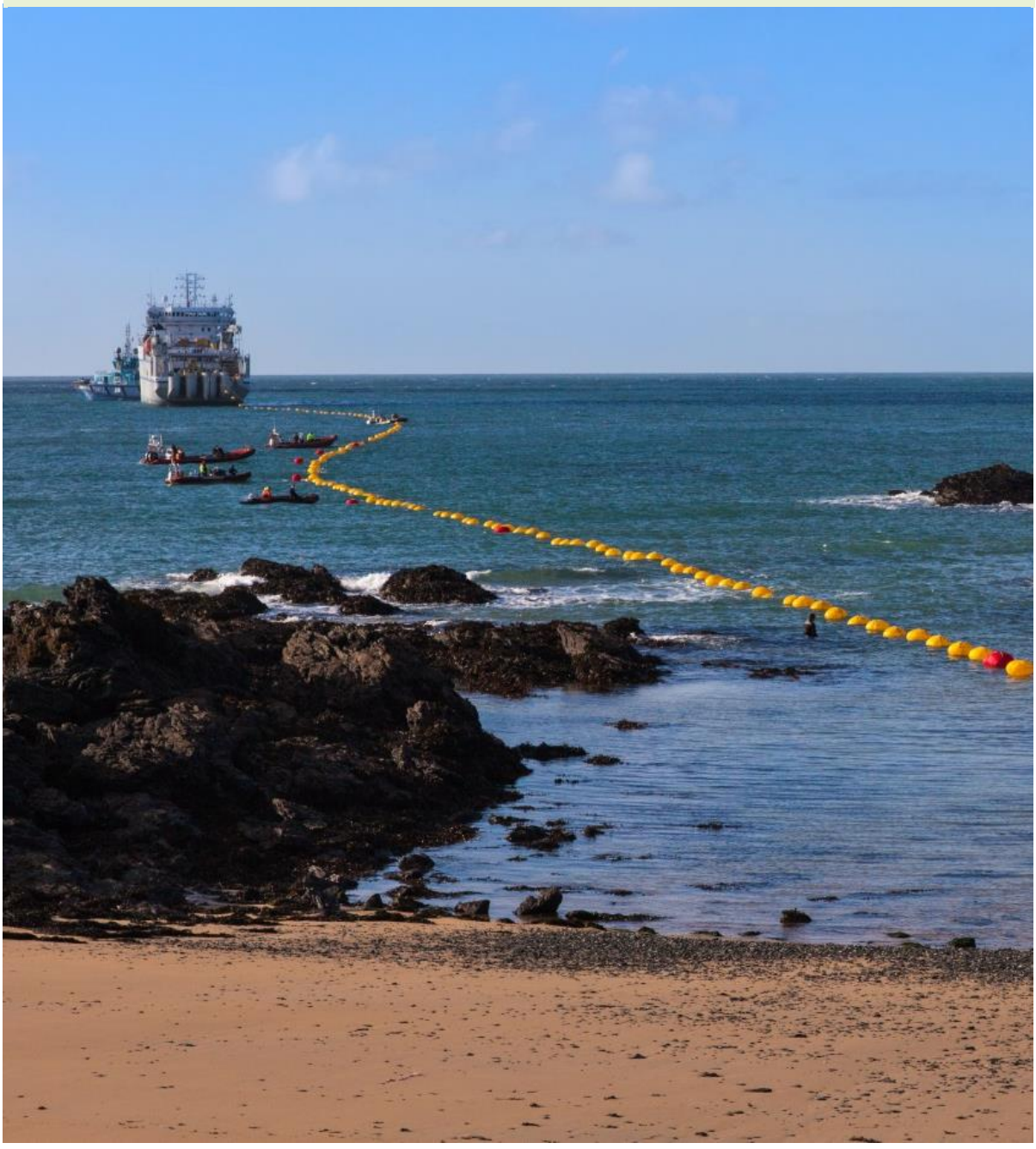
GREENLINK INTERCONNECTOR LIMITED

# ENVIRONMENTAL IMPACT ASSESSMENT (EIA) SCOPING REPORT – GREENLINK: IRELAND (ONSHORE)



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**Ove Arup & Partners Ireland Limited**

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# Contents

# 0. DOCUMENT RELEASE FORM

*Greenlink Interconnector Limited [Greenlink: Ireland (Onshore)]*

Environmental Impact Assessment (EIA) Scoping Report [Greenlink: Ireland (Onshore)]

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# 1. INTRODUCTION

## 1.1 GENERAL

Greenlink Interconnector Limited (trading as 'Greenlink', and also referred to as 'GIL') proposes to develop an electricity interconnector (Greenlink) linking the existing electricity grids in Great Britain and Ireland. GIL is a project company incorporated by Element Power. Element Power is a global renewable energy developer that develops, acquires, builds, owns and operates a portfolio of wind and solar power generation facilities worldwide. Element Power is owned by Hudson Clean Energy Partners, a global private equity firm dedicated to investing in renewable power, alternative fuels, energy efficiency and storage.

The 'Greenlink' project is an electricity interconnector consisting of two converter stations, one close to the existing substation at Great Island in County Wexford (Ireland) and one close to the existing Pembroke substation in Pembrokeshire (Wales), connected by electricity cables running underground (onshore) and subsea (offshore). The project is currently at the pre-planning stage, with design and environmental assessment ongoing at present.

This report, prepared by Arup, summarises the scope of the environmental assessments being proposed for the Irish onshore components (which comprise the Project for the purpose of this Scoping Report) and provides relevant stakeholders with information in respect of the proposed project, to allow them engage appropriately in the scoping process. Similar environmental assessment scoping reports have been prepared separately for the other components of Greenlink, offshore, and onshore in Wales. The project is described in Section 2 of this Report.

The proposed interconnector does not constitute a "project" listed within either Annex I or Annex II to Directive 2011/92/EU as amended by 2014/52/EU ("the EIA Directive"). Accordingly, an Environmental Impact Assessment (EIA) is not required in relation to the proposed interconnector. Notwithstanding this, GIL is cognisant of the broad interpretation required of the EIA Directive and the sectoral categories of projects referred to in Annex I and Annex II of the EIA Directive. Accordingly, GIL are inviting the competent authorities for both the Irish proposal and Welsh proposals to determine that an EIA is required and an Environmental Impact Assessment Report (EIAR) is required to be submitted with the applications for development consent.

This EIA Scoping Report seeks to confirm the scope and level of detail required to prepare an EIAR for the Irish onshore components only.

## 1.2 PROJECT OVERVIEW

Greenlink will link the EirGrid and National Grid electricity networks and the markets which they serve. The project is independent from the power generation sources that will produce the power to be transmitted across the interconnector; the interconnector will transfer whatever power is produced to those networks at the given time. Accordingly, the interconnector will facilitate power transfer in both directions.

The design of the project has evolved through constraints assessments, options appraisal and consultation with relevant stakeholders, including among others, Wexford County Council, Port of Waterford, the National Parks and Wildlife Service and landowners.

## 1.3 PROJECT NEED

Greenlink will have key strategic importance, providing significant additional interconnection between Ireland, the UK and onwards to mainland Europe. It will provide additional transmission network capacities, reinforcing the existing electricity grids in south-east Ireland and south Wales and contributing to each country's strategic interconnection objectives. The development and construction of Greenlink will deliver increased security of supply, fuel diversity and greater competition and will ultimately provide significant benefits to consumers in Ireland, Wales, Great Britain as a whole and mainland Europe. It is recognised that there are significant benefits to be accrued both in Ireland and the UK from the provision of additional interconnection of the two national electricity grids.

Greenlink will provide additional electricity interconnection and import/export capacity between Ireland and the UK which will enable greater:

- energy market integration;
- sharing of electricity reserve, generation capacity and ancillary services between Ireland and the UK;
- competition in electricity supply and capacity markets; and
- competition in system services.

The 'Energy Union' launched by the European Commission in February 2015, and endorsed by Member States in October 2015, is driving a fundamental transition towards more innovative ways to produce, transport and consume energy, and to address different approaches to design, implement and, where needed, enforce energy policy. A range of actions will be required to make this happen, including improvements to the physical interconnectedness of energy grids (both gas and electricity) to meet a 10% interconnection target by 2020 and to possibly reach 15% by 2030.

An interconnected European energy grid is vital for Europe's energy security, for more competition in the internal market resulting in more competitive prices, and for better achieving the decarbonisation and climate policy targets, to which the EU has committed. An interconnected grid will help to deliver the ultimate goal of the Energy Union i.e. to ensure affordable, secure and sustainable energy, as well as growth and jobs across Europe.

## 1.4 PLANNING PROCESS FOR THE PROPOSED DEVELOPMENT

### 1.4.1 PROJECTS OF COMMON INTEREST

In 2013, the European Union adopted Regulation (EU) No 347/2013 guidelines for trans-European energy infrastructure. This is known as the "TEN-E" regulation. The new regulation established a process to identify "Projects of Common Interest" (PCI). The regulation aims to implement a streamlined permitting procedure for such projects by requiring Member States to appoint a Competent Authority responsible for collating and co-ordinating the issuing of all the consents and decisions required from all relevant authorities.

An Bord Pleanála was designated the Competent Authority in Ireland for PCI. An Bord Pleanála has issued a document entitled 'Projects of Common Interest Manual of Permit Granting Process Procedures' which outlines the process to be followed for all PCI projects in Ireland.

The European Union identified 248 energy infrastructure projects, in the first Projects of Common Interest (PCI) list. These PCI projects encompassed a range of network development, smart grids, energy storage and interconnector projects involving two or more EU Member states. To ensure effective and efficient implementation of the projects, the European Commission is focusing on improving regional cooperation between Member States as part of the TEN-E Regulations. Greenlink has been awarded Project of Common Interest (PCI) status making it one of Europe's most important energy infrastructure projects and granting it the 'highest national significance' possible.

GIL has commenced PCI notification consultations with An Bord Pleanála in Ireland and the Welsh Government. Liaison between the Irish and Welsh counterparts is ongoing in respect of co-ordination of the various permitting requirements.

