X
Larus argentatus	Herring Gull				X	
Vanellus vanellus	Lapwing		X		X	
Haematopus ostralegus	Oystercatcher					X
Pyrrhocorax pyrrhocorax	Chough	X				X
Anthus pratensis	Meadow Pipit				X	
Carduelis chloris	Greenfinch					X
Passer domesticus	House Sparrow					X
Turdus merula	Blackbird					
Regulusregulus	Goldcrest					X
Phasianus colchicus	Pheasant					
Prunella modularis	Dunnock					
Carduelis carduelis	Goldfinch					
Troglodytes troglodytes	Wren					
Ardea cinerea	Grey Heron					
Pyrrhula pyrrhula	Bullfinch					
Corvus frugilegus	Rook					
Corvus monedula	Jackdaw					
Pica pica	Magpie					
Columba palumbus	Woodpigeon		X	X		
Fringilla coelebs	Chaffinch					
Corvus cornix	Hooded Crow					

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
Parus caeruleus	Blue Tit					
Hirundo rustica	Barn Swallow					X
Riparia riparia	Sand Martin					X
Motacilla cinerea	Grey Wagtail				X	
Motacilla alba yarrellii	Pied Wagtail					
Buteo buteo	Buzzard					
Aegithalus caudatus	Long-tailed Tit					
Parus major	Great Tit					
Turdus philomelos	Song Thrush					
Parus ater	Coal Tit					
Anthus petrosus	Rock Pipit					
Columba livia	Rock Dove		X			
Branta bernicla hrota	Light-bellied Brent Goose		X			X
Columba livia f. domestica	Feral Pigeon					

Symbol	Description
I	*Annex 1: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.*
II	*Annex 2: bird species can be hunted. However, the hunting periods are limited, and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.*
III	*Annex 3: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.*

At a meeting in 2018 the NPWS noted the following:

- A number of Peregrine Falcon roosts in the wider area along the route
- A Peregrine Falcon box within the Great Island power station site is used by a juvenile
- Whooper Swan using fields close to an unfinished housing estate in Ballinruan
- Golden Plover use fields to the north of the route at Fisherstown
- Shanacloon Wetland, to the west of the cable route, is used by wintering wildfowl

- There are records of at least one Hen Harrier frequenting the Campile Estuary area

Given the limited potential for disturbance for works along roads and the distance involved, no impact on peregrine falcon roosts, whooper swans, golden plover or Shanacloon Wetland will occur. Given the existing levels of noise and disturbance at the Great Island Power Station no impact on the juvenile Peregrine Falcon using the nest box will occur. Hen Harrier were not recorded by DixonBrosnan surveys and the use of HDD methodology will prevent any impacts from occurring.

Overall, the proposed cable route is of local value for terrestrial bird species that are relatively common in the Irish countryside. There are no terrestrial features or habitats of particular value, which would differentiate the habitats along the cable routes and the off-road diversion areas from large areas of similar habitat in the surrounding countryside.

The presence of a watercourse i.e. Newtown River and Campile River, does provide additional habitat for more specialised species such as Kingfisher (*Alcedo atthis*). Kingfisher is listed on Annex I of the EU Birds Directive and Appendix II of the Bern Convention. The species is Amber-listed in Ireland and BirdLife International has evaluated the European population as depleted, due to a moderate historical decline.

Kingfishers prefer still or gently flowing water with plenty of small fish, and with reeds, rushes or shrubs on the banks for perches. Streams, small rivers, canals and ditches are favoured to open waterbodies, but it also uses lakes, ponds and flooded gravel pits. Egg-laying occurs from March to July. Suitable banks for nesting are required in breeding season, but nest-sites can be over 250 m from foraging waters and can occur infrequently in walls, rotten tree stumps, concrete tunnels in canal banks, or in the burrow of Sand Martin (*Riparia riparia*). Suitable Kingfisher nesting banks are generally tall vertical banks with soft material into which they can dig their burrows.

The size of a kingfisher territory depends on the amount of food available, and on the bird population in the area. Territories tend to cover at least one kilometre of river, but may extend over 3-5 km. Any nearby waterbody that provides good fishing will be included in the territory. Kingfishers may be found along streams of all kinds, lakes and ponds and tend to be more coastal in winter, where they may be seen in estuaries, rocky seashores and harbours.

Breeding Kingfisher has been recorded in the wider area (NBDC). A kingfisher was recorded at the Newtown River approximately 150m upstream of the proposed open cut crossing point. No potential kingfisher nesting habitat was recorded within 150m of the crossing point or of the proposed discharge point from the converter station attenuation pond.

Choughs are a corvid species primarily associated with coastal areas. They are amber listed species under Birdwatch Ireland's Bird of Conservation Concern in Ireland (BWI BoCCI), afforded statutory protections under the Irish Wildlife Acts and the EU Birds Directive (Annex I). This species was recorded in flight approximately 150m from the proposed HDD site at Baginbun Beach. No feeding habitats of particularly high value for this species was recorded within the development footprint and no potential breeding habitat will be affected.

Breeding Bird survey

The NPWS noted at a meeting in 2018 that a Black Guillemot breeding area is located at Baginbun Headland (both sides of the Martello Tower) approximately 400m from the landfall site at Baginbun Bay. Given the distance involved no impact on this species will occur.

Specific breeding bird surveys were carried out by Dixon.Brosnan on the 23rd May 2018 and 19th June 2018**.** The survey methodology utilised a scaled down version of the British Trust for Ornithology's (BTO) Common Bird Census (CBC) Technique (Bibby et al., 2000 & Gilbert et al., 1998), with aspects of species-specific survey methodologies employed where required (Gilbert et al., 1998).

All bird species encountered during the survey were mapped and coded using standard BTO 'Species Codes' and 'Categories of Breeding Evidence' e.g. singing male, agitated behaviour, carrying food, recently fledged downy young. No attempts were made to locate nests as bird behaviour is generally sufficient to determine probable or confirmed breeding.

The habitats within the development footprint are dominated by habitats which are not of significant value for uncommon bird species. Works at the Lewistown compound, along the cable route and at the HDD site (Campile River Estuary crossing and Baginbun Beach) will be short in duration and whilst there may be short-term disturbance/ displacement during the works period the impact on birds is predicted to be imperceptible. However more detailed breeding bird surveys were considered necessary where works will be longer in duration and habitat removal will be permanent. Thus, a breeding bird survey was carried out at the proposed converter station. Due to presence of sea cliffs at the landfall site at Baginbun Beach, a breeding bird survey was also considered necessary here.

Kingfisher were recorded along the Newtown/Kilmmanock River however no suitable breeding habitat was recorded during site surveys. Kingfisher were also recorded during winter bird counts at the Campile River Estuary but no suitable breeding habitat was recorded. Therefore, no specific breeding surveys for this species was considered necessary.

To summarise the breeding bird survey was undertaken at two locations as indicated in **Figure 9.16**:

(1) proposed converter station location within agricultural fields and

(2) Baginbun beach - on the beach front and adjoining roadside.

Figure 9.16: Breeding bird survey (Converter site and Baginbun Beach) routes outlined in red | not to scale

A total of 25 species were recorded within the proposed converter station site while 28 species were recorded from the Baginbun Beach survey site. Of these species a total of 15 species i.e. Wren, Magpie, Dunnock, Blackbird, Robin, Great tit, Blue tit, Goldfinch, Herring Gull, Greater Black-backed Gull, Rook, Hooded Crow, Woodpigeon, Starling and Barn Swallow were recorded from both sites.

A full list of bird species recorded during the 2018 surveys is provided in **Table 9.12** (refer to **Table 9.11** for the relevant BTO breeding bird survey codes). More detail on the methodology and the results of the survey are provided in **Appendix 9.3.**

Table 9.11 British Trust for Ornithology breeding bird survey codes

Breeding status	Confirmed breeder (Br)	Probable breeder (Pr)	Possible breeder (Po)	Non-breeder (N)
Observed behaviours	Distraction-display or injury feigning (DD)	Pair in suitable nesting habitat (P)	Observed in suitable nesting habitat (H)	Flying Over (F)
	Used nest or eggshells found from current season (UN)	Permanent Territory (T)	Singing Male (S)	Migrant (M)
	Recently fledged young or downy young (FL)	Courtship and Display (D)		Summering non-breeder (U)
	Adults entering or leaving nest-site indicating occupied nest (ON)	Visiting probable nest site (N)		
	Adult carrying faecal sac or food for young (FF)	Agitated Behaviour (A)		

	Nest containing eggs (NE)	Brood patch of incubating bird (I)		
	Nest with young seen or heard (NY)	Nest Building or excavating nest-hole (B)		

Table 9.12 Breeding bird survey results

Proposed Converter Station and Tail Station Site				
Bird species	**Breeding status**	**Estimated No. of Pairs**	**No. Birds recorded per visit**	
			23/05/2018	**19/06/2018**
Wren	Br - FF	3 - 4	8	7
Magpie	Pr - P	1	1	2
Dunnock	Po - S	1 - 2	3	1
Blackbird	Po - S	2	4	2
Whitethroat	Br - FF	2	1	2
Robin	Br - FL	1 - 2	4	3
Great tit	Po - S	1	1	1
Blue tit	Po - H	1	2	1
Raven	N - F	0	1	0
Goldfinch	N - F	0	6	7
Chaffinch	Pr - P	1 - 2	4	4
Bullfinch	Po - H	1	1	2
Linnet	Po - H	1	0	2
Herring Gull	N-F	0	3	5
Greater Black-backed Gull	N-F	0	0	2
Rook	N-F	0	17	36
Hooded Crow	N-F	0	2	5
Woodpigeon	Po - H	1	2	1
Feral pigeon	N-F	0	0	7
Little egret	N-F	0	1	1
Starling	N-F	0	0	1
Barn Swallow	N-F	0	4	5
Chiffchaff	Po - S	0 - 1	0	1
Willow warbler	Po - S	0 - 1	0	1
Pheasant	Po - H	1	3	1
Baginbun Beach / Proposed Landfall Site/ Car Parking Area				
Bird species	**Breeding status**	**Estimated No. of Pairs**	**No. Birds recorded per visit**	
			23/05/2018	**19/06/2018**

Wren	Po - S	1 - 3	3	1
Magpie	N - F	0	1	0
Dunnock	Br - FL	1 - 2	3	0
Blackbird	Pr - P	2 - 3	6	3
Robin	Br - FL	2	2	2
Great tit	Po - H	0 - 1	1	1
Meadow pipit	Po - S	1 - 2	2	1
Rock pipit	Br - FL	2	4	1
Chough	N - F	0	1	0
Pied wagtail	Br - FL	1	2	3
House sparrow*	Br - ON	1 - 10	31	53
Blue tit	Po - S	0 - 1	0	1
Goldfinch	Po - S	0 - 2	7	3
Greenfinch	N - F	0	1	0
Reed bunting	Po - S	0 - 1	0	1
Herring Gull	N - F	0	13	4
Greater Black-backed Gull	N - F	0	1	3
Lesser Black-backed Gull	N - F	0	2	0
Cormorant	N - F	0	2	1
Rook	N - F	0	6	2
Hooded Crow	N - F	0	2	1
Jackdaw	N - F	0	2	3
Woodpigeon	N - F	0	21	15
Sparrow hawk	N - F	0	1	0
Sand martin	Pr - N	0 - 2	0	4
Stonechat	Br - FL	1	0	2
Starling*	Br - ON	1 - 2	8	0
Barn Swallow	N - F	0	5	0
Notes	** House sparrows and Starling largely concentrated around area to northwest of Baginbun Beach. Private dwelling with large number of bird feeders within garden. Both species seen entering gap below tiles.*			

At the proposed converter station site, it was estimated that three species are definitely breeding, a further two are probably breeding, 10 are possibly breeding, while the remaining 10 species are non-breeding. At Baginbun Beach, it was estimated that seven species are definitely breeding, a further two are probably breeding, six are possibly breeding, while the remaining 13 species are non-breeding.

Species recorded as breeding or potentially breeding during the survey period included resident species such as Wren, Robin, Rock pipit, Stonechat and House sparrow, and breeding migrants, including Sand Martin, Chiffchaff, Willow Warbler and Whitethroat

The two Annex I species recorded, namely Chough and Little Egret, both were recorded as non-breeders.

Although Chough were not recorded breeding within the study area they are likely to be breeding within the wider landscape as there are suitable cliff faces within the wider landscape. Choughs commonly build their nests on ledges in crevices and caves of coastal cliffs. No high value feeding or nesting habitat for Little Egret was recorded within the proposed development area.

Overall, the study area provides widespread breeding and foraging habitat and supports a diverse bird population. Most of the species recorded during the surveys are generally considered to be common and widespread. The most important habitats within the study area that provide resources for local populations of breeding species are less intensively managed and include scrub, hedgerows, treelines, woodland and coastal cliffs and crevices with ledge vegetation mosaics.

No significant populations of breeding birds were recorded within the survey area and most of the species recorded are common and widespread within the county although a few species were noted to be Red and Amber listed. The nature conservation value of the breeding bird assemblage onsite is of local value.

None of the species recorded during breeding bird surveys are listed as qualifying interests for the Bannow Bay SPA or as a trigger species for the Bannow Bay IBA.

Barn Owl survey

The NPWS noted at a meeting in 2018 that there are records of Barn Owl using the abandoned building to the south of the converter station site.

Dixon.Brosnan carried out a Barn owl (*Tyto alba*) survey at an abandoned and derelict old building in close proximity to the existing Great Island substation and proposed converter station site location. The survey was carried out on the 1st of February 2019 **(See Appendix 9.3).**

The focus of the survey was to determine if barn owl use the building. Therefore, an onsite day-time building visual inspection of external and internal structures was undertaken.

The survey followed the guidelines set out in '*Barn Owl Surveying Standards for National Road Projects*' (Transport Infrastructure Ireland (TII) Publications, 2017) and '*Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting'* (Shawyer, 2011).

Although barn owl nest verification surveys are best undertaken during the breeding season, they can also be conducted successfully by experienced barn owl ecologists after the owls have vacated their nest site, during the late autumn and winter months.

Barn owl activity was not recorded at the abandoned and derelict old building and the site was deemed to be unoccupied during the survey period and probably during the previous breeding season.

There was no evidence (i.e pellets, white-wash and moulted feathers) of barn owl observed during the day time inspection in and around the building. Although the building provides potential nesting opportunities no evidence of barn owl presence was recorded.

Winter bird surveys

Winter bird surveys were carried out in 2015/2016, and again in 2018/2019 at Baginbun Beach and the Campile River Estuary. The same vantage points were used during both survey periods. More detail on the methodology and the results of the survey are provided in **Appendix 9.4.**

Winter bird surveys 2015 to 2016

Winter bird counts were carried out by Dixon.Brosnan in 2015/2016 season in order to assess winter bird usage of potential landfall sites at Booley Bay, Boyces Bay and Baginbun Bay. An additional site (Sandeel Bay) was added in December 2015. Subsequently, Baginbun Bay was selected as the landfall site and thus only the data from this location is assessed below (See **Figure 9.17**)

The initial winter bird surveys were undertaken on six dates between November 2015 and March 2016. The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert et al. (1998).

The winter bird survey was undertaken using Nicon ProStaff-7 10X42 binoculars and a Safari 20-60 X 80 spotting scope. Ninety-minute counts were undertaken at either high tide, mid tide or low tide. Tides and weather conditions for each day were recorded.

Many of these birds were recorded overflying the channel as the surveys cover a radius of approximately 300m from each vantage point. Trawlers fishing for sprat offshore attracted large numbers of sea birds and seals. Thus, during the periods when trawlers were present numbers were elevated above the expected normal level. A total of 48 bird species were recorded during the site surveys. Two species listed as qualifying interests for the Bannon Bay SPA i.e. Oystercatcher and Redshank, were recorded at Baginbun Beach. Both were recorded in low numbers.

None of the waterbirds recorded by vantage point counts at Baginbun Bay were recorded in high numbers and numbers were low in-comparison to the figures which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical population of a migratory species). More detail on the methodology and the results of the survey are provided in **Appendix 9.4.**

Figure 9.17: Vantage point locations for the winter bird counts | not to scale

Winter bird surveys 2018 to 2019

A winter bird survey was also carried out Dixon.Brosnan on six separate occasions; from October 2018 to March 2019 (refer to **Appendix 9.4**). The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert et al. (1998) and the low tide waterbird surveys (Lewis, L. J. et. al. 2014). The winter bird survey was undertaken using 8.5×45 binoculars and a Swarovski ATX30-70x95 spotting scope. Ninety-minute counts were undertaken at each survey location at either high tide, mid tide and low tide. The scope of the survey was informed by the previous winter bird surveys, and also the selection of the preferred landfall site at Baginbun Beach.

The survey was focused on the following areas and the data gathered was used as a factor in determining the preferred cable route during the design process:

- The coastal waters and beach at Baginbun Beach which is the landfall location;
- A proposed cable crossing of the Campile River Estuary south of the railway line;
- A proposed cable crossing of the Campile River Estuary north of the railway line (This has been spilt into two vantage point locations due to sightlines):
    - North of the railway line
    - West of Dunbrody Bridge.

The survey locations were based on information gathered during the original site walkover and the location of the proposed works. Boundaries of the count areas were selected primarily to delineate patches of relatively homogenous habitat within the study area to compare bird usage of these habitats and spatial areas; but were also selected to be easily perceived by the observer. This was done by use of sight-lines to prominent landmarks such as permanent marker buoys, coastal features and features on the horizon. Survey vantage point locations for the winter bird counts are shown in **Appendix 9.4.**

Where possible the survey covered a radius of approximately 300m from the landfall site at Baginbun and the HDD site at the Campile River Estuary. A radius of 300m was used based on information by Borgmann (2011) stating that establishing set-back distances of 250 m from waterfowl, diving ducks, wading birds, and shorebirds may lessen the impacts to the most sensitive species. In addition, in most instances a visual stimulus will create a disturbance effect before any associated noise starts to have an effect e.g. a flight response might be expected by many species if approached to within c. 100-150m across a mudflat (Cutts et. Al, 2013).

A total 26 species were recorded from the site visits during the winter bird survey as detailed below in **Table 9.13**. Seven species were recorded within all three survey sites i.e. Black-headed Gull, Little Egret, Curlew, Black-tailed Godwit, Greenshank, Redshank and Teal.

Table 9.13: Species recorded during the winter bird surveys, along with their conservation status

		Birds Directive Annex			BOCCI		European Birds of Conservation Concern - Ireland		
Species		I	II	III	Red List	Amber List	SPEC 1	SPEC 2	SPEC 3
Larus ridibundus	Black-headed Gull				X				
Limosa limosa	Black-tailed Godwit					X	X		
Larus canus	Common Gull					X			
Phalacrocorax carbo	Cormorant					X			
Numenius arquata	Curlew		X		X		X		
Calidris alpina	Dunlin	X			X				X
Larus marinus	Great black-backed Gull					X			
Gavia immer	Great Northern Diver	X				X			
Tringa ochropus	Green Sandpiper								
Tringa nebularia	Greenshank								
Ardea cinerea	Grey Heron								
Uria aalge	Guillemot					X			
Larus argentatus	Herring Gull				X			X	
Alcedo atthis	Kingfisher	X				X			X
Larus fuscus	Lesser black-backed Gull					X			
Egrettagarzetta	Little Egret	X							
Tachybaptus ruficollis	Little Grebe					X			
Falco columbarius	Merlin	X				X			
Haematopus ostralegus	Oystercatcher					X	X		

		Birds Directive Annex			BOCCI		European Birds of Conservation Concern - Ireland		
Species		I	II	III	Red List	Amber List	SPEC 1	SPEC 2	SPEC 3
Alca torda	Razorbill					X	X		
Tringatotanus	Redshank				X			X	
Gavia stellata	Red-throated Diver	X				X			X
Phalocrocorax aristotelis	Shag					X		X	
Gallinago gallinago	Snipe		X	X		X			X
Anas crecca	Teal		X	X		X			
Arenaria interpres	Turnstone								
Anas penelope	Wigeon		X	X	X				

Only one Special Protection Area (Bannow Bay SPA, Site Code 004033) is deemed relevant to the proposed development. A total of five species listed as qualifying interests for the Bannow Bay SPA were recorded utilising the survey sites, namely, Dunlin, Curlew, Black-tailed Godwit, Oystercatcher and Redshank. Two species listed as qualifying interests were recorded at Baginbun Beach i.e. Redshank and Oystercatcher while four species were recorded in proximity to the Campile River Estuary crossing i.e. Redshank, Curlew, Dunlin and Black-tailed Godwit. None of these species were recorded in high abundance which would be considered important at a national level.

The peak numbers recorded by Dixon.Brosnan during the 2018/2019 winter bird survey represent a fraction of the mean peak number of these species within the SPA during the baseline period (1995/96 – 1999/00). The survey area for the SPA, which was used during the baseline period and the survey area used by Dixon.Brosnan for winter bird surveys do not coincide as the surveys carried out by DixonBrosnan focused on smaller, specific areas of particular relevance to this project whereas baseline surveys assess the overall value of the SPA for wintering bird species from different count locations. Although a direct comparison is not possible, the baseline data provides a benchmark for the birds recorded during DixonBrosnan surveys.

The peak number for each species represented as a percentage of the mean peak for each species during the baseline period was calculated as follows:

- Dunlin - <1%
- Curlew – 2.5%
- Black-tailed Godwit – 5.9%
- Oystercatcher - <1%
- Redshank – 6.9%

Overall, six Annex I bird species were recorded i.e. Little Egret, Dunlin, Kingfisher, Merlin, Red-throated Diver and Great Northern Diver. Six Red Listed species were recorded, namely Black-headed Gull, Herring Gull, Redshank, Wigeon, Dunlin and Curlew. Merlin was recorded roosting at Baginbun Head on a single occasion.

The mudflat habitat along the Campile River estuary is of local value for waders e.g. Curlew, Black-tailed Godwit, Greenshank and Redshank all of which were recorded during the winter bird survey. A high tide roost of Redshank was recorded south of the railway, along the riverbank.

The NPWS noted at a meeting in 2018 that Razorbill, Shag, Fulmar and Guillemot occur in the vicinity of the landfall at Baginbun Beach. Three of these species namely Razorbill, Shag and Guillemot were recorded however numbers were relatively low.

Overall, none of the waterbirds recorded by vantage point counts were recorded in high numbers and numbers were low in-comparison to the figures which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical

population of a migratory species). The results were also consistent with the previous 2015/ 2016 surveys.

9.3.9.6 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists several high impact invasive species which have been recorded within grid squares S61, S71, S70, S80 (**Table 9.14**).

Table 9.14: NBDC list of high impact invasive species.

Grid Square	Common Name	Latin Name
S61	Chinese Mitten Crab	*Eriocheir sinensis*
S61, S71	Canadian Waterweed	Elodea canadensis
S61, S71, S70, S80	Cherry Laurel	*Prunus laurocerasus*
S61, S71, S70, S80	Common Cord-grass	Spartina anglica
S71, S70	Giant-rhubarb	Gunnera tinctoria
S61		*Fallopia japonica x sachalinensis = F. x bohemica*
S61	Giant Knotweed	Fallopia sachalinensis
S61, S70	Indian Balsam	Impatiens glandulifera
S61, S71, S70, S80	Japanese Knotweed	*Fallopia japonica*
S61	New Zealand Pigmyweed	Crassula helmsi
S61, S71, S70, S80	Rhododendron	Rhododendron ponticum
S61, S71, S70, S80	Brown Rat	*Rattus norvegicus*
S61, S71, S70, S80	American Mink	*Mustela vison*
S61, S71, S70	Eastern Grey Squirrel	Sciurus carolinensis
S71	Feral Ferret	Mustela furo
S61, S71	House Mouse	Mus musculus
S61	Sika Deer	*Cervus nippon*

The non-native and invasive species Japanese Knotweed (*Fallopia japonica*) was recorded in proximity to the proposed works area. Rhododendron (*Rhododendron ponticum*) were recorded in proximity to and within the proposed works area.

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed, Himalayan balsam and Rhododendron, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. Regulation 49 deals with the '*Prohibition on introduction and dispersal*' while Regulation 50 deals with the '*Prohibition on dealing with and keeping certain species*'. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50.

The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

There is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland. Rhododendron, Three Cornered Leek and Japanese Knotweed are listed under the *3rd Schedule: Part 1 – Plants; Non-native species subject to restrictions under Regulations 49 & 50*.

The non-native and invasive species Japanese Knotweed (*Fallopia japonica*), Rhododendron (*Rhododendron ponticum*) and Three Conered Leek (*Allium triquetrum*) were recorded within or in proximity to the proposed works area. All three species are listed on both the "Most Unwanted: Established Threat" and on the "High Risk: Recorded Species" list compiled by Invasive Species Ireland a joint initiative by the Northern Ireland Environment Agency and NPWS. All invasive species listed are also included in the NRA Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads (NRA, 2010) as these species have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes. The location of Japanese knotweed, Three Cornered Leek and Rhododendron within or in proximity to the proposed development area is shown in **Figures 19** to **21**. The Amber listed species Winter Heliotrope was recorded within the works area and is ubiquitous along roadside verges in this area and was too prevalent to effectively map.

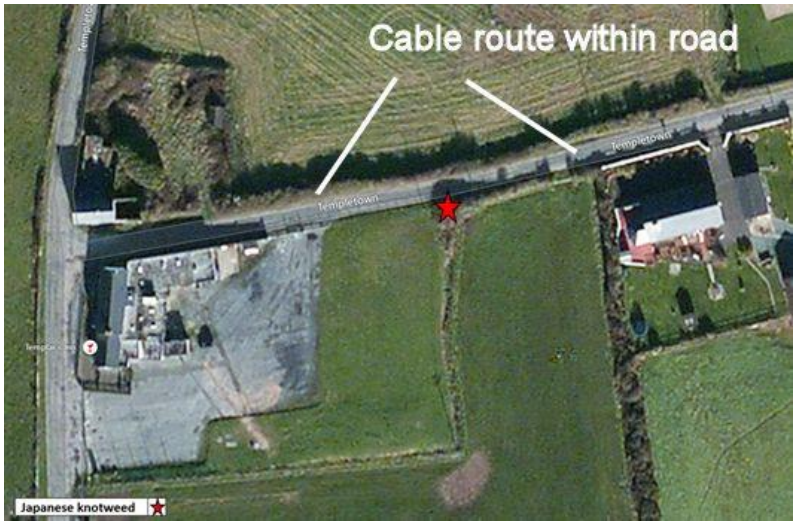


Figure 19. Location of the high-risk invasive species Japanese knotweed. A mature stand of Japanese knotweed was recorded approximately 35m east of the Templars Inn carpark, within a hedgerow habitat along the road verge (grid reference N52˚10'49.0", W006˚53'37.1"). The cable trench will be constructed in the road to the north of this hedgerow

Figure 20: Location of Rhododendron| not to scale. Rhododendron was recorded growing within the understory of woodland and treeline/ hedgerow habitats at various locations within and in proximity to proposed works, at the Campile River Estuary Crossing.

Figure 21: Location of Three-cornered Leek | not to scale This species was recorded approximately 86m from the proposed car parking area, which is the closest point of the proposed development at Baginbun Beach

Japanese Knotweed (*Fallopia japonica*)

Japanese knotweed is a highly invasive, non-native species which was originally introduced as an ornamental plant but has since spread along transport routes and rivers to become a serious problem. From an ecological viewpoint it out-competes native species by forming dense stands which suppresses growth of other species. It grows extremely vigorously and can penetrate through small faults in tarmac and concrete and thus can damage footpaths, roads and flood defence structures. As it can survive in poor quality soils, including spoil, it often thrives in brownfield sites and in urban areas. The key features of the plant are summarised below:

- Produces fleshy red tinged asparagus like shoots when it first breaks through the ground in an established stand;
- Has large, heart or spade-shaped green leaves which are approximately the size of your hand;
- Has leaves arranged in a zig-zag pattern along the stem;
- Grows up to 3 metres in height;
- Yellow / cream flowers in late summer (Typically the start forming from late July onwards);
- Hollow bamboo like stems which have distinctive ring like nodules at regular intervals along it;
- Brown stem remain in winter once it has died back;
- Extensive rhizome system (roots) (7m radius x 3m depth approximately);
- Orange centred rhizome; and
- Spread entirely via the movement of plant and rhizome fragments.