### 1.4.2 STRATEGIC INFRASTRUCTURE

The Planning and Development Act 2000 was amended in 2006 to require applications for planning permission for major infrastructure, including electricity transmission and gas infrastructure projects to be made directly to An Bord Pleanála rather than to the local planning authority, as would have previously been the case.

Greenlink commenced pre-application consultations with An Bord Pleanála in relation to the Ireland onshore elements of the project in November 2016 under section 182E of the Planning and Development Act, 2000, as amended. It is considered likely that the project will be determined a strategic infrastructure development.

### 1.4.3 ENVIRONMENTAL IMPACT ASSESSMENT SCREENING

The current requirements for EIA for projects in Ireland are set out in Council Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU. Directive 2014/52/EU amends Directive 2011/92/EU in a number of respects. For example, an Environmental Impact Statement (EIS) is now referred to as an Environmental Impact Assessment Report (EIAR). In Ireland, EIA requirements in relation to planning consents are currently specified in Part X of the Planning and Development Act, 2000, as amended and in Part 10 of the Planning and Development Regulations, 2001, as amended.

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 come into operation on 01 September 2018, and these regulations transpose the 2014 EIA Directive.

Greenlink is not Environmental Impact Assessment (EIA) development within Wales or Ireland, and the component parts of Greenlink (such as the converter stations or underground / subsea cables) are not EIA development, for the purposes of the Directive 2011/92/EU as amended by 2014/52/EU (the EIA Directive).

In spite of the position under the EIA Directive and EIA Regulations, GIL has decided to voluntarily submit an EIA on the basis that the Irish Courts' interpretation of the EIA Directive is evolving and

may go beyond GIL's interpretation of the EIA Directive. GIL is keen to ensure that Greenlink is not exposed to any challenge risk in either Ireland or Wales, and that actions taken in Wales do not undermine the Irish consenting process.

As described above, GIL has adopted a voluntary EIA approach, and will be preparing an EIAR (or equivalent) for each component of the project. The EIA reporting in each case will include the predicted cumulative effects of the entire Greenlink project.

### 1.4.4 APPROPRIATE ASSESSMENT SCREENING

Article 6(3) of *Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended) (hereafter 'the Habitats Directive') requires that, any plan or project not directly connected with or necessary to the management of a designated site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. For the purposes of the proposed project, the requirements of Article 6(3) have been transposed into Irish law by Part XAB of the Planning and Development Act 2000, as amended.

As set out in Section 177U of the Planning and Development Act 2000 as amended, a screening for appropriate assessment must be carried out by the competent authority to assess, in view of best scientific knowledge, if the proposed project, individually or in combination with another plan or project is likely to have a significant effect on any European site. A Stage Two Appropriate Assessment is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The first (Screening) Stage for appropriate assessment operates merely to determine whether a (Stage Two) Appropriate Assessment must be undertaken on the implications of the plan or project for the conservation objectives of relevant European sites.

### 1.4.5 OTHER CONSENTS REQUIRED

The Irish offshore component of Greenlink from the high tide mark at the Irish coast to the 12-mile limit (12 nautical miles, approximately 22.22 km) of the territorial seas will require a licence under the Foreshore Acts. Currently, the competent authority under the Foreshore Acts is the Department of Housing, Planning and Local Government. New foreshore legislation is proposed which would see responsibility for such consents being transferred to An Bord Pleanála, but this legislation is yet to be finalised. The component of the project (offshore cable), from the 12-mile limit to the median line between Ireland and the United Kingdom, does not require consent under the Continental Shelf Act. The components of Greenlink in Wales and from the median line to the Welsh coast will also require consents from the relevant competent authorities.

In addition, the following permits will be required for the Irish onshore components:

- Authorisation to Construct an Interconnector under Section 16 of the Electricity Regulation Act 1999, to be issued by the Commission for the Regulation of Utilities
- Consent to exercise the powers of ESB pursuant to section 53 of the Electricity (Supply) Act 1927 to Lay Electricity Lines Across Lands under Section 49 of the Electricity Regulation Act 1999, to be granted by the Commission for the Regulation of Utilities

- Consent to exercise the power to lay electric lines conferred on ESB by section 51 and section 52(1) of the Electricity (Supply) Act 1927, to lay Electricity Lines Under the Public Road under Section 48 of the Electricity Regulation Act 1999, to be granted by the Commission for the Regulation of Utilities
- (if required) Special Order for the Compulsory Acquisition of Lands for Converter Station site under Section 45 of the Electricity (Supply) Act 1927, as amended by Section 47 of the Electricity Regulation Act 1999, to be issued by the Commission for the Regulation of Utilities.

## 1.5 PURPOSE OF SCOPING

The purpose of the EIA scoping process is to identify the issues which are likely to be important during the environmental assessment and to eliminate those that are not. The scoping process will identify the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. The issues identified in the scoping process will be examined in the EIAR. Any potential impacts will be quantified, mitigation measures proposed as required and residual impacts described. The scoping process also identifies the appropriate level of detail for the information to be provided in the EIAR.

It is proposed to directly consult with the relevant statutory and non-statutory consultees, with this scoping report, to scope the work required for the EIAR.

## 1.6 ON-GOING CONSULTATION

An extensive consultation process will be undertaken by GIL and the environmental assessment team. Organisations consulted to date include:

- An Bord Pleanála – SID unit
- An Bord Pleanála – PCI unit
- Wexford County Council
- Port of Waterford Company
- Commission for Energy Regulation
- Department of Culture, Heritage and the Gaeltacht
- Department of Housing, Planning and Local Government
- Department of Communications, Climate Action and Environment
- The National Parks and Wildlife Service
- The National Monuments Service
- Irish Rail.

As part of the PCI process, Greenlink is preparing a Concept for Public Participation (CPP) which will set out its proposed strategy for public participation in the project consent process. This will be a

comprehensive document and will ensure that the public are consulted appropriately throughout the project.

Greenlink has set up a project specific website (http://www.greenlinkinterconnector.eu/) which provides regular updates with respect to the project.

This scoping document will be sent to the organisations listed above and, at a minimum, the following:

- Relevant regional authorities
- Relevant county development boards
- Other relevant government departments
- Environmental Protection Agency
- Transport Infrastructure Ireland
- National Transport Authority
- Health and Safety Authority
- Sea Fisheries Protection Authority
- Railway Safety Commission
- Railway Procurement Agency
- Iarnród Éireann
- Heritage Council
- Fáilte Ireland
- An Chomhairle Ealaíon (The Arts Council)
- Marine Institute
- Office of Public Works
- Geological Survey of Ireland
- Environmental NGOs including:
    - An Taisce
    - Birdwatch Ireland
    - Irish Whale and Dolphin Group
    - Irish Peatland Conservation Council
    - Irish Wildlife Trust

- Bat Conservation Ireland

Comments on the scope of the EIAR can be submitted via the Greenlink website's 'Contact Us' page: https://www.greenlinkinterconnector.eu/contact

Alternatively, comments can be emailed directly to Dan Garvey at daniel.garvey@arup.com

# 2. PROJECT DESCRIPTION

## 2.1 GENERAL

The main Irish onshore components are the converter station at Great Island, the onshore cable and the landfall at Hook Head. These elements are described below, and comprise the proposed development for the purposes of this Scoping Report. The marine and Welsh components of the project are also described in outline. The Irish onshore components are shown on the Route Options Map **Figure 2.1** below.

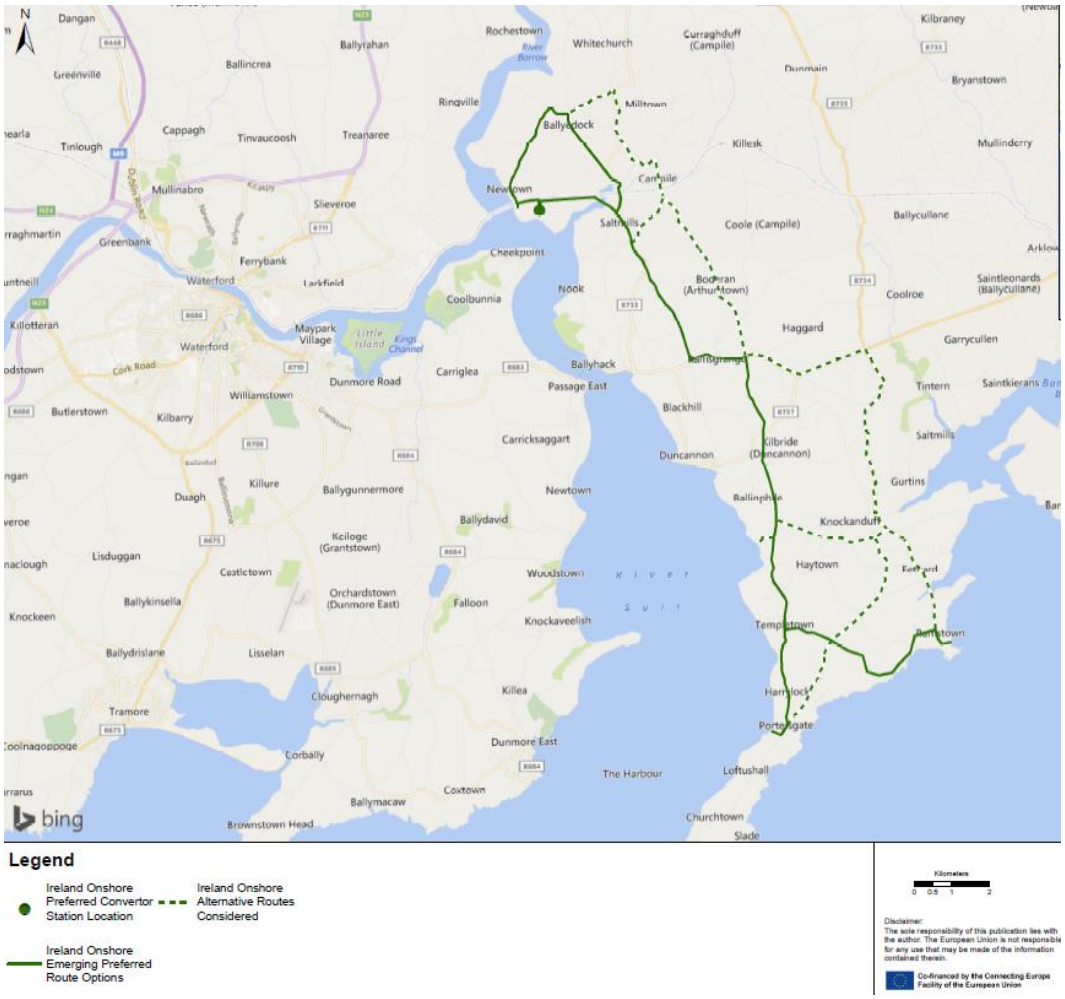


**Figure 2.1 Cable Route Options and Converter Station Location | Ireland (Onshore)** [not to scale]

The onshore elements in Ireland will consist of the following:

- A converter station (adjacent to the Great Island substation);
- A landfall site at either Boyce's Bay or Baginbun Beach on Hook Head, Co. Wexford;
- HVDC (High Voltage Direct Current) underground DC cables connecting the submarine DC cables at the landfall to the converter station – mostly routed within existing roads;

- HVAC (High Voltage Alternating Current) electricity cables connecting the converter station to a substation; and
- Cable jointing bays for the installation of the cables along the route.