The plant has woody underground rhizomes which can extend seven metres laterally from a parent plant. The leaves and stems die back during winter, but growth is extremely rapid during spring. The plants spread mainly through fragments of rhizomes - as little as 0.7g of material or the size of a small fingernail is sufficient, and through cut stems. Stem material cannot regenerate once it has dried, but rhizome material may be viable for up to 20 years in the soil. Thus, control of this species is very difficult. The key characteristics of this species are shown in **Figure 9.21.**

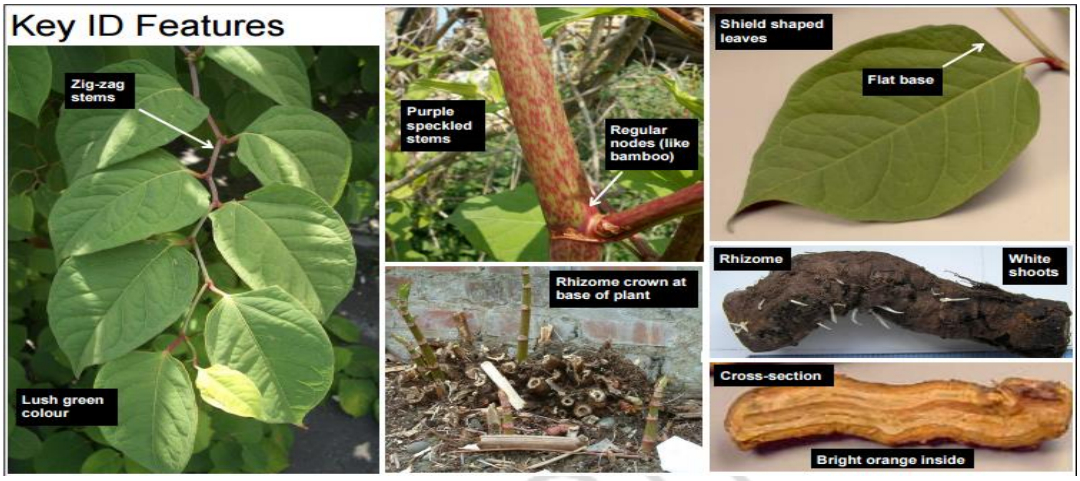


Figure 9.21 Key features of Japanese knotweed

Rhododendron *(Rhododendron ponticum)*

Rhododendron is listed on both the "Most Unwanted: Established Threat" and on the "High Risk: Recorded Species" list compiled by Invasive Species Ireland a joint initiative by the Northern Ireland Environment Agency and NPWS.

Under the right ecological condition, Rhododendron can become a highly invasive and once it has invaded an area, few native plants survive. Rhododendron can regenerate via seeds, suckers or rootlets. It forms extensive dense thickets which cast a very deep shade, leading in woodland to loss of ground flora, epiphytic bryophytes and lichens, modifying the fauna and preventing regeneration of trees. In addition to the effect of shade, it may produce biochemicals which can affect other plants, inhibiting the germination or seedling establishment of other species. There is also evidence for the prevention of mycorrhizal development in the roots of seedlings of competing plant species. *R. ponticum* is identified as a serious threat to upland oakwood. It is also identified as a threat for several lower plants and fungi including *Acrobolbus wilsonii, Arthothelium macounii, Lejeunea mandonii*. The characteristics of this species are illustrated in **Figure 9.22**.

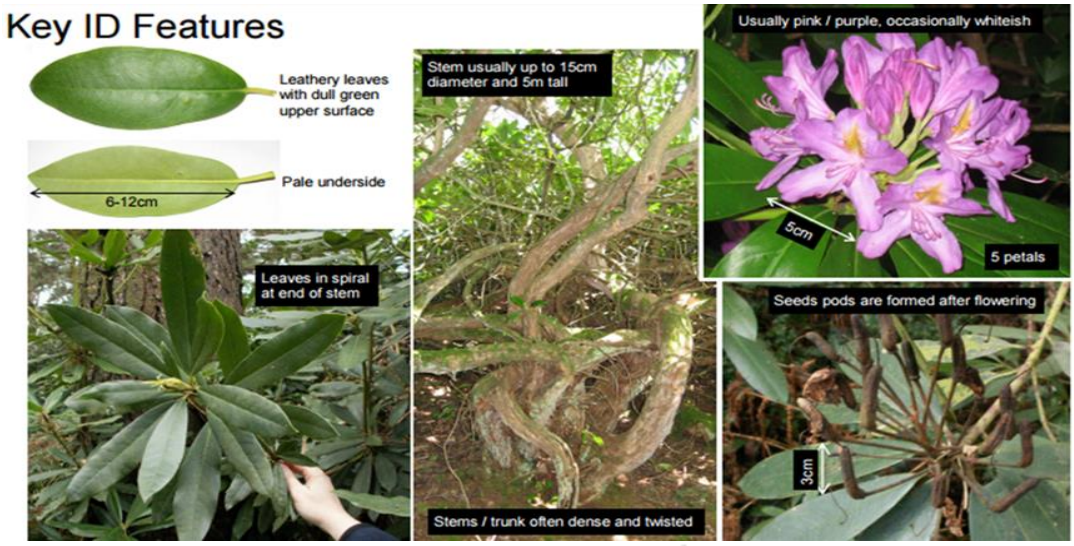


Figure 9.22: Key features of Rhododendron

Three-cornered leek (*Allium triquetrum*

Three-cornered leek (*Allium triquetrum*), a species also listed under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011, was also recorded near the works area. Three-cornered leek is known to have serious impacts on the natural habitats that it invades and is very aggressive, having the potential to rapidly occupy large tracts of land. Plants form dense and persistent stands that totally dominate the ground-flora when conditions are suitable (*moist and shaded*). These stands crowd out and displace the indigenous grasses and groundcover and can also seriously impede the regeneration of the over-storey vegetation. This species was recorded approximately 86m from the proposed car parking area, which is the closest point of the proposed development at Baginbun Beach. Therefore, other than avoidance and standard biosecurity measures as outlined below, a management programme is not required in relation to this species. An invasive species survey will be carried out prior to the commencement of works to ascertain if the distribution of this species has changed, the supervising ecologist will update this ISMP as required based on up to date data.

Figure 6: Three-Cornered Leek

Winter Heliotrope (*Petasites fragrans)*

Short hairy herbaceous perennial, up to 30cm with heart shaped leaves 20-50cm wide persisting in winter. White to lilac flowers, smelling strongly of almonds or Reproduces vegetatively as only male plants found in Britain and Ireland. It occurs on unvegetated or sparsely vegetated habitats including constructed, industrial or other artificial habitats. It is also found in hedgerows, roadsides, stream banks, waste ground and the edges of woodland. Forms dense stands excluding native vegetation. Following best practice guidance, the Amber Listed species Winter Heliotrope (*Petasites fragrans*), can be readily managed through standard eradication/control methods post construction. On the basis of their invasive qualities, the ecological value and types of habitats recorded during the walkover survey and their Amber Listing by Invasive Species Ireland, this species will not have a significant effect on habitats outside the works area.

Figure 7 Winter Heliotrope

9.3.9.7 Other terrestrial and freshwater species listed by NBDC as present within grid squares S61, S71, S70, S80.

Table 9.15 below lists other species listed by NBDC as being present within grid squares S61, S71, S70, S80, that are considered under threat and/or provided with legal protection. None of these species were recorded during site surveys.

Table 9.15: Other species listed by NBDC as present within grid squares S61, S71, S70, S80

Species Group	Named species
Alga	None protected
Annelid	None protected
Bony fish (Actinopterygii)	European Eel - Threatened Species: OSPAR Convention & Threatened Species: Critically Endangered
Centipede	None protected
Conifer	None protected.
Crustacean	None protected.
Fern	None protected.
Fungus	None protected.

Species Group	Named species
Harvestman (Opiliones)	None protected.
Hornwort	None protected.
Horsetail	None protected.
Beetle (Coleoptera)	None protected.
Butterflies	Marsh Fritillary listed as a Protected Species: EU Habitats Directive Annex II & Threatened Species: Vulnerable. Small Blue & Wall listed as Endangered. Dark Green Fritillary is listed as Vulnerable. Dingy Skipper, Gatekeeper, Grayling & Small Heath listed as Near Threatened.
Caddis fly (Trichoptera)	None protected.
Dragonfly (Odonata)	None protected
Flea (Siphonaptera)	None protected.
Earwig (Dermaptera)	None protected.
Hymenopteran	*Colletes (Colletes) similis*, *Megachile (Megachile) centuncularis*, *Andrena (Andrena) fucata*, *Andrena (Leucandrena) barbilabris*, *Nomada panzer*, Moss Carder-bee & Large Red-Tailed Bumble Bee are threatened species: near threatened. *Bombus (Bombus) magnus* is listed as a threatened species: data deficient. *Andrena (Melandrena) nigroaenea*, *Hylaeus (Spatulariella) hyalinatus*, *Andrena (Micrandrena) semilaevis*, Northern Colletes & Neat Mining Bee are threatened species: vulnerable. Great Yellow Bumble Bee is a threatened species: endangered.
Moths	None protected.
Stonefly (Plecoptera)	1 species recorded. Not protected.
Hemiptera	None protected.
True fly (Diptera)	None protected.
Lichen	None protected.
Liverwort	None protected.
Millipede	None protected.
Mollusc	Moss Chrysalis Snail & Swollen Spire Snail are threatened species: endangered. Silky Snail & Common Whorl Snail are threatened species: near threatened. Ear Pond Snail, Hollowed Glass Snail, Marsh Whorl Snail, Heath Snail, Lake Orb Mussel, Moss Bladder Snail, Smooth Glass Snail & English Chrysalis Snail are threatened species: vulnerable.
Moss	Slender Pocket-moss, Blunt-fruited Pottia & Bark Signal-moss are listed as a threatened species: vulnerable. Hair-pointed Grimmia is listed as a threatened species: data deficient. Hasselquist's Hyssop, Rib-leaf Moss & Megapolitan Feather-moss are listed as a threatened species: near threatened
Slime Mould	None protected

9.4 Potential Effects

This section documents the potential effects of the proposed development on biodiversity including the following:

- Terrestrial and Aquatic Habitats
- Impacts on fish
- Invasive Species
- Fauna Generally
- Otter
- Bats
- Badger
- Other Mammals
- Birds
- Other Fauna
- Water Quality and Aquatic Ecology
- Climate Change and Biodiversity.

Potential effects include:

- Indirect effects due to increased noise, vibration and disturbance including lighting during the construction phase of the development;
- Indirect effects on the terrestrial biodiversity due to the spreading of invasive species during site works;
- Indirect effects on the adjoining Baginbun Beach and Campile River Estuary, effects could arise from increased noise, lighting and disturbance associated with the HDD works;
- Indirect effects on the riverine, estuarine and marine environment could arise during construction from increased run-off of suspended solids or from inadvertent spillages of hydrocarbons during construction works;
- Direct effects due to a net, permanent loss of an area of semi-natural terrestrial habitat
- Indirect effects due to increased traffic and noise associated with the site, vibration at HDD sites and piling at the converter station site could potentially increase levels of disturbance which could result in the disturbance/displacement of birds and mammals such as otter. The precast piles will only penetrate as far as the weathered top of the bedrock, not into the intact rock. The installation of the precast piles does not have the potential to impact the bedrock aquifer.

Potential effects on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a NIS which forms part of the planning application

documentation for the proposed development. The NIS concluded that on the basis of objective scientific information, the proposed development will not, either alone or in combination with other plans or projects, adversely affect any of the constitutive interests of the River Barrow & River Nore SAC, Hook Head SAC, Lower River Suir SAC and the Bannow Bay SPA, in light of these site's conservation objectives. Impacts on designated sites including Natura 2000 sites are also addressed within this chapter of the EIAR.

When describing changes/activities and effects on ecosystem structure and function, important elements to consider include positive/negative, extent, magnitude, duration, frequency and timing and reversibility (IEEM, 2018).

Section 3.7 of the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports', (EPA, August 2017) provides standard definitions which have been used to classify the effects in respect of ecology (See **Appendix 1.5**).

9.4.1 Do nothing scenario

In the absence of development, it is expected that the small areas which are currently managed intensively for agriculture (arable and pasture) would remain under the same management regime. The general pattern of succession from scrub with patches of grassland to woodland would be expected to continue on areas that are not currently grazed. However, on-going monitoring and management of the invasive species recorded during site surveys is required to avoid further spread.

9.4.2 Construction Phase

9.4.2.1 Terrestrial and Aquatic Habitats

The potential effects on terrestrial habitats are generally restricted to direct removal of habitats and possible effects from the spread of invasive species. Based on the criteria outlined by EPA, 2017, as described above, the predicted effects in the absence of mitigation are detailed in **Table 9.16.**

Table 9.16 Potential impacts in the absence of mitigation

Converter Station and Tail Station Site and adjacent lands		
Habitat	**Ecological value (NRA guidelines)**	**Potential impacts in the absence of mitigation**
Buildings and artificial surfaces (BL3)	Local importance (Lower value).	These habitats are highly modified and any impact on ecology will be minimal. Neutral, imperceptible, temporary impact.
Recolonising bare ground (ED3)/ Buildings and artificial surfaces (BL3)/Scrub (WS1)	Local importance (Lower value).	Loss of a small area of this habitat will have a limited localised impact on local ecology.

		Negative, slight, long-term impact.
Improved agricultural grassland (GA1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Any impact on ecology will be low. Negative, slight, long-term impact.
Immature woodland (WS2)	Local importance (Lower value).	Planted woodland of limited ecological at present but ecological value will increase as the woodland matures. Neutral, imperceptible long-term impact.
Scrub (WS1)	Local importance (Higher value).	Loss of scrub which provides feeding and nesting resources will have a limited localised impact on ecology. Negative, slight, long-term impact.
Mixed broadleaved woodland (WD1)/ Scrub (WS1) Treeline (WL2)	Local importance (Higher value).	Mosaic of habitats of local ecological value which provide feeding and nesting resources. Very minor loss of habitat. Negative, not significant, temporary impact.
Hedgerow (WL1)/Scrub (WS1)/ Dry meadow and grassy verge (GS2)	Local importance (Low to Higher value).	Mosaic of habitats of local ecological value which provide feeding and nesting resources. Very minor loss of habitat. Negative, not significant, temporary impact.
Tidal River CW2	Local importance (Higher value).	Use of HDD methodology will prevent significant impacts. Discharge of surface water during operation will be ongoing. Negative, slight, long-term impact.
Off-road areas between Great Island and the Campile Estuary		
Habitat	**Ecological value (NRA guidelines)**	**Potential impact in the absence of mitigation**
Improved agricultural grassland (GA1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity.

		Negative, slight, temporary impact.
Arable crop (BC1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Any impact on ecology will be low. Negative, slight, temporary impact.
Hedgerow (WL1)/Treeline (WL2)	Local importance (Higher value).	Loss of hedgerow/treeline which provides feeding and nesting resources will have a limited localised impact on local ecology. Neutral, not significant, temporary impact.
Dry meadow and grassy verge (GS2) (of insufficient size to be mapped)	Local importance (Lower value).	Small areas may be affected where it occurs along road boundaries. Negative, not significant, temporary impact.
Buildings and artificial surfaces (BL3)	Local importance (Lower value).	Low value habitat. Neutral, imperceptible, temporary impact.
(Mixed) broadleaved woodland (WD1)/(Mixed) Conifer Woodland (WD3)	Local importance (Higher value).	No impact on this habitat will occur. Neutral, imperceptible, temporary impact.
Stone walls and other stonework (BL1)/ Spoil and bare ground (ED2)	Local importance (Lower value)	Minor impact on low value habitat. Neutral, imperceptible, temporary impact.
Drainage ditch (FW4)	Local importance (Lower value)	Habitat not affected. Neutral, imperceptible, temporary impact.
Tidal river (CW2)/ Earthbanks (BL2)	Local importance (Higher value).	Neutral, imperceptible, temporary impact.
Minor off road areas in proximity to roads		
Habitat	**Ecological value (NRA guidelines)**	Potential impact in the absence of mitigation
Arable crop (BC1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Negative, slight, temporary impact.
Improved agricultural grassland (GA1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Negative, slight, temporary impact.

Campile River Estuary Crossing		
Habitat	**Ecological value (NRA guidelines)**	Potential impact in the absence of mitigation
Tidal rivers (CW2)	International importance.	Will be unaffected due to use of HDD technology. Neutral, imperceptible temporary impact.
Upper salt marsh (CM2)	International importance.	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Mixed broadleaved woodland (WD2)/ Conifer woodland (WD3)	Although classified as being of international value where this habitat occurs within the River Barrow and River Nore SAC boundary it is considered of Local importance (Higher value).	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Mixed broadleaved woodland (WD1)/ Treelines (WL2)/ Hedgerows (WL1)/ Scrub (WS1)	Although classified as being of international value, where this habitat occurs within the River Barrow and River Nore SAC boundary it is considered of Local importance (Higher value).	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Improved agricultural grassland (GA1)	Although classified as being of international value where this habitat occurs within the River Barrow and River Nore SAC boundary it is considered of Local importance (Lower value).	Low value habitat. Negative, slight, temporary impact.
Recolonising bare ground (ED3)/Scrub (WS1)	Although classified as being of national value, where this habitat occurs within the Barrow River Estuary boundary it is considered of Local importance (Lower value).	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Embankment (BL2)	Although classified as being of international value where this habitat occurs within the River Barrow and River Nore SAC boundary it is considered of Local importance (Higher value).	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Baginbun Beach Landfall Site and Car Parking Area		

Habitat	Ecological value (NRA guidelines)	Potential impact in the absence of mitigation
Rocky sea cliffs (CS1) / Sedimentary sea cliffs (CS3)	International importance.	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Sand shores LS2	International importance.	Will be unaffected due to use of HDD technology. Neutral, imperceptible, temporary impact.
Buildings and artificial surfaces (BL3) / Spoil and bare ground (ED2)	Although classified as being of International importance where this habitat occurs within the Hook Head SAC boundary it is considered of lower value, local importance.	Low value habitat. Neutral, imperceptible, temporary impact.
Improved agricultural grassland (GA1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Neutral, imperceptible, temporary impact.
Arable crop (BC1)	Local importance (Lower value).	Habitat which is highly managed and has low biodiversity. Negative, slight, temporary impact.
Scrub (WS1)	Local importance (Lower value).	Loss of scrub which provides feeding and nesting resources will have a limited localised impact on ecology Negative, slight, permanent impact.
Cable route within artificial surfaces i.e. in roads, footpaths and verges		
Habitat	**Ecological value (NRA guidelines)**	Potential impact in the absence of mitigation
Buildings and artificial surfaces BL3)/Stone walls and other stonework (BL1)	Local importance (Lower value).	Low value habitat. Negative, slight, permanent impact.
Hedgerows (WL1)/ Treelines (WL2)	Local importance (Higher value).	As detailed in the tree survey report which is attached as **Appendix 9.5** significant stands of trees along the route have been identified. Road surfaces will naturally curtail root development. The route will avoid stands or

		mature trees where possible and no significant loss of trees or hedgerow is predicted to occur. Negative, slight, permanent impact.

9.4.2.2 Invasive species

There is potential during the construction phase for invasive species to be spread to Natura 2000 sites, thus impacting negatively on qualifying habitats. The risk from the spread of invasive species to Natura 2000 sites is minimal due to the limited potential for the spread of invasive species over large distances. An Invasive Species Management Plan (ISMP) which provides additional details is included as **Appendix 9.6.**

Three Cornered Leek occurs outside the works area and will be avoided. Based on surveys to date Japanese Knotweed occurs outside the works area and avoidance is the preferred methodology. Where this is not possible excavation and removal to a licenced facility under licence will be carried as detailed in the Invasive Species Management plan based on up to date survey data.

Rhododendron occurs within the red line boundary, however avoidance will be largely possible through control measures. Where avoidance is not possible, the ISMP provides methodologies for its successful eradication within the works area and biosecurity protocols.

The Amber Listed species Winter Heliotrope was recorded within the works area and is ubiquitous along roadside verges in this area. It does not create a significant risk to Natura 2000 sites or other habitats outside Natura 2000 sites and be treated by standard herbicide treatment post construction.

The invasive species management plan will be updated by the supervising ecologist, based on up to date data.

No impediment to the removal of these species within proposed development area if required as part of the invasive species management plan, has been identified. No risk to local ecology has been identified from the spread of invasive species.

The ISMP (which is included as **Appendix 9.6**) provides detailed methodologies for the effective avoidance of invasive species and treatment of same if required. Overall no impact on adjoining habitat or the qualifying interests and conservation objectives for European sites from the spread of invasive species will occur.

9.4.2.3 Potential Effects on Fauna

There will be effects on habitats located within the proposed works areas and there is the potential for adverse effects on fauna. Increased lighting, noise,

vibration and disturbance will occur during construction which can result in disturbance and/or displacement of fauna.

9.4.2.4 Otter

Surveys by Dixon.Brosnan in 2018 and 2019 recorded the presence of otter along the Campile River Estuary and at Baginbun Beach, however no holts or couches were recorded.

During construction works there will be increased noise and activity associated with the site works. The HDD sites at Campile River Estuary and Baginbun Beach are set back a minimum of 100metres from aquatic habitats which will be of primary value for otters.

Baginbun Beach is extensively used by the general public, and that usage is highest in proximity to the car park that is located immediately adjacent to the development site. These circumstances, particularly where dogs are also present, may reduce usage of the area by otter. The Campile River Estuary in proximity to Dunbrody Bridge and Dunbrody Abbey is already subject to some level of disturbance from traffic and human activity and otters readily habituate in these circumstances.

Based on the absence of otter breeding sites, the distance of the HDD sites from high value otter habitat, and the short-term nature of construction works there remains the potential for short-term slight negative effects.

9.4.2.5 Bats

A bat survey was carried out at Dunbrody Bridge, over the Campile River Estuary in September 2018. While no bats were recorded emerging from the bridge, the survey did detect limited usage of the surrounding area by Brown Long-eared Bat, Daubenton's Bat, Leisler's Bat and Soprano Pipistrelle. The recorded activity was largely confined to the external boundaries of the survey area namely woodland and treeline habitats. Daubenton's bat was recorded foraging along the Campile River Estuary.

A crossing of the Campile River Estuary via Dunbrody Bridge was considered as an option and it was for this reason the bat survey at this location was completed. Although this option was not utilised, the bat survey results are indicative of bat activity along this section of the estuary.

No potential roosting sites were identified within the proposed development area during the survey at Dunbrody Bridge. An additional day-time roost assessment/winter hibernation survey of an abandoned building in proximity to the proposed converter station site found no signs of bats.

Whilst the loss of immature woodland, scrub and small areas of grassland around the proposed converter station site and small areas of grassland, hedgerow, treeline and scrub habitat along the proposed cable route will reduce the net feeding area available for bats, the effect will be temporary to long term and slight in the context of the amount of similar habitat in the surrounding landscape.

Lighting during night-time works at the HDD compounds will be focused away from woodland and treeline habitats and will be temporary. External lighting will be installed at the proposed converter station. However, to avoid creating any unnecessary glare external lighting at the converter station will be turned off during hours of darkness. The exception would be for emergency outdoor works.

Overall the effect is predicted to be long term and slight and the effect will be localised and will not significantly affect overall bat populations as there will be no significant loss of critical resources for bats.

9.4.2.6 Badger

A main badger sett was recorded within the woodland habitat approximately 220m southwest of the northern Campile River Estuary HDD crossing site. An active annexe sett was recorded approximately 50m east of the main sett along the northern periphery of the woodland habitat. Although grassland habitat suitable for foraging was recorded within the development footprint no specific signs of badger foraging were recorded.

Badgers could potentially be affected via loss of habitat, increased noise and disturbance and via direct impacts on setts. In this instance there will be no direct effect on setts. The setts, which were located within woodland habitat at the Campile River Estuary, are not located in proximity to the proposed development area and due to the distances involved no effect on badger using these setts, including badgers that could potentially be breeding, will occur.

Although there is considerable regional variation the mean density of badger social groups in Ireland was estimated at 1 group per 2 km^2 (0.495 per km^2). There will be a net loss of potential feeding habitat within sections of the proposed development. Badgers show a strong preference for pasture used for cattle. Under the NRA guidelines (NRA, 2006c) where loss of habitat is likely to be greater than 25%, the effect may be considered as significant on the affected social group. In this instance there will only be temporary impacts on a very small area of potential badger feeding habitat and the effect will not be significant.

It is concluded therefore that the impact on habitats within the proposed onshore route will not have significant effects on badgers although changes in feeding patterns may occur during construction. Overall the effect is predicted to be temporary and slight.

9.4.2.7 Other Mammals

Signs of Irish Hare were recorded within the proposed converter station site and other mammal species which are protected under the Irish Wildlife Act 1976, as amended, such as Sika Deer, Pine Martin, Hedgehog, and Red Squirrel could potentially occur within the proposed development area. However most of the works will take place within roads and road verges or will impact on common habitats.

Effects on these species due to loss of habitat and increased noise and disturbance and lighting are predicted to be long-term and slight at the

converter station and temporary and slight within the proposed cable route and at compounds and other offline areas.

9.4.2.8 Birds

9.4.2.9 Birds associated with terrestrial habitats

The terrestrial bird species recorded during bird surveys are typical of the types of habitat noted on site and are generally common. No rare or uncommon species or species of high conservation value were recorded. No significant effect on peregrine falcon utilising the Great Island Power Station will occur. The use of HDD methodology will prevent any significant effects on hen harrier which is known to occur that Campile River Estuary.

There will be a net loss of semi-natural habitats within the proposed development area (e.g. arable land, scrub and grassland) and the loss of scrub at the site of the proposed converter station in particular will have a localised effect on nesting and feeding resources for common bird species. However, scrub habitat is often an ephemeral habitat within the wider agricultural/ industrial landscape and the scrub within the proposed converter site is not diverse or of particularly high value. Small areas of this type of scrub are commonly lost or recreated within the wider landscape. Only very small areas of grassland will be lost and the habitat quality of improved agricultural grassland to be affected by the cable route and compounds will quickly regenerate. Overall, the loss of habitat for breeding birds within the development site is considered a long term, slight effect.

Some disturbance/displacement of terrestrial and breeding birds may occur during construction due to increased noise and disturbance during construction. However, this will be short in duration. The effect is therefore predicted to be temporary and slight. Disturbance levels will be relatively low during operation, this is considered a long-term, slight impact.

9.4.2.10 Birds associated with shoreline/ estuarine habitats

Bird surveys were carried out to determine the degree to which the shoreline/estuarine habitats and waters in proximity to the proposed development site are utilised by birds and in particular important populations of overwintering waders and waterfowl. A total of 26 bird species were recorded during the winter bird surveys carried out in 2018/2019. Birds species listed in Annex I of the Birds Directive are considered a conservation priority and five such species were recorded. (Little Egret, Dunlin, Kingfisher, Red-throated Diver and Great Northern Diver). Six Red Listed species were recorded, namely Black-headed Gull, Herring Gull, Redshank, Wigeon, Dunlin and Curlew.

Several bird species were recorded feeding and/or roosting along the shoreline at Baginbun Beach and estuarine habitats at the Campile River Estuary. Although no habitats within the Bannow Bay SPA will be directly affected, there could potentially be indirect effects on bird species listed as qualifying interests for this SPA where they occur outside the SPA boundary. A total of five species listed as qualifying interests for the Bannow Bay SPA were recorded

utilising the survey sites, namely, Dunlin, Curlew, Black-tailed Godwit, Oystercatcher and Redshank. None of these species were recorded in high abundance or at levels that would be considered important at a national level.

Overall, none of the waterbirds recorded by vantage point counts were recorded in high numbers and numbers were low in-comparison to the figures which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical population of a migratory species).

Effects on birds near the proposed development areas could potentially arise during construction when levels of noise and activity will increase. The Bannow Bay SPA is located 1.3km north of Baginbun Beach landfall site. Given the distance involved disturbance from light, noise and vibration during the construction phase will not impact on foraging birds within the SPA during the winter period. However potentially impacts on these species feeding outside of the SPA boundary and in particular at Baginbun Beach which is the closest point of the proposed works to the SPA, could potentially occur.

Works with the potential to generate the greatest noise and vibration impacts (blasting and rock breaking) will take place at the converter station site which is located 11.5km km from the Bannow Bay SPA.

The potential effects and impacts of disturbance have been widely recognised in wildlife conservation legislation, as has the need to develop conservation measures for birds whilst taking human activities into account. Article 4.4 of the Bird's Directive (79/409/EEC) requires member states to "*take appropriate steps to avoid… any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article*". This specifically relates to conservation measures concerning Annex I species.

Optimal foraging theory is a useful basis from which to understand likely effects of disturbance on feeding. Many studies have shown that birds concentrate where feeding is best.

If birds are forced temporarily or permanently to leave these places, then there is an increased risk that their foraging ability will suffer. However, the severity of this type of situation and the way is which birds respond; vary in a very complex way. The multiplicity of variables underlying the observed interactions between birds and people makes it difficult to assess the cause and implications of a particular instance of disturbance. The magnitude of disturbance to birds may arise from synergistic effects of more than one activity.

Burger (1981), in a study of a coastal bay, found that birds were present 42% of the time when people were present, but birds were present 72% of the time when people were absent. Human activities such as jogging or grass mowing, which involved rapid movement or close proximity to roosting birds, usually caused them to flush (fly away). Slow-walking birdwatchers and clammers did not usually cause birds to flush. Gulls and terns were least affected and usually returned to where they had been; ducks usually flushed and flew to the centre of the pond; and herons, egrets and shorebirds were most disturbed and flushed to distant marshes.