### 2.1.1 CONVERTER STATION

A preferred site for the converter station at Great Island is emerging adjacent to the existing Great Island Substation. The converter station will convert the outgoing or incoming electrical power from Alternating Current (or AC, which is the type of current in the EirGrid and National Grid electricity networks) to Direct Current (or DC, which will be the type of electrical current to be used in the Greenlink Interconnector as it is suitable for long-distance electricity transmission), or DC to AC as appropriate.

In order to connect the Greenlink interconnector to the existing high voltage network it will be necessary to install additional equipment at the Great Island substation. This equipment is likely to include current, voltage and harmonics measuring devices as well as disconnectors, circuit breakers, surge arrestors and AC cable termination points. This will typically occupy an area of 70m by 50m. If there is not sufficient space within the existing substation, EirGrid may require that the footprint of the Converter Station is increased to include what is referred to as a 'tail station'. The final requirements for this work will be determined by ESB (as the owner of Great Island substation and the wider electrical network).

The indicative converter station site footprint is likely to be at least 1.85 hectares, with the requirement for additional land take for access, landscaping and maintenance, etc. Typically, the tallest components are the lightning towers at approximately 26 metres high, and the converter hall, which could be up to 21 metres high at its apex. The proposed HVDC/AC converter station site will consist of a converter building, a control building and ancillary facilities. The configuration, orientation and dimensions of the station will be finalised during the detailed design phase.

### 2.1.2 LANDFALL SITE

Two preferred options for the landfall are emerging at Boyce's Bay and Baginbun Beach, both in County Wexford. One of these sites will be selected.

Horizontal Directional Drilling (HDD) is the preferred method of connecting the seabed cables to land and this method would require a temporary construction working area (approximately 100m x 100m) within the landfall site. HDD is a technique whereby a hole is drilled from shore under any sea defences, cliffs, dune systems or sensitive features, to a point a suitable distance offshore, usually several hundred metres. A pipe is inserted into the drilled hole which is then used as a duct into which the cables are installed. It is intended that HDD will be used to drill under the cliff and beach, to emerge below the Mean Low Water Springs (MLWS) mark. Should this not be technically feasible and the cable emerges short of the MLWS mark in the intertidal area, a trench will be excavated across the beach using conventional excavators (either on the shore or mounted on a shallow barge). Trenching would affect a maximum 10m wide strip of the intertidal area. Once the trench has been formed the cable will be installed from the cable lay vessel by a combination of floating and pulling the cable using a winch anchored behind the beach. On completion of works,

the intertidal area will be restored to pre-construction conditions. Ground investigations are ongoing to confirm the technical details required to inform cable landfall.

The landfall site would provide for the storage of separated topsoil and subsoil, movement of plant including a drill rig and the storage of any pipework and equipment prior to trenching.

### 2.1.3 CABLE TRENCHING

The onshore underground HVDC cable route is expected to be approximately 28km long (dependent on the final landfall selected) and will consist of two HVDC conductor cables and a potential fibre optic cable or cables for communication and control purposes.

The Irish onshore cable will be routed along local roads, apart from the portions of the route closest to the landfall location, the converter station, and where it will be necessary to divert the route off the road for engineering reasons. An example of where this may be required is at the crossing of a river estuary (Campile River), where the existing road bridge may not be suitable for in-road construction. Horizontal directional drill (HDD) may be used to construct this section of the cable route.

Near the convertor station site, the cable may cross under the existing railway line (Waterford – Rosslare). A trenchless crossing technique is likely to be utilised subject to agreement with Iarnród Éireann. The route also crosses the Campile River estuary. At this location, the cable may be laid across the bridge, but it is more likely that trenchless technology will be used to cross under the estuary at a suitable nearby location. It is intended that HDD will be used to drill from farmland to the north of the estuary, to emerge in farmland to the south of the estuary. Should this not be technically feasible and the cable emerges short of the farmland to the south of the estuary, a trench will be excavated between the actual location of the HDD and the intended emergence location using excavators. Trenching would affect a maximum 10m wide strip of the estuarine area. Once the trench has been formed the cable will be installed. On completion of works, the estuarine area will be restored to pre-construction conditions.

Where the cable route crosses through agricultural fields (over short distances at the converter station and landfall locations) the cables will be trenched with a reinstatement cover of between 850mm and 1200mm within a fenced 30m working corridor. These are usually installed in plastic duct to simplify the construction process. It is usual for the two ducts to be positioned close together (approximately 300mm). A protective cover and warning tape are also usually buried along with marker posts at regular intervals at ground level. This arrangement is shown in **Figure 2.2**.

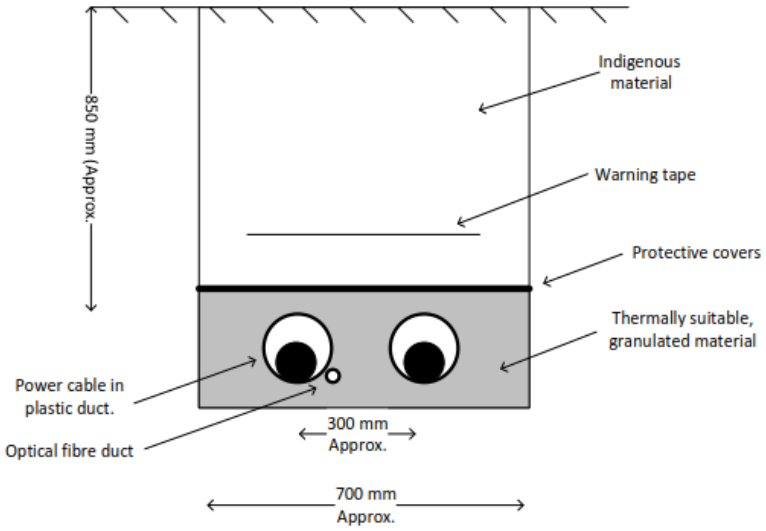


**Figure 2.2 Typical Underground HVDC Arrangement**

HVAC cables will connect the proposed converter station to the existing electricity substation. It is likely that a similar arrangement will be used for the underground HVAC cables, as illustrated in **Figure 2.3** below. The width of the cable corridors will be subject to detailed design, and the section shown is typical, with trench widths likely to be in the range 700 to 900mm, with some sections over 1000mm.

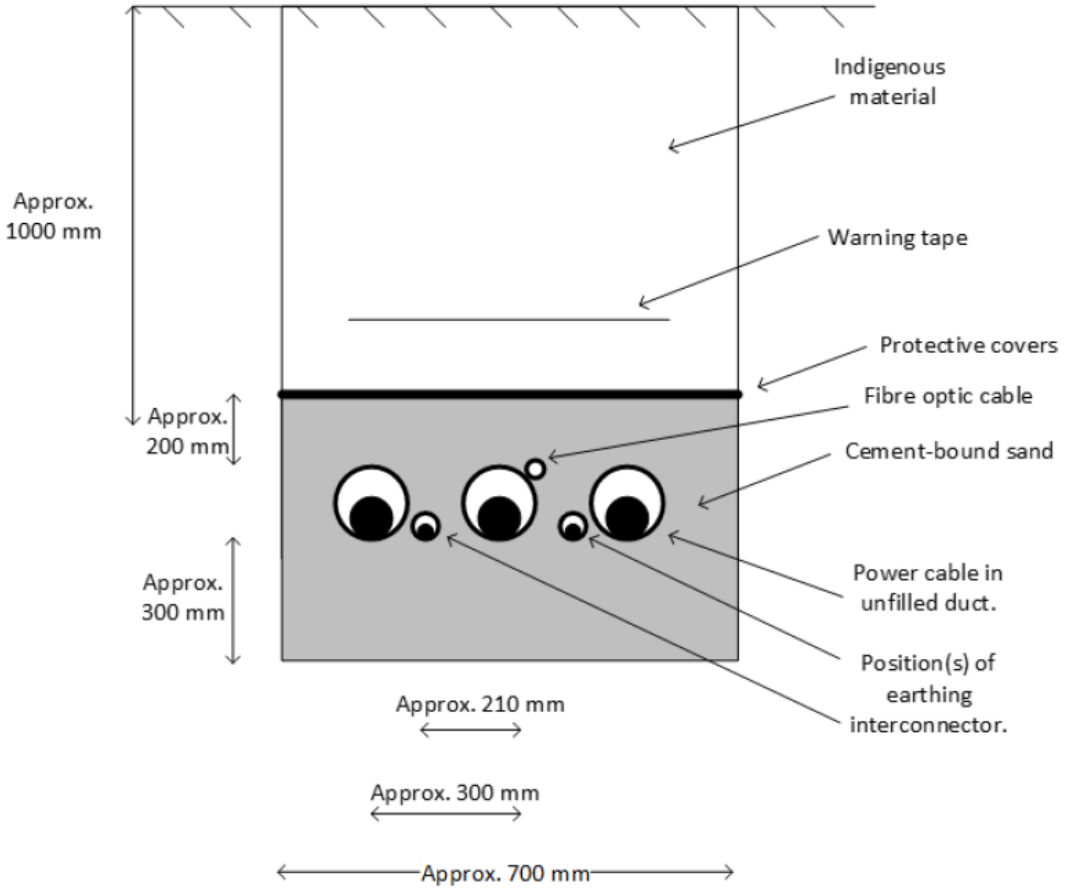


**Figure 5.4 Typical Underground HVAC Arrangement**

Within the agricultural fields a 30m working corridor would allow for an approximate maximum 5m wide cross-section trench as well as an access track for movement of construction plant and soil storage. Excavated material would be stored on site, with separate storage areas for topsoil and subsoil. Following completion of the cable installation the trench would be backfilled utilising the stored material and incorporating appropriate safety measures (e.g. warning tape).