The magnitude and predictability of impacts as a result of disturbance ranges between species, seasons, weather, source and duration of disturbance, degree of previous exposure of the individuals to disturbance and the occurrence of additional disturbances. Most disturbances to wetland birds result in an interruption to normal activity and the displacement of birds over variable distances, often into sub-optimal habitats. This can be critical during severe winters and can lead to a reduction in the carrying capacities of important wintering wetland sites. However, in general studies show that most bird species have the ability to habituate to regular and continual sources of noise and visual disturbance.

Migratory birds generally have to cope with narrow physiological and energetic balances and are often bound to fixed time-schedules (e.g. Piersma, 1994). Hence, they heavily depend on the resources they find at their stop-over sites en route between breeding- and wintering areas, and any serious disturbance or other human impact may easily disturb the precarious balance the birds are subject to. Eventually winter survival and breeding success, and thus population levels, might be affected as well (e.g. Madsen & Fox, 1995).

The proposed development site is located predominately within an agricultural landscape and along roadways. During the construction stage, there will be short-term increases in noise, vibration, lighting and disturbance. Blasting and rock breaking which have the potential to cause the highest levels of disturbance will only be carried out at the proposed converter station which is located approximately 11.5 m from the Bannow Bay SPA.

In general studies show that most bird species have the ability to habituate to regular and continual sources of noise and visual disturbances. While there may be some temporary displacement of bird species, there will not be a significant negative effect on their overall survival rate due to the close proximity of identical habitat, roosting and foraging resources e.g. high value mudflats with high densities of macro-invertebrates in relation to the Campile River Estuary.

Also, peripheral habitats including woodland, treelines and hedgerows provide a visual screen between the site works and birds utilising the nearby Bannow Bay SPA.

Works in close proximity to the Campile River Estuary, which provides habitat for wintering birds, will take place outside the peak season for wintering birds which runs from October to March inclusive. This will minimise the disturbance to any wintering/migratory bird species utilising the sites during this period.

Due to the distance involved no effect on the Black Guillemot breeding area at Baginbun Headland will occur. The impact on kingfisher utilizing the Newtown River will be long term and imperceptible.

The construction phase of the proposed development, in particular the HDD works, will increase noise and disturbance in proximity to aquatic habitats of potential value to wintering birds, however given the value of adjoining habitats for birds, visual screening of the HDD sites, the availability of alternative habitat and the short-term nature of the works, the impact on wintering birds will be temporary and imperceptible.

Overall, given the scale and temporary nature of the works, the distances involved, existing disturbance factors and avoidance of works in key areas during the bird wintering period, there will be no significant effect on bird populations utilising estuarine and marine habitats.

9.4.2.11Effects on other fauna

No signs of amphibians or reptiles were recorded. The proposed development area is only likely to support common invertebrate species. Given that the habitats which will be affected are relatively common in the surrounding landscape and the limited scale and short-term nature of the proposed development any effect on these species will be temporary and slight negative.

9.4.2.12 Water quality and aquatic ecology

There are no substantial freshwater habitats which will be affected by construction works. The Campile River Estuary which will be crossed via HDD is estuarine at the crossing point. A HDD methodology will also be employed at Baginbun Beach and thus there is the potential to impact on the marine environment. It is intended that the Newtown River will be crossed using trenchless techniques (mini-HDD), which will result in no direct interaction with the water quality and aquatic ecology. The use of an open cut methodology has also been assessed as a precautionary measure, although it is considered highly improbable that it will be required.

HDD drilling has the potential to release drilling fluids into the surface environment through frac-outs, whereby drilling fluids are released through fractured bedrock into the surrounding rock and sand and travels toward the surface. However as drilling fluids consist of a betonite clay-water mixture they are not classified as toxic of hazardous substances.

Given that bentonite is chemically inert, the dilution provided in the receiving waterbody and given that tidal habitats are generally robust and adapted to naturally fluctuating levels of silt, the impact on estuarine habitats and macroinvertebrate populations would be temporary and negligible. Likewise, the impact on fish such as Grey Mullet, European eel, Sea Trout, Salmon and Lamprey species which could potentially be moving through estuarine waters would be temporary and slight.

In the unlikely event that the Newtown River is crossed via an open cut methodology, there is the potential for the generation of increased silt levels and there is the potential for minor spills of hydrocarbons from construction machinery. The impact of increased silt and minor spills of hydrocarbons would not have a significant impact in the context of the limited potential for significant accidental discharges, the naturally occurring fluctuations in suspended solids in the estuarine environment and the high level of dilution provided in the estuarine environment. Although use of the Newtown River by fish is expected to be limited, it has the potential to support species such as European Eel, Stickleback, Brown trout and Grey Mullet. There will be temporary displacement of these species from the works area and free movement of fish will be prevented during the crossing period if open-cut is deployed, however this is a temporary impact. Overall it is concluded that the

crossing of the Newtown River will have a temporary, slight effect on water quality and aquatic ecology.

Most of the effects from the cable route will be within terrestrial habitats within roads or road verges and common agricultural habitats such as arable fields and intensively farmed grassland.

Minor impacts on water quality could occur due to minor localised run off of surface water during construction, use of concrete and minor contamination of surface water and ground water due to minor leaks of hydrocarbons from machinery. Ponded rain water in excavations may need to be removed. No direct discharge of water from excavations to stream or rivers is proposed. Ponded surface water will be pumped to vegetated areas to allow solids to be removed via overland flow. If required a settlement tank will be utilised with surface water discharging to a road side drain via a silt sock.

Surface water run-off from site compounds will either discharge to existing surface water management system at greenfield rates or will be allowed to run-off to vegetated areas. The temporary foul drainage at the construction compounds will comprise self-contained sanitary facilities, with wastewater stored and tankered off-site to appropriately licenced disposal facilities. Appropriate silt control measures such as silt fences will be employed where necessary. All water from wheel wash stations will be collected, fully contained and dispatched for treatment and disposal off-site. Based on the above, the potential negative effects on surface water and groundwater from the proposed works within roads, road verges or off-road diversion areas will be slight to not significant.

The HDD compounds have been located above the flood plain, which is an embedded mitigation which minimises the risk of flood events contributing to uncontrolled run-off of polluted water.

Precast piling will be installed at the converter station site. The precast piles will only penetrate as far as the weathered top of the bedrock, not into the intact rock. The installation of the precast piles does not have the potential to impact the bedrock aquifer.

The effect on water quality and aquatic ecology during construction is predicted to be short term and not significant to slight.

9.4.2.13Climate change and biodiversity

The EU Commission guidance document on integrating climate change and biodiversity into environmental impact assessment (EU Commission, 2013) aims to improve the way in which climate change and biodiversity are integrated into Environmental Impact Assessment. Key principles specified by the document when considering impacts include the following:

- Consider climate change at the outset;
- Analyse the evolving environmental baseline trends;
- Take an integrated approach;
- Seek to avoid biodiversity and climate change effects from the start;

- For biodiversity, EIA should focus on ensuring 'no net-loss';
- Assess alternatives that make a difference in terms of climate change and biodiversity;
- Use ecosystem-based approaches and green infrastructure as part of the project design and/or mitigation measures; and
- Assess climate change and biodiversity synergies and cumulative effects which can be significant.

The potential effects from the proposed development on climate have been specifically addressed by **Chapter 7** *Air Quality and Climate* of this EIAR. No significant interactions between the effects on biodiversity resulting from this development and climate change have been identified.

In relation to biodiversity, it is important to adopt an "*ecosystem approach which considers all of the different ecological elements and how they interact with each other".* The entire proposed development includes a mixture of semi-natural habitats with native hedgerow/ treeline and woodland habitats, which form connective elements within the local landscape. Dense hedgerows for example can connect different ecological elements within a landscape which allows mammals, birds and invertebrates a means of moving through the landscape under cover. In addition, these boundary habitats provide nesting and feeding habitat for birds and other fauna and is of value as feeding habitat for bats. The retention of these habitats is therefore considered important in maintaining ecological value within the site.

The project has been designed to minimise impacts on biodiversity by ensuring that most of the construction activity will be located in areas of low ecological value, such as existing roads. Minimisation of effects on linear habitats will help to maintain connectivity and the use of HDD techniques will prevent effects on important estuarine and shoreline habitats. Planting of trees at the converter site will create additional habitat. Overall therefore the effect will be imperceptible.

9.4.3 Operational Phase

Chemical contaminants such as hydrocarbons could potentially impact on water quality and thus could impact on fish species, aquatic ecology and aquatic qualifying species for the River Barrow and River Nore SAC which migrate through or occur within the estuary (Sea lamprey (*Petromyzon marinus)*, River Lamprey (*Lampetra fluviatilis)*, Twaite Shad (*Alosa fallax)* and Salmon (*Salmo salar*)*)* and on common fish species within the Newtown River. Impacts on fish populations could in turn impact on populations of otter.

Surface water run-off from yard areas and the building roofs of the converter station site, will discharge through proposed filter drains and surface water sewers, through a bypass interceptor, to a proposed attenuation pond, to be constructed to the south-eastern part of the site. Discharges from the attenuation pond will be controlled to greenfield rates. Water from the attenuation pond will be discharged to the Newtown River in the southern part of the site. The Newtown River is tidal at this location. The impact on water quality in the Newtown River is predicted to be long-term and imperceptible.

Foul wastewater will be collected from the welfare facilities in the converter station and tail station. It will be contained in the units and removed from site periodically, by a licensed service provider, to a local sewage treatment plant, which has adequate capacity.

Transformers will be sited within a reinforced concrete bund (which will have 100% capacity) which will be linked to an underground oil dump tank. Transformer bunds will be designed as waterproof structures in accordance with BS EN 1992-3 and the crack width will be limited to 0.2mm with appropriate water bars. The bunds will be tested in accordance with standard bund testing requirements. Rainwater or other surface water shall permeate through a flame trap. Once permeated through the stone fire trap, the water will be collected in a common dump tank. It will then be pumped out of the dump tank via a bund water control pump to a manhole, before flowing by gravity to an oil separator prior to final discharge into the surface water drainage system. The oily water system will incorporate penstocks to close off the system.

The oil separator shall be a Class 1 full retention unit in accordance with BS EN 858-1, incorporating a coalescer automatic closure device and high oil level alarm. The separator shall be fully capable of isolating all upstream oil flow in the event that the high-level oil alarm is activated. The interceptor will be sized to suit the storm intensity flow rates from the transformer bunds and any other designated oil containment area.

A range of mitigation measures will be implemented as part of the operation of the proposed converter station site. In general, the estuarine habitats listed as qualifying interests for the River Barrow and River Nore SAC (Mudflats and sandflats not covered by seawater at low tide, Salicornia and other annuals colonizing mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and Mediterranean salt meadows (*Juncetalia maritimi*)) are robust. Given the comprehensive mitigation measures to be implemented as part of the proposed development, the dilution provided in the estuarine environment and the qualifying habitats in question, any impacts on water quality will not effect qualifying habitat interests for the River Barrow and River Nore SAC.

Sea lamprey (*Petromyzon marinus)*, River Lamprey (*Lampetra fluviatilis)*, Twaite Shad (*Alosa fallax)* and Salmon (*Salmo salar*) will occur in the lower estuary but these migratory species will only move through the estuary and thus will only be present for a limited time period. Given the comprehensive mitigation measures to be implemented as part of the proposed development, the dilution provided in the estuarine environment and the qualifying habitats in question, any impacts on water quality will not significantly impact on qualifying species for the River Barrow and River Nore SAC and the impact on these species will be not significant.

9.4.3.1 Invasive Species

During the operational phase, no effects due to the spread of invasive species will occur. The effect will be imperceptible.

9.4.3.2 Bats

Artificial lighting from the proposed converter station site could have a potential negative and long-term effect on bat behavior. A bat survey did not record bats within the derelict house to the south of the proposed converter station. External lighting will be turned off during hours of darkness, the potential effects are limited to periods when repairs are being conducted and therefore are long-term and imperceptible. A comprehensive landscaping scheme will be implemented at the converter station site incorporating significant earthworks, berming, planting of approximately 15,000 native mixed-woodland trees, and zones of grassland meadow. This scheme will provide breeding and nesting habitat for birds and mammals including bats, and in the long-term improve the habitat value of the existing site. The effect will be long term and slight.

9.4.3.3 Operational effects from noise and visual disturbance

There will be no ongoing noise and disturbance associated with the cable route apart from occasional maintenance works. There will be long-term increase in noise and activity at the converter station during operation. The converter station will be located in proximity to the existing Great Island Power Station and therefore existing levels of noise and activity will already be relatively high. It is also noted that noise mitigation measures are integrated into the design. Given the distance from the Bannow Bay SPA, the existing levels of noise and activity in this general area, the ability of winter birds to habitualise to increased levels of light, noise and activity no effect on winter birds listed as qualifying interests for the Bannow Bay SPA will occur.

During the operational phase the levels of activity will stabilise and birds and mammals in the surrounding landscape will habitualise to increased activity. Two personnel will be stationed at the converter station at all times and levels of activity will be low.

The effects on birds and mammals in habitats adjoining the proposed development is therefore predicted to be long term and not significant during operation.

9.4.4 Decommissioning

As mentioned in **Chapter 3** *Proposed Development*, once the interconnector ceases operation the proposed development will be decommissioned. Equipment and all above ground civil works at the converter site will be removed and the site returned to its previous state. Underground cables will remain in-situ as there would be more of an environmental impact in their removal. Above ground structures such as the link boxes and fibre optic joints will be removed, and their locations reinstated.

As the site of the converter station and tail station is generally of low biodiversity interest, the impact of decommissioning will be temporary and not significant following the implementation of standard mitigation measures.

9.5 Mitigation and Monitoring Measures

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented.

A Construction and Environmental Management Plan (CEMP) has been prepared for the proposed development and is included as **Appendix 4.1**. This CEMP provides details of all proposed mitigation measures. All measures outlined in the CEMP will be implemented in full, at a minimum.

The principal mitigation measures are detailed below:

Construction best practice measures (of relevance in respect of any potential ecological impacts) will be implemented throughout the proposed development, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- NRA (2010) Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin.
- IFI (2016) Guidelines on protection of fisheries during construction Works in and adjacent to waters (IFI, 2016)
- H. Masters-Williams et al (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.
- E. Murnane, A. Heap and A. Swain. (2006) Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA.

All personnel involved with the proposed development will receive an on-site induction relating to operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
- Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the site manager;
- Monitor the work place for potential environmental risks and alert the site manager if any are observed; and

- Co-operate as required, with site inspections.

9.5.1 Construction Phase Mitigation Measures -Water Quality

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the proposed development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with Construction Industry Research and Information Association (CIRIA) guidance – Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al, 2001). Further detail is provided in the CEMP which is attached as Appendix 5 and in Chapter 13 of the EIAR (Water and Hydrology) which is attached as Appendix 7.

To minimise the potential for elevated silt levels in surface water run-off, the working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.