Trenchless crossing techniques (such as horizontal directional drilling) will be employed as required for crossing rivers, streams, drainage ditches and existing services. The technique for horizontal directional drilling involves pushing a steerable rotating boring head, supported by a drilling fluid, through the ground. When the pilot bore is completed it is enlarged to the required diameter by pulling a reamer back towards the drilling machine and pulling the duct into place. In some locations, the geology and ground conditions or the topography may be such that horizontal directional drilling or similar trenchless technologies will not be practicable and an open cut trench crossing will be used as deemed necessary.

**Table 2-1 HDD Specification**

| LOCATION | HVDC | COMMENTS |
|---|---|---|
| Depth below roadway | 2.4m | May be deeper if services are encountered |
| Depth below small river | 4m | |
| Depth below large river | 10m | |
| Entry and exit pit dimension | 2m x 2m x 4m | |
| No. of bores | 1 per cable | |

**Table 2-2 Cable Specification**

| LOCATION | HVDC |
|---|---|
| Depth to top of Duct – Agricultural lands[1] | 1.2m |
| Depth to top of duct – roadbed[2] | 1.2m / 0.75m |
| Separation distance to other services | Depends on the nature of the other service |
| Layout in trench | Separated |
| Backfill | Cement-bound sand and indigenous material |

### 2.1.4 CABLE JOINTING BAYS

Typically, up to 1.8km of HVDC cable can be carried on a single reel. This results in at least one jointing bay being required every 1.8km of a cable installation and often more frequently to reflect the complexity of the final cable route. A jointing bay provides a temporary safe and clean environment for an engineer to work in while connecting two cable ends during the installation process. A jointing bay can take many forms from a soft-walled tent to a shipping container. The form a jointing bay takes will depend on the amount of space available to work in, ground conditions and the type of joint being made. The final specification of each jointing bay will be determined once a final cable route has been selected and the immediate constraints identified. Once the joint has been made the cable will be buried in the same manner as the rest of the underground cable.

### 2.1.5 CONSTRUCTION PROGRAMME

It is anticipated that the project will take approximately 36 months in total, including design, manufacturing, construction and testing.

## 2.2 OTHER PROJECT COMPONENTS

From the landfall at Hook Head, the DC cable will be installed under the Irish Sea to a landfall in Pembrokeshire, in South Wales. From the landfall, the cable will be laid to the proposed converter

[1] The depths may be reduced if additional protection of the service is provided e.g. protection slabs
[2] Cable specification will determine the layout in the trench, backfill etc. – the cable specification has not yet been determined.

station site, adjacent to the existing Pembroke substation. Refer to **Figure 2.4** below for the offshore route options.

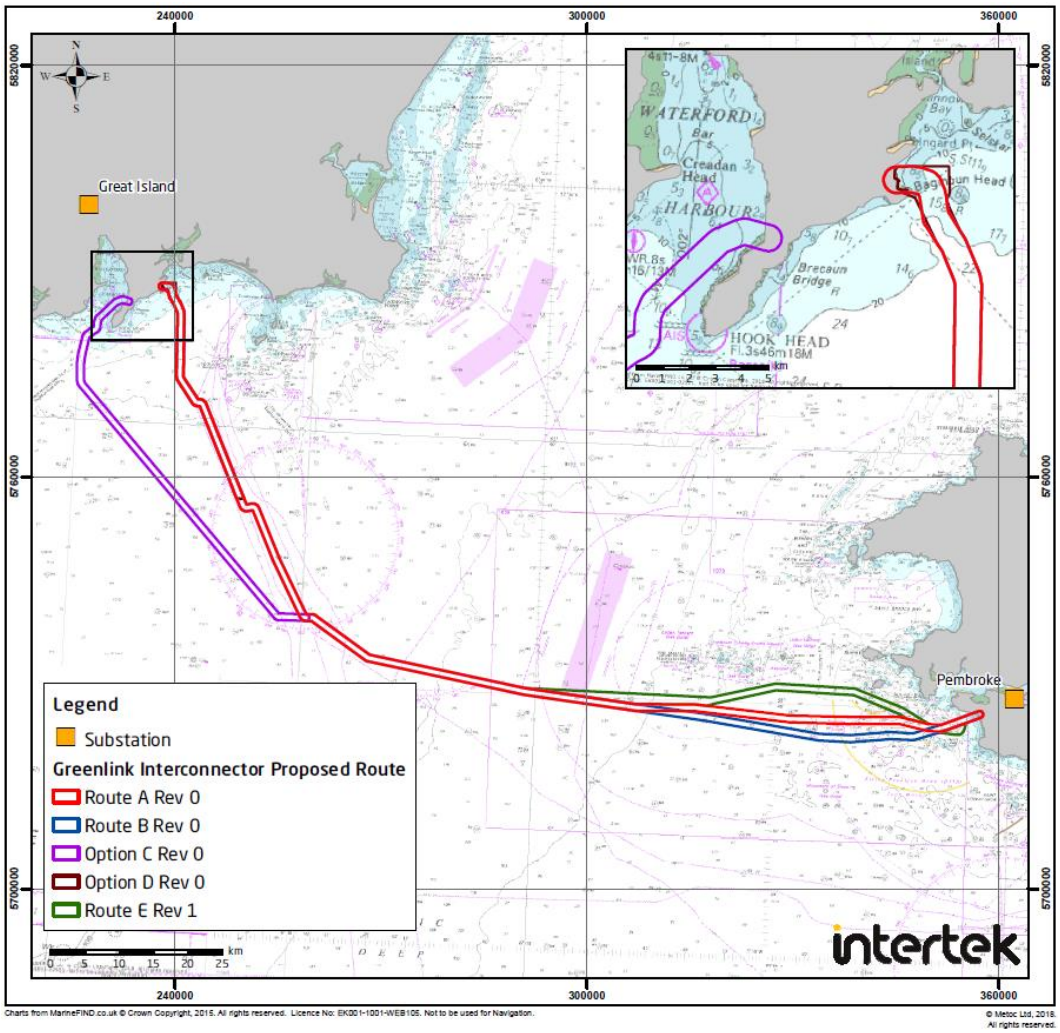


**Figure 2.4 Offshore Route Options** [not to scale]

The cables will normally be buried as a safety measure to avoid damage and entanglement (with, for example, trawling gear and anchors) and to minimise the risk of "free span" cable over gaps, causing cable fatigue.

Where possible the cable will be buried in the seabed. Where the seabed composition is not suitable for burial, external mechanical protection will be provided through either rock-placement, application of concrete mattresses and/or installation of cast iron shells.

The recommended target burial depths along the cable route will be determined by a detailed cable burial study. Typically target depth for burial is 1m to 3m below mean seabed level, although this may vary depending on the nature of the substrate. For example, in areas where there is evidence of trawling activity, anchoring or areas of mobile seabed this may be increased.

The main risk of negative impacts on the environment from the subsea cable and the onshore cable in Wales will be during the construction phase. When the subsea cable and the onshore cable in Wales are operational, they will have minimal potential to have a negative impact on the environment. The main risk of negative impacts on the environment from the Welsh converter

station will occur during the construction phase. When the converter station is operational, the only potential negative impacts on the environment will be noise emissions and visual impact.

# 3. STRUCTURE AND SCOPE OF THE EIAR

## 3.1 EIA SCREENING CONCLUSIONS

GIL will submit an EIAR (or equivalent) with the main applications for development consent for the project. For the Irish onshore components this application will be to An Bord Pleanála.

The structure of the EIAR will be in accordance with the EIA Directive, and the relevant European and Irish guidance documents relating to EIARs.

## 3.2 CONTENTS OF THE EIAR

The EIAR will be compiled to ensure that the following information is included:

1. (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.
(b) A description of the likely significant effects on the environment of the proposed development.
(c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development.
(d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.

2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:

   (a) a description of the proposed development, including, in particular—
      (i) a description of the location of the proposed development,
      (ii) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases,
      (iii)a description of the main characteristics of the operational phase of the proposed development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used, and
      (iv) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases;

   (b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the

EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;

(c) a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge;

(d) a description of the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act likely to be significantly affected by the proposed development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape;

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things—

(I) the construction and existence of the proposed development, including, where relevant, demolition works,

(II) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources,

(III) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste,

(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters),

(V) the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources,

(VI) the impact of the proposed development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change, and

(VII) the technologies and the substances used, and

(ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union level or by a Member State of the European Union which are relevant to the proposed development;

(f) a description of the forecasting methods or evidence used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved;

(g) a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events.

## 3.3 PROPOSED EIAR METHODOLOGY

### 3.3.1 GENERAL

The EPA has published guidelines on the preparation of environmental impact statements (now referred to as EIARs under Directive 2014/52/EU). These are contained in 'Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)', published in 2003, 'Guidelines on the Information to be contained in Environmental Impact Statements' published in 2002, ' Revised Guidelines on the Information to be Contained in Environmental Impact Statements', published in draft in 2015, 'Advice Notes for Preparing Environmental Impact Statements', published in draft in 2015 and 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports', published in draft in 2017.

The EIAR will be prepared with due regard to these guidelines. The team will also have regard to best practice guidance for individual environmental topics and to applicable sections of Transport Infrastructure Ireland's publications in relation to the preparation of EIARs for national road projects.

### 3.3.2 MITIGATION MEASURES

The central purpose of the EIAR is to identify potentially significant adverse impacts at the pre-application stage and to propose measures to mitigate these impacts. The primary mitigation will be by avoidance. Where potential adverse impacts are identified, the project element giving rise to the adverse impact will be modified, if feasible, to avoid the impact. For example, where feasible, cables will be rerouted in such instances. Other mitigation measures will include, if feasible, reducing the area affected by construction activities or changing the construction method, for example by doing a trenchless crossing of a road, railway or river. If impacts cannot be avoided, measures will be incorporated into the project to reduce the adverse impacts to as low as is practicable. Where

adverse impacts cannot be prevented, measures will be taken to restore the environment to an approximation of its previous condition or to a new equilibrium.

### 3.3.3 EIAR STRUCTURE

The EIAR will in general follow the grouped format EIAR structure. Using this structure there is a separate chapter for each topic, e.g. air and climate change, biodiversity, land soils and geology. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in each chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

The proposed structure of the EIAR is described below and has been developed with full consideration of the need to ensure that the EIAR is readily accessible to both the general public and statutory authorities.

The structure of the EIAR is proposed as follows:

- Introduction
- Background to the Project
- Alternatives Considered and Need for the Project
- Description of the Development
- Construction Activities
- Planning and Policy
- Consultation
- Population and Human Health
- Landscape and Visual
- Biodiversity
- Noise and Vibration
- Roads and Traffic
- Land Soils, Geology and Hydrogeology
- Hydrology, Flooding and Surface Water Quality
- Archaeology, Architectural and Cultural Heritage
- Material Assets, Major Accidents and Disasters
- Air Quality and Climate Change
- Cumulative and Transboundary Impacts

# 4. ENVIRONMENTAL ISSUES TO BE ADDRESSED IN THE EIAR

## 4.1 INTRODUCTION

The EIAR will generally follow best practice guidance for EIA and will also have regard to environmental impact assessments which have been undertaken recently by An Bord Pleanála and other consent authorities for similar projects, including interconnector projects.

## 4.2 BACKGROUND TO THE PROJECT

The EIAR will summarise the strategic need for Greenlink. In particular, the requirement for further interconnection between Ireland and the UK will be explained.

## 4.3 ALTERNATIVES CONSIDERED AND NEED FOR THE PROJECT

The alternatives which were considered when developing Greenlink will be described. This includes technology options as well as alternative onshore routes, landfall and converter station sites.

The routes, technologies and other alternatives considered for the interconnector onshore in Ireland will be described. The reasons, including environmental considerations, for choosing the proposed alternatives will be explained. The selection of locations of the converter station and the technology options considered will be outlined. The locations considered for the cable landfalls on the Irish coast and the factors leading to the choice of the proposed landfalls will be explained. Only one landfall will be used, and planning permission will be sought for a single landfall.

## 4.4 SCHEME DESCRIPTION

Each element of Greenlink will be described.

### 4.4.1 LANDFALLS

The landfall site will be described with information provided on the landfall site, temporary works area requirements and cable laying methodology. A description of the landfall location will also be provided.

### 4.4.2 ONSHORE CABLE ROUTE

The preferred route for the onshore cable will be described with information provided on dimensions, voltages and jointing bays. The relevant features of the roads in which the cables will be laid will be addressed. Where the cable route diverge from the road a description will be provided of the route and the terrain or the obstacle which will be crossed.

### 4.4.3 CONVERTER STATION

The layout and physical features of the converter station will be described. Safety features and design codes will be addressed.

The operating procedures and hours, staffing, monitoring, maintenance requirements and the provision for decommissioning of the various project elements will also be outlined.

## 4.5 CONSTRUCTION ACTIVITIES

The project will have a defined planning boundary to include all project elements, including ancillary infrastructure such as site access roads, underground cabling, drainage and temporary working areas for site facilities where appropriate. Details on all of these elements will be provided within the EIAR.

Information will be provided on the following aspects of the construction of the project:

- Construction programme
- Construction sequence and methodology
- Drainage control measures
- Temporary site facilities
- Site preparation works
- Converter Station construction
- Cable installation
- Landfalling of cable
- Commissioning
- Maintenance
- Decommissioning.

Most of the potential negative environmental impacts of Greenlink will be associated with construction and installation activities. An explanation of cable installation methods will be given. The methods and techniques to be used for the construction of the crossings of roads, railway lines, and rivers and for the landfalls will be described. The measures to control potential impacts on water courses and other features, including Natura 2000 sites, will be described. The duration and phasing of the construction and installation activities will be outlined. The control measures that will be implemented to manage the risk of soil and water pollution, emissions of dust and noise, construction waste management and traffic impacts will be explained.

## 4.6 PLANNING AND POLICY CONTEXT

Greenlink has been proposed in response to European, Irish Government and United Kingdom Government policies in relation to energy. The European, national, regional and local planning and policy context for Greenlink will be addressed with reference to relevant county development and other plans or policies, regional planning guidelines and Government and other policy statements.

## 4.7 CONSULTATION PROGRAMME

A detailed consultation plan is being implemented for Greenlink. Stakeholders, including national and local regulatory bodies, government agencies, environmental NGOs and the general public will be provided with information on the project and asked for their comments and concerns. A list will be provided in the EIAR of the bodies consulted and a summary will be provided of the queries and concerns expressed.

As this project is a PCI project, a Concept for Public Participation (CPP) document has been prepared and will be agreed with the competent authority for PCI, An Bord Pleanála, setting out in detail the proposed public participation strategy for the project.

## 4.8 POPULATION AND HUMAN HEALTH

The potential impacts on health and safety from the onshore cables and the converter stations will be assessed. This will include the potential for effects from electromagnetic fields. The potential impacts of Greenlink on population trends, employment and the main economic activities of the region will also be addressed in this chapter.

The assessment will contain a desk study review of the impacts of the operation of onshore cables and converter stations on health and safety.

Data from the Central Statistics Office will be used to define the socio-economic baseline. The potential positive and negative impacts of Greenlink on population, employment and economic activity, both directly and indirectly, will be assessed.

The assessment will also address the potential impacts of Greenlink on land use, residential amenity and recreational facilities.

The Irish onshore components will be located in County Wexford. The general receiving environment is rural, with areas of agriculture being the predominant land use. The settlement pattern is one of individual farms, small clusters of roadside housing and scattered villages. The onshore cable will, for the most part, be laid under public roads in County Wexford and will bypass the main population centres in the area, passing primarily through smaller villages and rural and agricultural areas in which farms and residential dwellings are dispersed. The converter station will be located on agricultural land adjacent to the existing Great Island substation.

The main land uses in the area which could potentially be affected by the Irish onshore components will be described using Corine 2012 land cover data and this data will be verified by subsequent walkovers and drive-by surveys. All areas of scenic beauty in addition to heritage, culture and leisure facilities in the areas will be identified. A review of the main recreational activities in the area likely to be affected will be conducted. Residential amenities and recreational facilities such as forestry in public ownership, walking paths and sports facilities will be recorded and potential impacts assessed.

Greenlink is not likely to have a significant impact on human health and safety.

Generally, this area of County Wexford experienced population growth between 2006 and 2011. Wexford has a higher share of persons employed in farming, agriculture and unskilled labour than the national average. Wexford also has a higher dependence than average on the construction industry, which was significantly affected in the recent downturn. Key sectors in Wexford include food and drinks industries, construction products and systems and tourism.

Direct and indirect employment will be created during both the construction and the operational phase. There will also be contributions to the economy in the form of taxes and rates.

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An assessment will be conducted to ascertain any potential impacts that may arise which could directly or indirectly affect land use, a recreational activity or an amenity. This assessment will be prepared giving cognisance to other disciplines such as cultural heritage and archaeology, hydrology and ecology.

The converter station will require landtake for the proposed infrastructure. The landfall will also require landtake for the cable route corridor and also on a temporary basis for the construction of the landfall. Any cable routes which are proposed outside the public road will also require some landtake for cable laying.

The onshore cables will be routed along public roads which provide access to amenities and sports and recreational facilities. The cables will also cross a number of watercourses, including the Campile River estuary. It is intended that the watercourses will be crossed by trenchless techniques. Potential construction impacts include full or partial closure of the access roads to any amenities and sports and recreational facilities while the cables are being installed. There may be disruption to access routes and walking paths which are adjacent to the watercourses being crossed by trenchless means while the trenchless crossings are being constructed.

Both the construction and the operation of the project have the potential to have a negative impact on residential amenity from construction activities and the visual impacts from the converter station, respectively. The construction of the cables and converter station have the potential to have a short-term negative impact on residential amenity in the immediate vicinity of the construction activities, during construction. Once the cables and converter station are operational, the potential for negative impact on residential amenity is minimal.

## 4.9 LANDSCAPE AND VISUAL IMPACT

Landscape impact assessment relates to changes in the physical landscape brought about by the proposed development which may alter its character and how this is experienced. This requires a detailed analysis of the individual elements and characteristics of a landscape that go together to make up the overall landscape character of that area. By understanding the aspects that contribute to landscape character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This in turn provides a measure of the ability of the landscape in question to accommodate the type and scale of change associated with the proposed development without causing unacceptable adverse changes to its character.

Visual impact assessment relates to changes in the composition of views as a result of changes to the landscape, how these are perceived and the effects on visual amenity. Such impacts are population based rather than resource based as in the case of landscape impacts.

A landscape impact assessment and visual impact assessment will be undertaken. The assessments will address landscape context, character, vulnerability and sensitivity to change, scenic amenities, protected routes and views which are designated in the County Development Plans, and the presence of sensitive receptors.

Cumulative landscape and visual impacts will also be assessed in relation to other relevant developments.

A desk study will be undertaken to identify designated scenic routes and views, the relevant objectives in the relevant County Development Plans, and the sensitive receptors along the routes of the cable and at the converter station. Zone of theoretical visibility maps and photomontages will be prepared for the converter station site.

The cable route is located along rural roads in County Wexford. The proposed converter station and the northern end of the cable route is within the Barrow/Suir river valley, while the southern end of the cable route and the landfall are within the coastal landscape designation, as per the draft Wexford Landscape Character Assessment. The southern part of the route is also within the Hook peninsula, which is a landscape of greater sensitivity.