A set of standardised emergency response procedures will govern the management of emergency incidents. These are provided in the CEMP (which is a live document which will be updated/added to as construction progresses), together with the Emergency Incident Response Plan.

A detailed spillage procedure will be put in place and all will be trained with respect to the relevant procedures to be undertaken in the event of the release of any sediment, hydrocarbons into a watercourse. Spill kits will be maintained on site and relevant staff will be trained in their effective usage. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wexford County Council, Inland Fisheries Ireland and the NPWS shall be notified. Further measures include:

- A monitoring regime/programme for water quality will be put in place;
- All works undertaken will be fully consolidated to prevent run-off of silt;
- Silt fences/swales shall be provided at all locations where surface water run-off may enter/leave the working areas, and adjacent to the haul roads;
- There will be no tracking of machinery within watercourses;
- Dewatering, where required, will incorporate the use of filter media;
- Self-contained wheel wash facilities will be provided to protect watercourses from the carriage of silt on vehicles with the waste liquid contained on site, and dispatched off-site for disposal at an appropriately permitted facility;
- The length of trench excavation at any particular section of the cable route will be limited to ensure that the trench will not act as a conduit for stormwater run-off.

- Access/haul roads shall be set back from watercourses by at least 10m where possible.
- Refuelling of vehicles will take place at designated locations at a distance of 10m or greater from the nearest watercourse;
- Any fuel stored on site will be stored in double skinned, appropriately sized bunded containers and will be located in a designated work compound;
- No vehicles will be left unattended when refuelling;
- A spill kit including an oil containment boom and absorbent pads will be on site at all time;
- All vehicles will be regularly maintained, washed and checked for fuel and oil leaks;
- Concreting works will be carried out in dry conditions where possible and concrete works will be strictly controlled and monitored.
- No concrete washout will be allowed to discharge to watercourses. Wash out of concrete trucks will not be permitted on site;
- There will be no direct pumping of contaminated water from the works to a watercourse at any time; and
- All discharges will be in compliance with the European Communities (Surface Water) Regulations, 2009 (European Communities, 2009) and the European Communities (Groundwater) Regulations, 2010 (European Communities, 2010).

The following construction management measures will be implemented at all construction compounds, onshore cable routes and the converter station site;

Contractor Compounds

- Any containers of potential polluting materials such as fuels and oils will be stored in a bunded area (110% capacity) and protected from flood damage and inundation;
- All bunded storage areas will be a minimum distance of 10m away from any watercourse;
- A designated bunded refuelling area on an impermeable surface will be provided at all construction compounds, again at a minimum distance of 10m away from any watercourse.

Converter Station Site

- Secure oil and chemical storage in over-ground bunded areas (110% capacity), limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas;
- Emergency spill kits retained onsite at sensitive locations;
- Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified;

- Temporary measures will be provided to ensure only clean water is discharged from site i.e. de-silting and temporary oil interceptor. These will be subject to daily inspection to ensure they remain adequate and effective;
- Interceptor/dump/attenuation tanks will be secured at designated points, strapped down to the concrete slab. Backfill will be carefully controlled, ensuring this is balanced and even around all sides of the tank, while the tank is gradually filled internally with water, to avoid distortion or damage from external backfill pressures. The interceptor washdown slab will be constructed. Interceptors will be commissioned by a specialist contractor;
- Silt traps will be employed and maintained in appropriate locations;
- Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities;
- Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall in order to minimise sediment generation and soil damage;
- Below ground drainage will be installed prior to erection to completion of building superstructure/roof drainage. Final connection will be made when down pipes are installed to ensure accurate positioning;
- The treated water will discharge directly into the surface water drainage system as it is suitable for direct discharge into the local watercourses, having passed through the oil separator.

Surface Water Drainage from the Converter Station

Oily water is classified as rainwater runoff and/or surface wash down which may potentially contain small amounts of low hydrocarbon concentrates in oil containment areas. This is to be treated directly by oil separator facilities on site.

It is proposed to include a Class 1 full retention oil separator unit for the oily water system. Oil storage volume will be provided by the separator and the separator shall be fully capable of isolating all upstream oil flow in the event that the high-level oil alarm is activated. Oil resistant nitrile rubber seals will be employed throughout the oily water drainage systems. The oil separator will be vented in accordance with the manufacturer's recommendations, with vents located clear of all site operating areas, a minimum of 2000mm above ground level. Vent pipes will be supported by means of a concrete post and protected from vehicular traffic by means of spaced concrete bollards, if required.

The treated water will discharge directly into the surface water drainage system as it is suitable for direct discharge into the local watercourses, having passed through the oil separator described above.

Onshore Cable Route

- Any groundwater or rainwater that collects in a trench will be pumped into locations agreed with the landowners and local authorities. Typically, this will be onto adjacent land, not directly into waterways, and through a filter medium, to avoid the build-up of silt, as some granular material will,

inevitably, be pumped out with the water. A similar arrangement will apply at joint bays, where a sump will be cast into the concrete base for a pump.

- The flowrates will have to match that of the water into the trench, as it must be kept generally free of water. A single pump with a 75mm hose will usually be adequate to deal with rainwater running into a trench.
- For the HDDs, any groundwater or rainwater that collects in a HDD drilling pit shall be pumped away as described above. Any bentonite (or similar HDD drilling head lubrication material) shall be handled and removed by the drilling contractor. Typically for a land based HDD the volume of bentonite would be approximately 5 cubic metres per shift, and for the landfall HDD the volume of bentonite would be approximately 15 cubic metres per shift. Further information on bentonite is discussed in **Section 4.11.2.1** of **Chapter 4** *Construction Strategy*.

Watercourse crossing - Newtown River

- The preferred method to cross the Newtown River is a HDD using a mini-rig. The non-preferred alternative is an open-cut methodology. For the open-cut method the watercourse will be temporarily dammed to allow for cable installation. At the stream crossing, the cable trenching detail will not differ, however, a one metre separation between the protective measures and the bed of the watercourse will be maintained to account for any future erosion. If the open-cut methodology is required the Newtown River watercourse will be temporarily dammed immediately upstream and downstream of the cable installation. Over-pumping will be employed to ensure continuous flow in the watercourse.
- The watercourse is of sufficient size to support fish species such as stickleback, eel and brown trout. A fish salvage operation will therefore be conducted prior to damming under the provisions of a Section 14 licence. Standard biosecurity protocols will be implemented, and fish will be translocated to similar habitat upstream of the works area.
- Appropriate silt control measures such as silt fences will be employed where required. Once reinstatement of the cable trench is complete, the temporary dams will be removed and over pumping ceased. No haul road is proposed at the watercourse crossing; plant will utilise existing accesses used by landowners to avoid further works within the watercourse.

Foul Drainage

The temporary foul drainage at the construction compounds will cater for welfare facilities including a canteen, toilets, showers and hand wash basin only, and will comprise self-contained sanitary facilities, with wastewater stored and tankered off-site to appropriately licensed disposal facilities.

Flooding

The following best practice construction measures relevant to the hydrological regime and flooding will be implemented for the duration of the construction phase. Further detail is provided in the CEMP which is attached as **Appendix 4.1** and in Chapter 13 of the EIAR (Water and Hydrology).

- All construction compounds will be in areas that are at low risk of flooding (outside 1:100 year flood zone);
- Material storage locations will be set back from watercourses and surrounded with silt fencing and covered. There will be no material storage in floodplains or areas at risk of pluvial flooding. Material excavated from trenches along the roads will be loaded onto trucks and removed from the site;
- Weather warnings will be monitored during construction to ensure that there is no risk to construction workers installing the cable. A risk assessment will be carried out in the case of a weather warning to determine what works can proceed, and what works need to be postponed;
- No material will be stored in flood plains or in areas which would impede flood flow paths;
- Temporary works (including haul roads) will be designed so as not to affect the connectivity between the relevant channel and the floodplain to maintain adequate flood storage during the construction phase;
- Where the proposed works encounter an existing drainage line, arrangements will be made to reinstate the existing drainage system. This will mitigate the risk of excess run-off from the proposed works. All road and drainage system modifications are to be designed following relevant best practice guidelines; and
- Road run-off will be channelled during excavation works for the cable, to avoid potential ponding on roads or flooding of adjacent lands during construction.

9.5.2 Construction works – Noise

Best practice noise and vibration control measures will be employed by the contractor. This includes guidance on several aspects of construction site environmental measures, including, but not limited to the following:

Specific noise abatement measures will be taken to comply with the recommendations of BS 5228-1 and 2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites: Noise and vibration* (BSI, 2014) and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001* (EC, 2001). The following specific measures will be implemented during the construction phase to ensure noise and vibration effects are minimised;

- Site representatives shall be appointed to be responsible for matters relating to noise and vibration;
- Equipment will be switched off when not required;
- Internal haul routes will be well maintained;
- Rubber linings shall be used in chutes and dumpers etc. to reduce impact noise;

- Drop heights of materials will be minimised;
- Plant and vehicles will be started sequentially rather than all together;
- Construction plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose;
- Generators will be located away from sensitive receivers and will be enclosed;
- Where required, improved sound reduction methods e.g. enclosures shall be used;
- Site equipment will be located away from noise sensitive areas, as much as is feasible;
- Regular and effective maintenance by trained personnel will be carried out to reduce noise and/or vibration from plant and machinery;
- Acoustic barriers with a density of at least 7kg per square metre will be provided around construction works to minimise the effects of noise and vibration generating activities in the vicinity of sensitive locations, including HDD compounds;
- Typically, site activities shall be limited to 7am – 7pm, Monday to Friday; and 7am – 2pm, Saturday. It may also be necessary in exceptional circumstances to undertake some other types of activities outside of normal construction core working hours. Any such working hours outside the normal construction core working hours will be agreed with Wexford County Council. The planning of such works will have regard to nearby sensitive receptors;
- A Community Liaison Plan will be prepared to provide for effective community liaison to help ensure the smooth running of construction activities and to address any issues that may arise.
- Construction work within 400 metres of the Gas Networks Ireland transmission pipeline will be carried out in accordance with the Code of Practice for Working in the Vicinity of the Gas Transmission Network (included as Appendix 4.2 to this EIAR). This may include the assessment of potential peak particle velocity effects associated with rock removal activities.
- For the locations where significant temporary noise effects are predicted during cable route excavation, Greenlink Interconnector Ltd and the appointed contractor will develop and implement specific measures to mitigate impacts, potentially including temporary acoustic screening and discretionary pre-condition surveys.
- The use of vibratory roller compactors will be in 'static' mode only, for compaction activities within 50m of properties.
- To minimise the impulsive noise and vibration associated with the driving of pre-cast piles, the following measures will be taken as required, to meet the established noise and vibration thresholds: acoustic screen for hammer

head and top of pile and the use of a resilient pad (dolly) between the pile and the hammer head.

9.5.3 Lighting during construction

Potential impacts during construction and operation, from lighting, will be mitigated by the following measures:

- Floodlights will be cowled and angled downwards to minimise spillage;
  - Lighting will be provided with the minimum luminosity sufficient for safety and security purposes;
  - Lighting will be positioned and directed as not to unnecessarily impact on designated sites or woodland habitats.

9.5.4 Construction Works – Invasive Species

- A survey for invasive species will be carried out prior to the commencement of works. This is to confirm the extent of infestations as identified by invasive species surveys to date, and to determine whether any new infestations have established in the intervening period. A step by step procedure for the management of invasive species is set out in the ISMP which is included as Appendix 9.6. This includes undertaking up to date surveys prior to commencement of construction and based on the results, proposed methodologies, in accordance with codes of practice and guidelines, for the elimination of these species. No significant effects on Natura 2000 sites will occur. However as invasive species are present within the overall study area and given their invasive nature, repeat surveys will be carried out and mitigation implemented.
- Prior notification will be given to all contractors that parts of the site are infested with Japanese knotweed, Rhododendron and Three-Cornered Leek and Winter Heliotrope and that they must adhere to this protocol to avoid the spread of the plant within and more importantly, outside of the works area. This includes any site investigation works in advance of commencement of excavation works.
- The location of the invasive species will be clearly delineated with hazard tape in a manner visible to machine operators prior to the commencement of works. Appropriate signage will be put in place to deter any entrance by people or machinery into the areas within which the invasive species are growing.
- The invasive species management plan (which is a live document), will ensure that risks are minimised. This includes any site investigation works which may proceed the commencement of site works. The management plan will include all provisions for site hygiene and appropriate disposal of contaminated soil and subsoil.
- If contaminated material is to be removed off site it will require a licence from the National Parks and Wildlife Service in advance of any removal, in

accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477).

9.5.5 Protection of habitats

- The Wildlife Amendment Act 2000 (S.46.1) provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 01st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Where possible, vegetation will be removed outside of the breeding season and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided. This will also minimise the potential disturbance of breeding birds outside of the proposed development site boundary.
- To prevent incidental damage by machinery or by the deposition of spoil during site works, any habitats earmarked for retention in close proximity to the proposed works will be identified and will be securely fenced or sign posted early in the construction phase. These will be clearly visible to machine operators. Hedgerow, tree and scrub vegetation that are to be retained which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation.
- Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary. Within the large field that accommodates the converter station site, a comprehensive landscaping scheme will be implemented, incorporating significant earthworks, berming, planting of approximately 15,000 native mixed-woodland trees, and zones of grassland meadow.
- There will be a defined working area which will be fenced off with designated haul routes to prevent inadvertent damage to adjoining habitats.
- To prevent incidental damage by machinery or by the deposition of spoil during site works, any habitats earmarked for retention nearby will be securely fenced or sign posted early in the construction phase. These will be clearly visible to machine operators.
- Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary.
- Mature trees, particularly over mature trees with the potential to provide bat roosts will be avoided. Any hedgerows or treeline habitat disturbed during construction will be replanted using a suitable mix of native species.
- Tree root systems can be damaged during site clearance and groundworks. No materials will be stored within the root protection area of mature trees.

Materials, especially soil and stones, can prevent air and water circulating to the roots. Retention of the existing networks of woodland/ treelines/ hedgerows will provide natural screening and help to maintain biodiversity. Where tree root systems cannot be avoided the trees will be assessed by an arboriculturalist to determine if crown reduction is required. If a small number trees are removed they will be replanted.

9.5.6 Otter Mitigation Measures

- No signs of otter or otter holts were noted within 150m of cable route, HDD launch pits or proposed converter station, although otter was recorded utilising habitats along the Campile River Estuary and at Baginbun Beach. Otters could occur along the Newtown/Kilmannock River. A detailed pre-construction survey will confirm the absence of otter holts within 150m of the proposed development area.
- If otter holts are recorded at that time, the supervising ecologist will determine the appropriate means of minimising effects i.e. avoidance, moving works, timing of works etc. If required the ecologist will obtain a derogation licence from the NPWS, to facilitate licenced exclusion from the breeding or resting site in accordance with a plan approved by the NPWS.
- Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA *Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006b)*. If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence. The prohibited working area associated with otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the otters have left the holt, as determined by a specialist ecologist. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the otters have left the holt prior to removal.