The main potential impact from the cable route will be vegetation clearance during construction, particularly where the cable route diverges from the road network. Once construction is completed, the potential for a negative landscape or visual impact due to the cable route is minimal.

The converter station will be a large, relatively tall structure and will be visible in the absence of screening over a large area. The landscape and visual impact of this will be carefully considered, including the use of photomontages, and suitable mitigation, such as landscaping and building finishes, among others, will be proposed. Cumulative impacts with, in particular, the adjacent Great Island substation and the SSE CCGT facility, will also be considered.

## 4.10 NOISE AND VIBRATION

This chapter will address noise and vibration impacts from the construction and operation of the project.

The methodology for the construction noise and vibration assessment for the cables will have regard to the TII guidance on noise assessment for motorway construction. Surveys of ambient noise at selected locations along the proposed route will be undertaken in accordance with ISO 1996. Due consideration will be given to the nature of the primary noise sources when setting assessment criteria. At selected locations potential noise levels at the nearest sensitive receptors, due to construction activities, will be modelled in accordance with ISO 9613.

The assessment of the impacts of noise and vibration from the construction phase of the converter station will use the methodology and assessment criteria set out in BS5228 Code of Practice for the Control of Noise and Vibration on Construction and Open Sites Part 1: Noise and Part 2: Vibration, (BSI, 2009). The methodology and assessment criteria for the assessment of noise impacts from the operational phase of the converter station will be in accordance with the Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), (EPA 2016). The assessment will include a detailed baseline noise survey, in accordance with ISO 1996, at the converter station site. Potential noise levels at the nearest sensitive receptors from construction activities and the operation of the converter station will be modelled in accordance with ISO 9613.

The cable route passes through predominantly rural areas with generally low ambient noise levels. The converter station is also located in a rural area but is adjacent to an existing substation and CCGT power station with their associated operating noise levels.

During the construction phase, the main sources of noise and vibration will be the construction plant and equipment and the road traffic associated with the construction works.

Both the construction and the operation of the converter station have the potential for noise impacts. During the construction phase of the converter station, the noise sources will be the construction plant and equipment and the road traffic associated with the construction works. Construction plant and equipment will also be a potential source of vibration.

Transport Infrastructure Ireland`s (TII) document *Good Practice Guidance for the Treatment of Noise during the planning of National Road Schemes* (TII, 2014) contains information on the permissible noise and vibration levels during the construction phase, as follows:

**Maximum permissible noise levels at the façade of nearby dwellings during construction**

| **Days and Times** | **$L_{Aeq\ (1hr)}$ dB** | **$L_{pAmax,\ slow}$ dB** |
|---|---|---|
| Monday to Friday<br>07:00 to 19:00hrs | 70 | 80 |
| Monday to Friday<br>19:00 to 22:00hrs | 60 | 65 |
| Saturday<br>08:00 to 16:30hrs | 65 | 75 |
| Sundays and Bank Holidays<br>08:00 to 16:30hrs | 60 | 65 |

It should be noted that the noise criteria quoted in the table are specific to construction activities only (i.e. these levels are not cumulative with the existing noise environment from road traffic and other surrounding sources).

The TII Guidelines recommend that in order to ensure that there is no potential for vibration damage during construction, vibration from construction activities should not exceed the values as set out in the TII guidance as follows:

**Maximum allowable vibration levels during construction phase**

| **Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of** | | |
|---|---|---|
| Less than 10Hz | 10 to 50Hz | 50 to 100Hz (and above) |
| 8 mm/s | 12.5 mm/s | 20 mm/s |

BS 5228-1 and 2:2014+A1:2014 (British Standards, 2014) Code of Practice for noise and vibration control on construction and open sites was also referred to in the consideration of noise mitigation measures.

During the operation of the converter station, there will be plant noise from the electrical and mechanical plant, most of which will be located indoors in the converter hall. The cumulative impact with these existing developments will also be considered. There will be no potential for vibration impacts during the operation of the converter station. In any case, it is planned that equipment will

be installed to attenuate noise emitted from the converter site (such as power transformer enclosures).

For the operational phase the impact of the proposed development will be assessed through the application of significance criteria based on predicted changes in noise level due to the scheme. This is done by calculating the change in $L_{Aeq}$ and categorising the significance as below:

**Changes in Noise Level – Significance Criteria**

| Change in Sound Level (dB) | Subjective Reaction | Significance Level |
|---|---|---|
| **None** | **No change** | **No change** |
| <3 | Inaudible | Imperceptible |
| 4-5 | Perceptible | Slight |
| 6-10 | Up to doubling of loudness | Moderate |
| 11-15 | Over a doubling of loudness | Significant |
| >16 | | Profound |

Source: Based on a number of noise documents including EPA Guidelines, BS4142 and PPG24

The EPA's '*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities'* sets out permissible levels for industrial facilities. Typical limit values (free field) for noise from industrial sites at sensitive receptors are:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$;
- Evening time (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$; and
- Night-time (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

$L_{Ar,T}$ is the rated noise level, equal to the $L_{Aeq}$ during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.

$L_{Aeq,T}$ is the equivalent continuous sound level. It is an average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T).

The limits above will be applied to assess the impact of operational sources at the nearest sensitive receptors.

As the scheme has no significant operational traffic associated with it, no operational traffic assessment will be undertaken.

## 4.11 ROADS AND TRAFFIC

The traffic impact assessment will address the traffic impacts on the road network from the construction and operation of the Greenlink project. The assessment will include the supply of materials, plant and equipment, the cable laying operations and the components of the converter station. Traffic arising from the construction and operations workforce will also be addressed.

A traffic impact assessment will be conducted in accordance with the National Roads Authority (NRA) (now TII) Traffic and Transport Assessment (TTA) Guidelines, 2014.

The methodology for the traffic impact assessment will include a review of the existing traffic patterns and an estimation of the traffic volumes which will be generated by the construction of the onshore cable, the landfall and the converter station. The traffic generated by the construction workforce and by the transport of materials and equipment will be predicted. The potential disruption to the road network during the installation of the cables and the availability of alternative routes will be assessed. The traffic distribution pattern on the local road network during construction will be examined and impacts determined. Recommendations will be made to mitigate any potential traffic impacts on the road network.

The area in which Greenlink is located has an extensive network of regional and local roads. The onshore will be routed along third class rural roads and regional roads which are generally lightly trafficked. The cable routes will avoid towns and villages where feasible. The roads in the vicinity of towns and villages experience more traffic. The cable routes will avoid motorways and national primary and secondary roads. Generally, the converter station will be accessed by lightly trafficked rural roads.

The greatest potential for traffic impact from Greenlink is during the construction phase which will give rise to additional traffic on the road network.

Installation of the cables will require partial or full road closures and traffic may have to use alternative routes. Where the cable route diverges from the road, the impacts will be reduced.

Once the Greenlink project is in operation, the potential for a traffic impact is minimal. The operations and maintenance workforce will be minimal, so that the impact on any particular road will be insignificant.

## 4.12 BIODIVERSITY

This chapter of the EIAR will address the habitats and species, including those of conservation concern, on and in close proximity to the proposed landfall, onshore cable and converter station.

In particular, the assessment will focus on:

- Natura 2000 sites i.e. Special Areas of Conservation designated under the EU Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EU Birds Directive (Directive 2009/147 EC) within 15km of the proposed sites and routes.
- Other designated sites such as Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora
- Habitats listed in Annex I of the Habitats Directive
- Birds listed in Annex I of the Birds Directive
- The impact on any flight paths of bird and bat species
- Species protected under the Wildlife Acts including protected flora
- Habitats that can be considered as corridors for the purposes of Article 10 of the Habitats Directive

- Red data book species
- Alien invasive species
- Biodiversity in general – all opportunities to enhance biodiversity will be taken where practical and feasible within other project constraints.

Desk studies have been undertaken in which ecological databases, such as those of the NPWS and EPA will be consulted. The NPWS, Inland Fisheries Ireland and the main environmental non-governmental organisations have been or will be consulted.

Bird survey methods will follow best practice guidelines and there will be ongoing consultation with NPWS and other bodies such as BirdWatch Ireland.

Surveys completed to date have not identified significant ecological constraints that would prevent the selection of an appropriate final route. Some alien invasive species (Japanese Knotweed) is present at locations along the road route, and some potentially valuable saltmarsh habitat is evident in the Campile River Estuary. The potential for bat presence in the old stone bridge over the Campile River Estuary has also been identified.

The assessment methodology will be as follows:

### Winter Bird surveys

Winter bird surveys were undertaken between October 2015 and March 2016. The surveys focused on the landfall locations and the vicinity of these sites. The surveys recorded the number of all species and any foraging habitats in the vicinity of the proposed works at the landfall sites. The surveys were completed monthly for five months over the winter period, around times of mid to high tides at the landfall. A second suite of winter bird surveys is being carried out for the 2018-2019 season.

### Breeding Bird Surveys

Breeding bird surveys have been conducted to record the number of all species and any foraging habitats in the vicinity of the proposed works. Surveys have been completed monthly for a period of three months at the proposed convertor station site and at the landfall site.

### Bat Surveys

Where required, bat surveys will be undertaken in accordance with best practice guidelines as they apply in Ireland and the UK. Surveys for bat roosts will be carried out on trees and structures which have been identified to have bat roosting potential.

### Badger Survey

The badger survey will include searches for characteristic field signs (faeces, setts, paths, scratching posts, snuffle holes, day nests, hair traces, footprints and latrines) with activity level at each sett found recorded to identify type of sett. This survey will be undertaken within 30m of the proposed working corridor (assumed corridor - road width where on-road / 30m where off-road).

### Otter Survey

The otter survey will be undertaken at all stream crossings of the proposed cable route – 250 m upstream and downstream and adjacent areas suitable for dens/resting places. It will comprise a searching for characteristic field signs (dens, resting places, spraints, tracks and footpaths).

### Habitats

The landfall and converter station site will be mapped to Fossitt (2000) "A Guide to Habitats in Ireland", following best practice guidelines in Smith et al. (2011) "Best Practice Guidance for Habitat Survey and Mapping".