9.5.7 Crossing of the Newtown/ Kilmannock River Mitigation Measures

The key design mitigation measure for this watercourse crossing is the use of mini-HDD as the preferred construction methodology. Vegetation will not be significantly adversely affected as the majority of the access route to this location is on road, while off-road access is limited.

In the unlikely event that mini-HDD technology is not used, the following mitigation measures will be implemented:

- Works will comply with The IFI's Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016) and IFI will be

consulted with regard to any proposed overpumping at the Newtown River crossing.

- Construction activities at the Newtown River will be undertaken during daylight hours only This will ensure that there is potential for undisturbed fish passage at night. The works will be temporary and will not create a significant long term barrier to fish movement.
- Works will take place outside the most sensitive time for these species: during the summer periods from July – September inclusive. Due to dryer conditions in the summer period this will also minimise the risk of ground damage, minimises the potential for silt generation and thus minimises the risk of inadvertent ecological impacts.
- The least preferred option will be open cut methodology, therefore requiring dams to be put in place. The height of the dams and method of construction will take into account the potential impacts from high tide events downstream. Works during high spring tides will be avoided.
- Over-pumping of the stream will take into account that pumping may be required from downstream to upstream during high tides.
- Turbidity monitoring will be carried out to ensure that sediment levels are not significantly elevated above baseline levels.
- A fish salvage operation will be carried out by the supervising ecologist and fish, if present, will be relocated to suitable habitats in proximity to the proposed works. This will be carried out following receipt of a section 14 licence from Inland Fisheries Ireland and in consultation with Inland Fisheries Ireland.
- Sediment from the stream bed will be stockpiled outside of the flood plain and used to re-create the stream bed.
- Dams will be removed gradually, with silt curtains in place and under ecological supervision to minimise the potential for silt generation.
- Bankside impacts will be minimised, and any disturbed areas will be reseeded as soon as practicably possible after completion of works.

9.5.8 Badger Mitigation Measures

As a precautionary measure, the site will be surveyed for badgers immediately prior to the commencement of site works, to confirm the absence of badgers within the zone of influence of the development. If badgers are discovered at that time, the mitigation measures outlined in the NRA publication, *Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme* (NRA, 2006c), are to be followed. If necessary, the following measures will be employed for all construction works where badger issues arise:

- Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. Based on the results of badger surveys to date the HDD works at the Campile River Estuary will not take place within these buffer zones.
- During the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts or pile driving within

150m of active setts. Based on the results of badger surveys to date the HDD works at the Campile River Estuary will not take place within these buffer zones.

- Where badger setts are likely to be affected, they will be clearly marked and buffer zones for vehicles clearly marked by fencing and signage;
- Works close to badger setts or removal of badgers from a site will only be carried out under the supervision of a qualified ecologist under license from the NPWS;
- Where affected setts do not require destruction, construction works may commence once recommended mitigation measures to address the badger issues as identified by the supervising ecologist and agreed with NPWS, have been complied with. Such mitigation may include hoarding or visual screens.
- In the unlikely event that destruction of a badger sett is required this can only be carried out under licence from the NPWS. In these circumstances, which are highly unlikely to arise, badgers must have an alternative sett within their territory that can be utilised or an alternative artificial sett will be provided.

9.5.9 Bat Mitigation Measures

The first aim of the developer will be to entirely avoid or minimise the potential effect of the proposed development on bats and their breeding and resting places. During the site works, general mitigation measures for bats will follow the National Road Authority's '*Guidelines for the Treatment of Bats during the Construction of National Road Schemes' NRA (2005)* and *'Bat Mitigation Guidelines for Ireland: Irish Wildlife Manuals, No. 25'* (Kelleher, C. & Marnell, F. (2006)). These documents outline the requirements that will be met in the pre-construction (site clearance) stage to minimise negative effects on roosting bats, or prevent avoidable effects resulting from significant alterations to the immediate landscape.

The contractor will take all reasonable steps to ensure works do not harm individuals by altering working methods or timing to avoid bats, if necessary. No bat roosts were recorded within the proposed development areas. The following mitigation measures will be implemented:

- Any required felling of mature trees, as identified by the supervising ecologist, will be undertaken in autumn (September-November) or spring (April-May) to avoid the destruction of maternity roosts and hibernating sites. Young bats are unable to escape injury because they cannot fly. Equally, hibernating bats may not arouse sufficiently to avoid fatal injuries;
- Felled trees will not be mulched immediately. Such trees should be left lying several hours and preferably overnight before any further sawing or mulching. This would allow any bats within the tree to emerge and avoid accidental death. A bat ecologist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work should cease and the local NPWS Conservation Ranger should be contacted for advice;

- Bat roosting sites can change depending on a variety of factors and therefore the presence of bats should never be ruled out completely;
- Retain mature to semi-mature trees in external boundaries where possible and resist 'tidying up' dead wood and spilt limbs on tree specimens;
- Any inadvertent damage to treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by the supervising ecologist.
- During construction lighting will typically be provided by tower mounted 1000W metal halide floodlights that will be cowled and angled downwards to minimise spillage. The primary area of concern is the potential impact on woodland habitat at the HDD site at the Campile River Estuary HDD site. There will be no directional lighting focused towards this woodland and as noted above by cowling and focusing lights downwards light spillage will be minimised
- Felling of trees with no potential for roosting bats (features such as tree holes, crevices, loose bark, spilt limbs and dead wood are absent) does not require a bat specialist to be present;

If bats are recorded by the bat ecologist within any vegetation or structure on site i.e. trees, or walls to be removed or impacted on, no works will proceed without a relevant derogation licence from the NPWS.

Upon completion external lighting will be installed at the converter station. To avoid creating any unnecessary glare external lighting will be turned off during hours of darkness with the exception being for emergency outdoor works.

9.5.10 Bird Mitigation Measures

Works in close proximity to the Campile River Estuary will take place outside the peak season for wintering birds which runs from October to March inclusive. This will prevent any disturbance to wintering species utilising the sites during this period.

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Nonetheless, it is recommended that vegetation be removed outside of the breeding season.

Retention of the native treelines, hedgerows and woodland along the site boundaries will reduce the loss of breeding and nesting habitat for birds. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b).

Prior to the commencement of construction works a full survey for evidence of Barn owl occupation will be carried out by a suitably qualified person to ensure no offence is committed under the Wildlife Act. If evidence of Barn owl is found within the building, no construction work shall take place within 30 metres of any part of the site containing material evidence unless survey-based

evidence has been provided to the Local Planning Authority that no birds are nesting at the site to which the consent applies. If a nesting site were to be removed it would be necessary to create as a minimum the same amount of suitable Barn owl foraging habitat to that which is being lost to ensure no net loss in biodiversity. This can be on or off-site. A habitat management plan should specify a topping regime of not more than once a year and not before 15th July. Annual topping on a rotational basis can help ensure there is always some optimum foraging habitat available for the barn owls.

9.5.11 Biodiversity and Landscaping

A comprehensive landscaping scheme is proposed for the converter station and tail station site, leading to long-term local improvements in habitat and species diversity in the area.

9.5.12 Operational Phase

There will be two personnel stationed at the converter station at all times operating the interconnector, with only infrequent visits by personnel to the tail station, foul wastewater generated will be minimal. Foul wastewater will be collected from the welfare facilities in the converter station and tail station. It will be contained in the units and removed from site periodically, by a licensed service provider, to a local sewage treatment plant, which has adequate capacity.

Surface water on site will be collected in a new surface water drainage system. Surface water from the proposed access road will connect to the existing Great Island sub-station road drainage.

Surface water run-off from yard areas and the building roofs of the converter station and tail station, will discharge through proposed filter drains and surface water sewers, through a bypass interceptor, to a proposed attenuation pond, to be constructed to the southeastern part of the site. The attenuation pond will provide c. 800 m3 of storage and will discharge at greenfield rates.

Transformers will be sited within a reinforced concrete bund which will be linked to an underground oil dump tank.

Transformer bunds will be designed as waterproof structures in accordance with BS EN 1992-3. The bunds will be tested in accordance with standard bund testing requirements.

The height of all oil retaining area walls will be a minimum of 450mm above the finished substation ground level or the support plinth(s) of the associated contacting equipment, whichever is greater, to provide a physical barrier preventing possible vehicular contact with transformers.

Rainwater or other surface water within this bund shall permeate through a flame trap. Once permeated through the stone fire trap, the water will be collected in a common dump tank. It will then be pumped out of the dump tank via a bund water control pump to a manhole, before flowing by gravity to a hydrocarbon interceptor prior to final discharge into the surface water drainage system.

The oily water system will incorporate penstocks to close off the system.

The hydrocarbon interceptor system will include a Class 1 full retention unit in accordance with BS EN 858-1, incorporating a coalescer automatic closure device and high oil level alarm. The separator shall be fully capable of isolating all upstream oil flow in the event that the high-level oil alarm is activated. The interceptor will be sized to suit the storm intensity flow rates from the transformer bunds and any other designated oil containment area.

The lighting system will provide adequate illumination within the converter station to allow personnel to move without risk to health and safety. Security lighting will be installed against the building and GRP lighting poles of at least 6m height will be installed for illuminating the external area between buildings, transformer and reactor area and within the perimeter walls.

Under normal operating conditions, external lighting would be switched off during the hours of darkness, to avoid any unnecessary impacts on fauna including otter. The exception would be for emergency repairs to outdoor equipment, where high-level illumination would be switched on.

The key operational mitigations are the enclosure of key noise-emitting equipment. This includes acoustic enclosures for transformers, and the placing of particular items of plant at the converter station within buildings, thereby already limiting noise breakout to the atmosphere. **Chapter 8** of the EIAR *Noise and Vibration* notes that no significant residual noise and vibration effects are predicted during the operational phase.

9.5.13 Decommissioning

The mitigation measures, described for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase.

9.6 Cumulative and Transboundary Effects

The proposed development forms part of the Greenlink project, which also includes offshore elements, and works in the United Kingdom.

The only potential for cumulative or interactive effects with the wider project occur at the landfall site near Baginbun Beach, as described in **Chapter 18** *Cumulative, Transboundary and Interactive Effects* and the potential effects at this location have been fully documented in this chapter. Considering the nature and location of the proposed development as described in **Chapter 3** and **Chapter 4** no transboundary effects are predicted.

Two permitted developments have been identified, which will be located in the general vicinity of the proposed development site and which have the potential to result in cumulative effects arising from their construction and/or operation. These were the only proposed developments in the area which were of sufficient scale to have the potential to have a significant cumulative impact with the proposed development. These projects are assessed below in Table 9.17.

Table 9.17 Potential Cumulative Effects

Plans and Key Policies/Issues/Objectives		
Greenlink Project – Marine Impacts	Marine habitats which are specifically addressed within the Greenlink Marine Natura Impact Statement[Error! Bookmark not defined.]	Impacts relating to the qualifying marine habitats for the Hook Head SAC ('Reef' and 'Large shallow inlets and bays') are specifically addressed in the Greenlink Marine Natura Impact Statement. This report concluded that "*there will be no adverse effects on the conservation objectives of the Qualifying Interest*" in relation to reef habitats and that there will be "*No Adverse Significant Effect to Qualifying Interest*" in relation to large shallow inlets and bays. In the absence of any significant adverse effect in relation to the terrestrial and marine components of the project no significant adverse effect on qualifying interests and conservation objectives for Natura 2000 sites has been identified.
River Basin Management Plan 2018-2021	The project should comply with the environmental objectives of the Irish RBMP which are to be	The implementation and compliance with key environmental policies, issues and objectives of this

	achieved generally by 2021. • Ensure full compliance with relevant EU legislation • Prevent deterioration • Meeting the objectives for designated protected areas • Protect high status waters • Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will build knowledge for the third cycle.	management plan will result in positive cumulative effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. It will not contribute to cumulative impacts with the proposed development.
Inland Fisheries Ireland Corporate Plan 2016 -2020 **The Inland Fisheries Act 2010.**	To ensure that Ireland's fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and that pristine aquatic habitats are also enjoyed for other recreational uses. To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected. To grow the number of anglers and ensure the needs of IFI's other key	The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive on-combination effects to European sites. The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. It will not contribute to cumulative impacts with the proposed works.

	stakeholders are being met in a sustainable conservation focused manner. EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning salmon and trout.	
Irish Water Capital Investment Plan 2014-2016	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and biodiversity requirements through reducing: • Habitat loss and disturbance from new / upgraded infrastructure; • Species disturbance; • Changes to water quality or quantity; and • Nutrient enrichment /eutrophication.	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare, and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water's short, medium and long-term objectives and identifies strategies to achieve these objectives. As such,

		the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of upgrades and new builds within the Irish Water owned assets. The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, no likely significant cumulative effects are envisaged.
Wexford County Development Plan 2013-2019	Strategic Environmental Objectives within the development plan include: B1 - Conserve and enhance the diversity of habitats and species	The implementation of the Wexford County Development Plan 2013-2019 will have a positive impact on biodiversity. It will not contribute to

	within the county, and support the sustainable management of these areas. B2 - Ensure compliance with the Habitats Directive with regard to protection of Natura 2000 sites and habitats 197 and species listed under Annexes I and II of the Directive and prevent the loss of ecological networks and stepping stones or parts thereof which provide important connectivity for species. B3 - To ensure compliance with Article 10 of the Habitats Directive with regard to the protection of wildlife corridors and contiguous areas of habitat which are important on a County level for wild fauna and flora and essential for the migration, dispersal and genetic exchange of wild species. B4 - Protect aquatic and terrestrial habitats from the spread of invasive species.	cumulative impacts with the proposed development.
WWTP discharges	Fethard-on-Sea and Environs WWTP, Duncannon WWTP, Campile WWTP, New Ross WWTP, Graignuenamanagh Tinnahinch WWTP, Borris Waste Water Works, Goresbridge WWTP, Muinebheag and Leighlinbridge WWTP, Carlow WWTP, Athy WWTP, Stradbally Agglomeration WWTP, Monasterevin Town, WWTP, Portarlington WWTP, Thomastown WWTP, Bennettsbridge WWTP, Kilkenny City and Environs WWTP, Castlecomer WWTP, Clogh – Moneenroe WWTP, Durrow WWTP, Waterford	Discharges from municipal WWTPs are required to meet water quality standards. Irish Water Capital Investment Plan 2014-2016 and 2017 – 2021 proposes to upgrade water treatment services countrywide. Discharges from municipal WWTPs are required to meet water quality standards Given that no significant effect on water quality is predicted from this proposed project no significant cumulative

	city WWTP, Portlaw WWTP, Carrick-on-Suir WWTP, Fiddown WWTP, Kilsheelan WWTP, Clonmel WWTP etc.	effects on water quality will occur.
Great Island Power Station		Discharges from and noise levels relating to the Great Island Power Station are governed by strict limits to ensure compliance with quality standards. No long-term cumulative impact will occur
Great Island – Kilkenny 110kV Line Uprate Project	Permission was sought for the development at the existing Great Island to Kilkenny 110 kV overhead line which is approximately 49 kilometres long. Approximately 2.6km of the existing circuit is located within the functional area of Wexford County Council with approximately 46.4lm located within County Kilkenny. The development will consist of the uprate of the Great Island Kilkenny 110 kV overhead line which will primarily include: re-stringing the conductor with a higher capacity conductor, replacement of a large proportion of existing structures, breaking out and reconstruction of the concrete foundation and shear blocks of metal masts, painting of mast structures, replacement of insulators, crossarms, stays and/or fittings on existing structures; and the	Given the nature and location of this project, no significant cumulative effects will occur The uprate project has sufficient physical separation from the site of the proposed development to reduce the potential for cumulative noise and vibration effects and surface water effects to a negligible level. If the construction of the energy storage system is concurrent with the bulk excavation works on the site of the converter there is potential for cumulative effects, as the sites are located adjacent to each other. Should this situation arise, construction activities

	fitting/replacement of bird flight diverters. No additional structures are proposed along the existing circuit. Any replacement structures will be reconstructed at or immediately adjacent to the existing structures they will replace and will be of a generally similar height and appearance. Associated temporary site development works to gain access to the existing structures include clearance of vegetation, disassembly and reassembly of stone walls and gate posts and removal and reinstatement of existing fencing. The proposed development includes all other temporary associated and ancillary site development works required for the uprate of the existing circuit, including the installation of silt traps, silt fences, stone roads, bog mats and clean span bridges. No additional structures, no alteration to the nature, extent, alignment, character or voltage of the existing electricity infrastructure is proposed.	will be planned and phased, in consultation with the construction management team for the energy storage system project. Given the location of these projects (in areas of relatively low habitat and species value), together with the implementation of best practice standard construction environmental measures, the CEMP for the proposed development and the Construction Traffic Management Plan, as detailed, no significant cumulative effects on biodiversity will result.
Great Island Energy Storage System	Permission for the development of a grid system services facility within a total site area of up to 1.15 hectares, to include 1 no. TSO compound including 1 no. single storey TSO electrical	This project is located adjacent to the site of the proposed converter and tail station and surrounded on three sides by the red-line boundary of the

	substation building and 1 no. single storey customer substation, electrical inverter/transformer station modules, containerised battery storage modules on concrete support structures, heating, ventilation and air conditioning units (HVAC units). Access tracks and upgraded site entrance, associated electrical cabling and ducting, security gates, perimeter security fencing, CCTV security monitoring system, landscaping works and all associated ancillary infrastructure on land.	proposed development. It is possible that the construction of these projects with the proposed development could overlap. However, given the location of these projects (in areas of relatively low habitat and species value), together with the implementation of best practice standard construction environmental measures, the CEMP for the proposed development and the Construction Traffic Management Plan, as detailed, no significant cumulative effects on biodiversity will result.

9.7 Residual Effects

9.7.1 Residual Effects - Habitats

The proposed development will have effects on habitats that are primarily of limited local ecological value and there will be no perceptible effect on habitats listed as qualifying interests the River Barrow and Nore SAC (Estuaries, Mudflats and sandflats not covered by seawater at low tide, *Salicornia* nd other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and Mediterranean salt meadows (*Juncetalia maritimi*)) or Hook Head SAC (Vegetated sea cliffs of the Atlantic and Baltic coasts).

There will be a net loss of common terrestrial habitats, and high value habitats have been avoided at the design stage. No significant effect due to habitat fragmentation or significant effects on commuting routes for fauna will occur. No rare or uncommon plant species were recorded. Landscaping and tree planting at the proposed converter site will provide additional habitat which will be greater value from an ecological viewpoint over time. There will be a loss of semi-natural vegetation, including scrub and hedgerow/treelines within the offline work area. This is considered a long-term localised, imperceptible impact.

Trees on roadsides along the route were surveyed and will be avoided where possible. The root development of trees is likely to have been curtailed by the existing road surface. Where the route cannot avoid mature tree roots an arboriculturist will specify appropriate crown reduction to maintain the stability of the trees. No significant loss of trees will occur and any trees removed will be replaced. Additional habitat will be created by the planting of native trees.

9.7.2 Residual effects -Designated sites

The southern HDD compound for the Campile River Estuary is located within low value agricultural grassland within the Barrow River Estuary pNHA. The temporary loss of grassland habitat will have an imperceptible effect on this pNHA. The Campile River Estuary will be crossed via HDD methodology which will also be utilised at the Baginbun landfall site. This effectively prevents any direct effects on designated sites. Noise, lighting, vibration during construction will not have a significant effect, as it will be temporary in nature, will be subject to detailed mitigation and due to the distance from the boundary of Natura 2000, the effects will be insignificant. As detailed below no significant effects on water quality, migratory fish, otter or birds or significant effects from the spread of invasive species will occur. No significant effects will arise during operation and decommissioning. It is concluded therefore that there will be no significant effect on Natura 2000 sites.

9.7.3 Residual effects - Invasive species

Japanese Knotweed and Three-Cornered Leek were recorded within the study area and these stands will be avoided. Where avoidance is not possible, they will be eradicated within the works area and biosecurity measures will be implemented to prevent any spread offsite. Rhododendron may also be avoidable and if this not feasible it will also be eradicated from the works area. Winter Heliotrope is ubiquitous in road verges and will be eradicated from the works area via a standard herbicide treatment programme. Mitigation measures in relation to invasive species are included in the ISMP which will be modified to include up to date monitoring data. No effect from the spread of invasive species will occur.

9.7.4 Residual effects - aquatic ecology

Impacts on water quality could potentially arise from elevated silt and hydrocarbon levels in surface water run-off and hydrocarbon contamination of surface and ground water. The HDD and Converter Station sites are located in proximity to tidal waterbodies which support species and habitats that are adapted to extreme fluctuations in silt levels and which provide considerable dilution in relation to possible hydrocarbon contamination. The use of HDD methodology at sensitive locations will effectively prevent any such effects from occurring. Based on an assessment of potential risks, a range of detailed mitigation measures have been specified in line with appropriate guidelines for each element of the project, to prevent any significant effect on water quality from occurring. These include measures in relation to hydrocarbon usage and storage, methodologies for silt control, measures in relation to the discharge of surface water arising within the works area and measures in relation to stockpiling excavated material. Based on the above no significant effect on water quality will occur. Therefore, there will be no significant effect on aquatic habitats and no knock-on effect on otter which is listed as a qualifying interest for the River Barrow and River Nore SAC which includes the Campile River Estuary or on common fish species on which otter feed.

The Newtown River, which is tidal at the crossing point is of low fisheries value and may be crossed via an open cut method. A fish salvage operation will be carried out by the supervising ecologist to ensure that fish mortality is prevented. The instream works will create a barrier to fish movement, however this is a temporary impact and this small, heavily modified and culverted watercourse does not provide suitable habitat for Annex II species which are listed as qualifying interests for the River Barrow and River Nore SAC (River Lamprey, Sea Lamprey, Salmon and Twaite Shad). No significant effect on migratory fish will occur.

Kingfisher (listed on Annex 1 of the Birds Directive) was recorded along the Newtown River upstream of the works area. No evidence of otter (listed on Annex 2 of the Habitats Directive which is a qualifying interest for the River Barrow and River Nore SAC) were recorded within 150m of the Newtown River crossing and discharge outlet which will used during operation.

In the absence of significant effect on water quality and fish populations no significant effect on otter or kingfisher will occur. The overall impact on water quality and fish is considered a temporary, imperceptible impact.

During operation surface water will be discharged to an attenuation pond before discharging to a tidal section of the Newtown River. The use of a hydrocarbon interceptor will prevent any potential effects from hydrocarbons. The is considered a long-term, and imperceptible impact.

9.7.5 Residual effects - Vibration, lighting, noise and disturbance

Levels of vibration, lighting, noise and disturbance will increase during construction and a range of mitigation measures have been specified to minimise such impacts. The construction of the converter station will include rock breaking and blasting and short-term works at HDD sites will take place 24/7. This is likely to lead to short-term disturbance and displacement of common bird and mammal species during the construction period. The habitats in proximity to the converter station consist of common agricultural and industrial habitats which are not of significant value for fauna. The buffer zone between the HDD sites and the Campile River Estuary provides a sufficient buffer to prevent significant effects on badgers utilising woodland on the northern bank of the Campile River Estuary, and on bird species within and adjacent to the estuary. Any residual effect will be temporary and imperceptible. No significant effects on bats. Any residual effect will be temporary and imperceptible.

Otter were not recorded at the Newtown River and although they could potentially occur this small water courses is not a critical resource for this species. The buffer zone between the HDD sites and the Campile River Estuary and the HDD site and Baginbun Beach are sufficient to prevent any significant effect from occurring with respect to bird populations utilising the estuary or marine environment for foraging. By confining works at the Campile River Estuary to the April to September period no effects on winter bird species utilising estuarine mudflats will be prevented.

9.7.6 Residual effects – Cumulative

Other plans relevant to the proposed development and potential cumulative impacts were assessed and where necessary mitigation measures specified. This included an assessment of the marine elements of this project. No significant cumulative effects will occur.

9.7.7 Residual effects - Operation

In relation to the converter station where operation effects could potentially occur, sufficient mitigation in relation to noise has been built in the project design and the level of human activity will be low. Lighting will be turned off at night. Levels of ongoing noise, lighting and disturbance associated with the operation of the converter will not be significant and fauna would be expected to habituate to the prevailing conditions in a relatively short time period.

Otter were not recorded at the Newtown River to the south of the converter station and this river is not a critical resource for this species.

Mitigation measures which have been specified in relation to water quality effects including appropriate storage of chemicals, the use of a hydrocarbon interceptor and discharge via an attenuation pond ensuring that there will be no significant effect on water quality during operation.

9.7.8 Residual effects – Decommissioning

When it becomes appropriate to decommission the interconnector, each item of equipment in the converter station and tail station will be removed with appropriate management, based on the waste regulations and environmental guidelines at the time of decommissioning. All above ground structures within the proposed converter station and tail station footprint will be removed and the site will be returned to its previous state. Underground cables will remain in-situ as there would be more of an environmental impact in their removal. Ecology and invasive species surveys will be carried out prior to decommissioning and appropriate mitigation will be provided based on up to date data and in line with up to date guidelines. The original habitats will be restored and levels of noise, lighting and disturbance will return to levels pre-construction. Therefore, no significant effect from decommissioning or the decommissioning process will occur.

9.7.9 Impact Assessment Summary

Table 9.18 summarises the potential biodiversity impacts, mitigation and monitoring measures and residual impacts that will arise following implementation of the mitigation measures.

Table 9.18 Summary of Impacts, Mitigation Measures and Residual Impacts

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Converter Station and Tail Station Site and Adjacent Lands				
Buildings and artificial surfaces (BL3)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Recolonising bare ground ED3/ Buildings and artificial surfaces (BL3)/Scrub WS1	**Negative, slight, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Improved agricultural grassland (GA1)	**Negative, slight, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Immature woodland (WS2)	**Neutral, imperceptible, long-term impact.**	None proposed	None proposed	**No significant effects**
Scrub (WS1)	**Negative, slight, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Treelines (WL2) /(Mixed) Broadleaved Woodland (WD1)/ Scrub	**Neutral, not significant, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Hedgerow (WL1)/Scrub (WS1)/ Dry meadow and grassy verge (GS2)	**Negative, not significant, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Tidal River CW2	**Negative, slight, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Off-road area between Great Island and the Campile River Estuary				
Improved agricultural grassland (GA1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Arable crop (BC1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Hedgerow (WL1)	**Neutral, not significant, temporary impact.**	None proposed	None proposed	**No significant effects**
Dry meadow and grassy verge (GS2) (of insufficient size to be mapped)	**Neutral, not significant, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Buildings and artificial surfaces (BL3)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
(Mixed) broadleaved woodland (WD1)/ Treeline (WL2)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Stone walls and other stonework (BL1)/ Spoil and bare ground (ED2)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Drainage ditch (FW4)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Tidal river (CW2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Minor off-road areas adjacent to roads				
Arable crop (BC1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Improved agricultural grassland (GA1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Campile River Estuary Crossing				

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Tidal rivers (CW2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Upper salt marsh (CM2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Mixed broadleaved/ conifer woodland (WD2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Mixed broadleaved woodland (WD1)/Treelines (WL2)/Hedgerows (WL1)/Scrub (WS1)	**Neutral, imperceptible, temporary impact**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Improved agricultural grassland (GA1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Recolonising Bare Ground (ED3)/Scrub (WS1)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Embankment (BL2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Baginbun Beach Landfall Site and Road-side Car Parking Area				

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Rocky sea cliffs (CS1) / Sedimentary sea cliffs (CS3)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Buildings and artificial surfaces (BL3) / Spoil and bare ground (ED2)	**Neutral, imperceptible, temporary impact.**	None proposed	None proposed	**No significant effects**
Sand shores (LS2)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Improved agricultural grassland (GA1)	**Neutral, imperceptible, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Arable crop (BC1)	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Scrub WS1	**Negative, slight, permanent impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Otter				
Habitat	**Negative, slight, short-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Bats				
Roosting sites, foraging sites, hibernation sites	**Negative, slight to negligible, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Badger				
Habitat and setts	**Negative, slight, long-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Other Mammals				
Habitats, noise and disturbance	**Negative, slight, long-term impact**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Birds				
Habitat	**Negative, slight, permanent impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Shoreline / Estuarine Habitats	**Negative, slight, short-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Other Fauna				
Amphibians, reptiles, invertebrates	**Negative, slight, temporary impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**
Water Quality and Aquatic Ecology				
Marine and aquatic habitats	**Negative, not significant, short-term impact.**	Refer to CEMP and detailed breakdown in Section 9.5	Refer to CEMP and detailed breakdown in Section 9.5	**No significant effects**

9.8 Conclusions

All potential ecological constraints were identified and incorporated into the project design and appropriate mitigation specified. Overall, it has been concluded that the project will not have a significant effect on ecological receptors and no significant effect on ecology has been identified.

9.9 References

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