Where the cable routes deviate from the paved road, all sites will be mapped to Fossitt (2000) "A Guide to Habitats in Ireland", following best practice guidelines in Smith et al. (2011) "Best Practice Guidance for Habitat Survey and Mapping".

For cable routes on paved roads, the road side vegetation will be assessed and its habitat value determined by desk study of aerial photography, Google "Street View" photography and other available photography. The desk study will be verified by site visits to sample locations and locations assessed as having high habitat value, if potential impacts identified, will be mapped as above.

### Mammals

Mammal surveys for Badger and Otter will be undertaken at the converter station site to establish presence/absence.

Similarly, where the cable route deviates from the paved road and, for cable routes on the paved road, if potential impacts on relevant species are identified, mammal surveys for Badger and Otter will be undertaken to establish presence/absence.

### Hedgerows

All hedgerows will be assessed to see if they are of ecological importance.

In terms of the existing environment, the Greenlink project is located in a rural area adjacent to the Wexford coastline. The landuse is predominantly improved agricultural grassland/tillage. Much of the proposed cable route is along existing public roads, with only short sections proposed off-road. The landfall site (two current sites being considered; one final one to be selected) is located on the Hook peninsula.

There are a number of Natura 2000 sites in close proximity to the proposed works, including the River Barrow and River Nore SAC (Site Code 002162), Bannow Bay SAC (Site Code 000697), Bannow Bay SPA (Site Code 004033) and Hook Head SAC (Site Code 000764). Any potential impacts on these sites will be considered.

The onshore cable will be installed mainly in rural roads. The cables will be installed in trenches in the carriageway, hard shoulder or grass verge. The main risk of impact on flora and fauna will be where the cable routes diverge from the road. At these locations, the potential impacts will be direct disturbances from construction activities, disturbance to fauna, and pollution of watercourses by silt or by a spill of liquids or fuels used during construction. In some locations it may be necessary to

remove or trim road side trees and hedge rows. At the converter station site, the potential impacts are the same as for the cable routes.

It is proposed, where feasible, to cross any watercourses either using trenchless technologies, or by laying the cable duct across the bridge (if there is sufficient depth). The potential impacts of any watercourse crossings include direct disturbance of the bed, substrate and banks, disturbance of the species present, and the generation of silt. There will also be a risk of pollution of the watercourses by silt or by a spill of liquids, drilling fluids or fuels used during construction.

Once Greenlink is operational, the potential for a negative impact from the cable route and converter station on terrestrial and freshwater flora and fauna is minimal.

### 4.12.1 MARINE FLORA AND FAUNA

The habitats and species at the landfall and the potential impacts on same will also be addressed. In particular, any habitats of ecological significance (especially any habitats associated with the Hook Head SAC) will be considered.

An intertidal walkover survey will be undertaken to describe the baseline environment at the landfall location. Habitat types will be mapped and any features of interest noted. Transect surveys, using standard methods, will be undertaken to determine the flora and fauna baseline at the foot of the cliff and beach.

The landfall is at a beach with cliffs of varying height (generally 10 – 30 m) at the back of the beach. The construction compound will be located in farmland a short distance inland from the top of the cliffs.

It is intended that the landfall will be constructed by trenchless techniques. A construction compound will be established in the farmland a short distance inland from the landfall location. The drilling equipment will be located in the construction compound. The drill holes for the cables will emerge from the sea bed several hundred metres seaward from the beach. As the landfalls will be constructed by trenchless techniques, the potential impacts are direct disturbances of the farmland in the footprint of the construction compound, disturbance to fauna by the construction activity and noise, and pollution of the seawater by silt or by an accidental spill of liquids, drilling fluids or fuels used during construction. Direct disturbance of the cliffs will not occur.

Should HDD not be technically feasible and the cable emerges short of the MLWS mark in the intertidal area, a trench will be excavated across the beach using conventional excavators (either on the shore or mounted on a shallow barge). Trenching would affect a maximum 10m wide strip of the intertidal area. Once the trench has been formed the cable will be installed from the cable lay vessel by a combination of floating and pulling the cable using a winch anchored behind the beach. On completion of works, the intertidal area will be restored to pre-construction conditions. Ground investigations are ongoing to confirm the technical details required to inform cable landfall.

From the point at which the cables emerge they will be laid in a trench in the sea bed. This operation will result in the loss of biota and habitats in the trench footprint. It is expected that the surface of the backfilled trench will quickly be recolonized. Where rock is present on the sea floor, the cables will be laid on rock and then covered by a protective rock layer. The laying of the cables and protective rock layer will result in the loss of biota and habitats in the footprint of the protective rock

layer. It is expected that the protective rock layer will quickly be colonised. Suspension of sediments and the pollution of the seawater by an accidental spill of liquids or fuels used during construction are other potential impacts.

Once Greenlink is operational, the potential for a negative impact on marine flora and fauna is minimal.

## 4.13 LAND SOILS, GEOLOGY AND HYDROGEOLOGY

This assessment will address soils and bedrock underlying the landfall, onshore cable route and the converter station site.

The methodology for the soils, geology and hydrogeology assessment will be in accordance with the guidelines published by the Institute of Geologists of Ireland (2013) "Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements, and (2002) "Geology in Environmental Impact Statements – A Guide".

The assessment will include a detailed desk study of a corridor along the onshore cable route. Site surveys will be undertaken at key locations such as at the converter station site, the landfall and where the cable routes diverge from the road network. Preliminary intrusive geotechnical investigations will be undertaken at the landfalls.

The geology underlying the elements of Greenlink varies. This area of Wexford is generally underlain by Paleozoic sediments. In general, the overburden is till derived in the main from lower Paleozoic shales and further north, from acidic volcanic rocks. Alluvium is present in the river valleys.

At the landfall sites on the Hook peninsula, the geology of the area is of high interest as it represents a fine example of the junction between Devonian Old Red Sandstone and overlying Carboniferous limestone. The cliffs are mostly low (usually not more than 10m) but rise to 20m at Hook Head and 30m towards Baginbun Head. Below the rocky cliffs a well-developed bedrock shore occurs, which is often wide and contains a series of platforms. Fossils are a feature of the limestone rock formations. These cliffs are also a designated habitat, forming part of the Hook Head SAC and therefore careful consideration needs to be given to the cable laying methodology here.

While most of the area which Greenlink crosses is underlain by poorly productive bedrock aquifer, there are areas of productive fissured bedrock aquifer in the northern part of the study area.

The potential soils, geology and hydrogeology impacts from construction of the onshore cables will depend on the terrain that the routes pass through. Rock close to the surface can lead to excavation being a lengthier process, whereas firm, gently undulating, glacial till is the ideal material in which to install cables. Alluvium typically falls between glacial deposits and peat in terms of suitability as a medium in which to install cables. The potential impacts will be the direct disturbance of the overburden or bedrock in the footprint of the cable trenches and pollution of soils or bedrock by silt or by an accidental spill of liquids, drilling fluids or fuels used during construction. The potential impacts from the construction of the converter station will be similar. A programme of geotechnical investigation is ongoing to inform the design and assessment of the project.

Once Greenlink is operational, the potential for a negative impact on soils, geology and hydrogeology is minimal.

## 4.14 HYDROLOGY, FLOODING AND WATER QUALITY

This assessment will address water quality impacts on the surface water courses. The impact of the project on hydrological features including flood risk will also be addressed.

The assessment will consist of a review of existing baseline data including water quality data from the EPA, River Basin Management Plans and flood risk data from the OPW. The objectives of the relevant River Basin Management Plans in relation to water quality will be considered. The review will include County Development Plans and consideration of the policies and objectives of each Plan in relation to surface water and flooding. The assessment will be prepared in accordance with EPA guidance. Any concerns expressed by consultees such as Inland Fisheries Ireland and relevant local authorities, relating to hydrology and drainage, will be addressed.

The review will have regard to baseline data and the studies undertaken for the assessment of impacts on terrestrial and fresh water ecology, geology and hydrogeology in relation to environmentally protected areas, receiving waters and soil conditions.

Site visits to undertake a walkover of the relevant areas will be undertaken. These surveys will include noting the hydrological features and land use across each site. The information gained on these site visits will provide input to the final design with the aim of minimising river/stream crossings. In addition, the converter station site will require a preliminary Flood Risk Assessment and this will be identified in advance of the site visits so that additional records of hydrological features e.g. at downstream structures which may be outside the site boundary, can be noted.

Where required, a detailed flood risk assessment will be undertaken and the vulnerability of the site and type of development will be assessed in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities, November 2009.

In the case of essential infrastructure such as the converter station, the scope of the Site Specific Flood Risk Assessment, where required, will include the following:

- Examine the adjacent river along this reach and establish the survey requirements.
- Procure a river survey where required and a topographical site survey for each site.
- Estimate the flood flows in the river, interpret the results of the survey for input to the model of the river channel/downstream structure, derive the $Q_{100}$ flood levels, and identify areas at risk on site. Information gathered during the hydrology site surveys will also feed into the flood risk assessment. The potential impact on the capacity of downstream structures from the proposed development will also be assessed.
- Report on survey and river/structure modelling and recommend mitigation measures if possible to protect the property and the users of the proposed developments from the effects of adverse flooding. Such mitigation measures may include a revision of the layout of associated infrastructure on the site or raising proposed access tracks, for example. Mitigation will also be recommended where the capacity of downstream structures is found to be impacted by the proposed development.

- Prepare the Site Specific Flood Risk Assessment Report in accordance with the guidelines produced by the Planning System and Flood Risk Management Guidelines for Planning Authorities, November 2009.
- A justification test will be required to assess the appropriateness, or otherwise, of the reasons for locating the development in a high flood risk area. All justification tests will be included in the appendices of the ER.

The following will also be included as part of the assessment:

- Identify potential impacts of the proposed development on hydrology (hydrodynamics and flooding).
- Identify potential cumulative hydrological impacts of the proposed development with any neighbouring developments.
- Consider potential drainage into sensitive catchments.
- Site drainage investigation will involve identification of drainage sub-catchments, studying the requirement(s) of cross-drainage works, if any, exploring the infiltration potential of the soils in the area etc.
- Identification of mitigation measures for flooding and pollution of receiving waters.
- Identification of residual impacts.

Greenlink lies within the South Easter River Basin District. The main river catchments are the Ballyteigue, Bannow and the Barrow. The estuarine waters of the Barrow in the vicinity of the proposed project are a transitional water body and recent water quality results indicate that these waters are of intermediate status.

Where cable trenches and jointing bays are to be constructed in an area with a very high water table, the trench and jointing bay may have to be dewatered and the water removed may have to be discharged to a local watercourse. Where rivers and streams are crossed by trenchless techniques, dewatering of launch pits or pilot holes may be required. These would result in a localised depression of the water table at the trench or launch pit for the duration of the construction at that location. Such a localised depression of the water table has the potential to have an impact on sensitive habitats which are dependent on the groundwater regime. There would be the risk of water with potentially high levels of silt being discharged to the local watercourse. The main risk of impact will be where the cable route diverges from the road and crosses watercourses by trenching. The potential impacts will be pollution of watercourses by silt or by a spill of liquids, drilling fluids or fuels during construction.

At the converter station site, the potential impacts are the pollution of groundwater by a spill of liquids or fuels during construction. The converter station could give rise to an increased risk of flooding. The converter station will have staff welfare facilities. Where possible, these will be connected to local authority sewers or will be connected to a small package sewage treatment plant on site. There will be the potential for sewage contamination of groundwater.

Once Greenlink is operational, the potential for a negative impact on water quality, surface water and groundwater from the project is minimal.

## 4.15 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

This assessment will address features and sites of archaeological, architectural and cultural heritage significance. The purpose of the study will be to assess the significance of the receiving cultural heritage environment and to identify the likely and significant impacts of the proposed development on this environment. It will propose measures to mitigate those effects so as to allow a fully informed decision to be made by the adjudicating authority.

A desk study of the baseline environment will be undertaken, which will include:

- Record of monuments and places
- National Monuments in State Care (guardianship and ownership)
- National Monuments with a Preservation Order or Temporary Preservation Order
- The register of historic monuments
- National Museum of Ireland Archives
- Database of Irish Excavations
- World Heritage Sites
- Candidate UNESCO World Heritage Sites
- Designated archaeological landscapes
- Areas of archaeological potential i.e. for sub-surface archaeological remains
- Record of Protected Structures in the County Development Plans
- Architectural Conservation Areas (ACAs)
- NIAH building survey sites
- NIAH historic gardens and designed landscapes survey sites
- Structures of architectural heritage merit (vernacular, urban and rural)
- Recorded cultural heritage features
- Cartographic sources
- Place names
- Language and inherited traditions.

All relevant designated heritage assets will be mapped in preparation for the field assessment stage and inventories of all relevant heritage constraints will be prepared. The assessment will include field assessment and consultation with statutory and non-statutory bodies.

Field walk surveys will be undertaken where the cable routes pass close to recorded monuments and protected structures, where the route diverges from the paved road and at the jointing bay, landfall and converter station sites. Fieldwork along the cable route will also identify unrecorded roadside cultural heritage features (such as milestones, water pumps and stone bridges etc.) and structures.

There are a number of recorded monuments and protected structures in the vicinity of the cable route which will need to be considered including in particular, Dunbrody Abbey and associated features, which is in close proximity to the cable route. The townland names in the study area are also an invaluable source of information, not only on the topography, land ownership and land use within the landscape, but also on its history, archaeological monuments and folklore.

The potential impact of the onshore cables, landfall and converter station will be the loss or interference with a site or feature of archaeological, architectural and cultural heritage significance caused by excavations or by construction related vibrations. While a few of the roads along which the route passes are in close proximity to areas of archaeological or cultural heritage significance, the main risk of impact will be where the onshore cables and jointing bays diverge from the road. Where a cable route passes in the vicinity of a cultural heritage asset, there will also be a risk that construction activities would interfere with views to or from the asset, or obstruct access to the asset, or that the noise from construction activities would alter the ambience of the asset.

## 4.16 MATERIAL ASSETS, MAJOR ACCIDENTS AND DISASTERS

This assessment will address the potential impact on physical infrastructure, such as roads, pipelines, railways and ports. The assessment will also address the use of natural and other resources such as minerals, aggregates, cement, steel, copper, fossil fuels, electricity and water. The impacts arising from the generation and management of waste will also be assessed.

The physical infrastructure which could potentially be affected by Greenlink will be catalogued and capacities estimated. All utilities services will be identified and mapped and an assessment will be carried out to determine if any service needs to be diverted/relocated. This process will be carried out in consultation with the service provider with the proposed mitigation measures to be agreed by both parties.

A review will be undertaken of mineral and aggregate sources in the study area. Data on the availability and/or consumption of aggregates, cement, fossil fuels, electricity and water in Ireland will be obtained. The quantities of these resources, to be consumed in the construction and operation of Greenlink, will be estimated and compared with the available supplies.

A materials mass balance will be prepared for the project to balance excavation and fill material. The wastes which will arise from the construction and operation of Greenlink will be quantified. The waste management strategy will be outlined.

The area is served by a network of local and regional roads, extending from the N25 and M9, serving Waterford, Wexford and Dublin. There is also an existing railway line at the northern end of the cable route. Power lines at various voltages cross the area and water mains are present in the vicinity of towns and villages. The area adjacent to the convertor station is also crossed by high pressure natural gas mains.

Generally, the area in which Greenlink will be located is very well supplied with construction materials, fossil fuels, electricity and water.

Utilities such as overhead power lines or telephone lines or underground services may require diversion or be temporarily disrupted during the construction stage of the project. This has the potential to impact on nearby dwellings and commercial/industrial activities.

The construction of the cable trenches, predominantly in roads, will physically damage the roads concerned and some roads may require to be completely rebuilt. Importation of materials and equipment for Greenlink will increase shipping traffic at the ports being used and increase freight on the motorway, national primary route and regional road network. Construction traffic will also use local, poor quality roads, which could experience structural damage.

Construction of the Greenlink project will require considerable quantities of aggregates, cement, fossil fuels, electricity and water. Where feasible, excavated material will be re-used. There is also the potential that the Greenlink cables could sterilise deposits of aggregates or minerals along the routes.

The overseas manufacture of the cables and converter station equipment will consume significant quantities of materials including copper, steel and specialist electrical insulation materials. There will be approximately 28km of cable trench). Where the spoil from excavation of the trench is not suitable for use as backfill, imported back fill materials will be used and it is expected that a significant quantity of spoil will be generated. The spoil may not be suitable for reuse as an engineering material and may require disposal.

Municipal solid wastes will be generated in the offices and canteen facilities of the temporary construction compounds. Excavation of any made ground encountered may give rise to spoil requiring disposal. Small quantities of hazardous waste may arise from the clean-up of accidental spillages and the use of oils and hydrocarbons in the construction and maintenance of turbines, plant and machinery etc.

The potential environmental effects of major accidents and disasters will be identified and evaluated.

Once Greenlink is operational, the potential for a negative impact on material assets is minimal.

## 4.17 AIR QUALITY AND CLIMATE CHANGE

This assessment will address the potential impacts on air quality due to construction equipment and activities and due to emissions from traffic associated with the construction phase. The potential impacts on air quality in the operational phase will also be addressed.

Air quality monitoring conducted by the EPA at suitable locations in the general vicinity will be reviewed and levels compared with the air quality standards.

To assess the impacts of construction dust emissions, the approach and assessment criteria outlined in the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA 2011) will be used.

For the purposes of assessing the impact on air quality of emissions generated by construction traffic, the methodology described in the Design Manual for Roads and Bridges 2007a (UK Highways Agency, May 2007) will be used. Parameters to be assessed will include oxides of nitrogen, particulates $PM_{10}$ and $PM_{2.5}$, carbon monoxide and benzene.

The Irish onshore components are located in mainly rural areas, corresponding to Air Quality Zone D, Rural Ireland, in the Air Quality Regulations, SI 180 of 2011, as amended. The air quality is expected to be good.

The construction phase of Greenlink has the potential to generate dust emissions which could give rise to nuisance for local residents. Construction plant and equipment, and the traffic generated by the construction process, have the potential to give rise to emissions of oxides of nitrogen, benzene and particulates, which could impact on local air quality. The operation of Greenlink is not expected to have a negative impact on air quality. Beneficial impacts on air quality arising from the effects of balancing grid loads across Ireland and Great Britain will also be described.

The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is known as the macro-climate. The potential impacts of Greenlink on micro-climate and macro-climate will be addressed as part of the assessment.

# 5. ASSOCIATED PROJECTS

## 5.1 DESCRIPTION OF ASSOCIATED PROJECTS

As described in Section 2 above, Greenlink also involves marine elements and elements onshore in Wales, including marine cables from the Wexford coastline to a landfall in Wales, and onshore underground cables to the proposed converter station site adjacent to the existing Pembroke substation.

The subsea cables and the onshore cables in Wales will be subject to the permit and consent processes applicable in these jurisdictions.

An overview will be given of the baseline receiving environment, the potential impacts, proposed mitigation measures and residual impacts of the elements of the project subsea and in Wales.

The assessment methodology will be similar to, but less detailed than, the methodologies used for the other assessments presented in the EIAR.

## 5.2 TRANSBOUNDARY IMPACTS, CUMULATIVE IMPACTS, INDIRECT IMPACTS AND INTERACTION OF EFFECTS

The effects of Greenlink offshore and in the United Kingdom will be addressed. The cumulative impacts of Greenlink with other projects which have received planning permission but have not yet been built, or for which there is information in the public domain at a sufficient level of detail to allow assessment, will be addressed. Indirect effects and effects in different environmental media will be addressed.

The assessment methodology will be based on the EPA guidance and the EU guidelines, 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', published by the Office for Official Publications of the European Communities in May 1999.

As part of scoping the studies required to assess the impacts of Greenlink in the different environmental media, the potential for significant cumulative and indirect impacts and interactions will be examined and any such potential impacts will be identified. Where the potential for significant cumulative and indirect impacts and interactions is identified, such impacts and interaction of impacts will be included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental media and aspects of the project. The cumulative and indirect impacts and interaction of impacts will be presented in the chapters of the EIAR which address the most relevant environmental media.