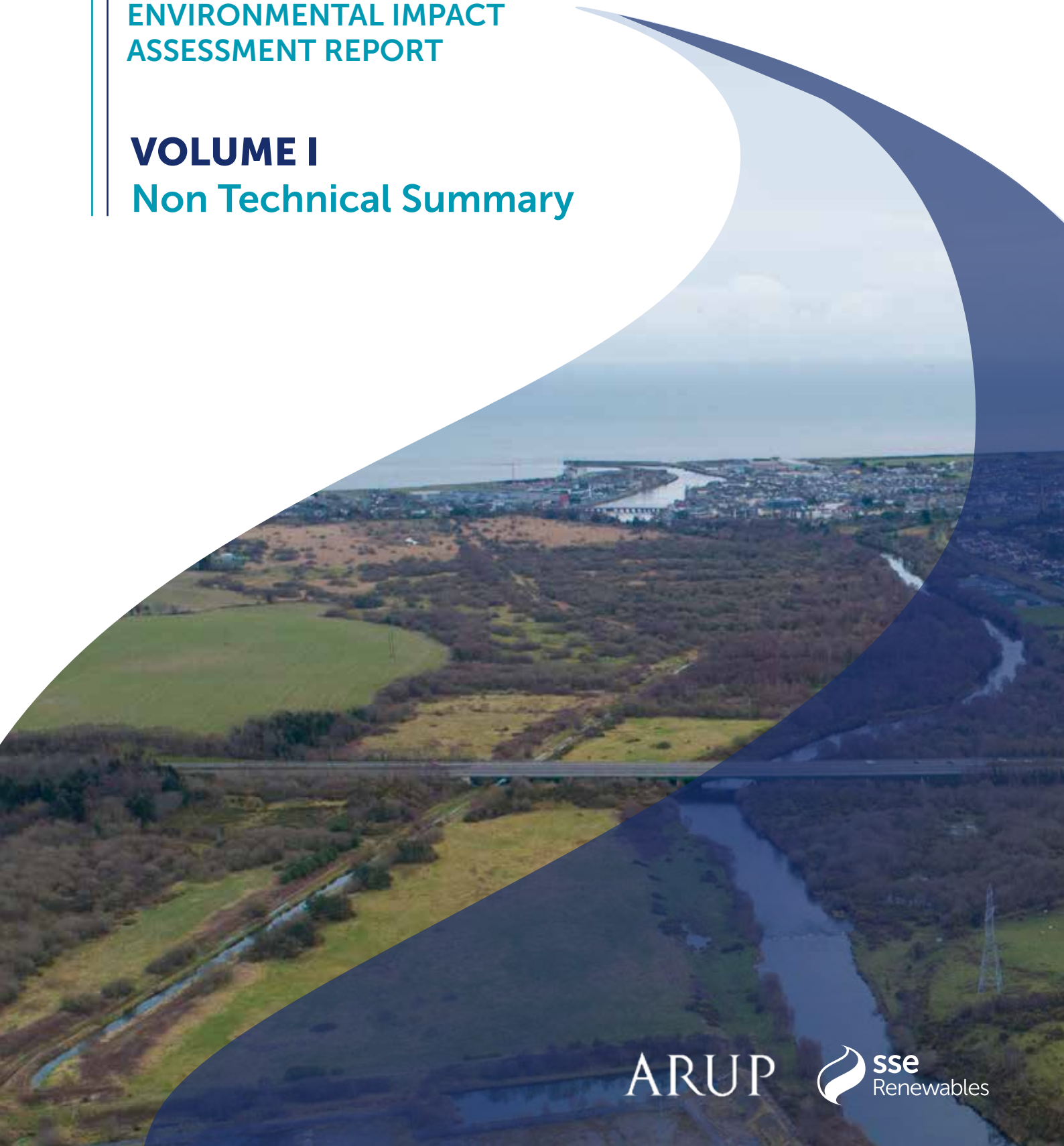


Sure Partners Limited

ARKLOW BANK WIND PARK
PHASE 2
**ONSHORE GRID
INFRASTRUCTURE**

ENVIRONMENTAL IMPACT
ASSESSMENT REPORT

VOLUME I
Non Technical Summary



ARUP

sse
Renewables

Contents

	Page
Contents	1
1 Introduction	1
2 Policy Context	2
3 EIA Methodology	5
4 Alternatives	7
5 Proposed Development	12
6 Construction Strategy	18
7 Air Quality	24
8 Climate	25
9 Land and Soils	26
10 Water	28
11 Noise and Vibration	31
12 Biodiversity	32
13 Traffic and Transport	34
14 Landscape and Visual	37
15 Archaeology, Architecture and Cultural Heritage	40
16 Resource and Waste Management	42
17 Material Assets	44
18 Population and Human Health	46
19 Major Accidents and Disasters	48
20 Inter-related Effects	49
21 Cumulative Effects	50

1 Introduction

1.1 Introduction

This is the Non-Technical Summary of the Environmental Impact Assessment Report (EIAR) for the Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure, hereafter referred to as the ‘proposed development.’

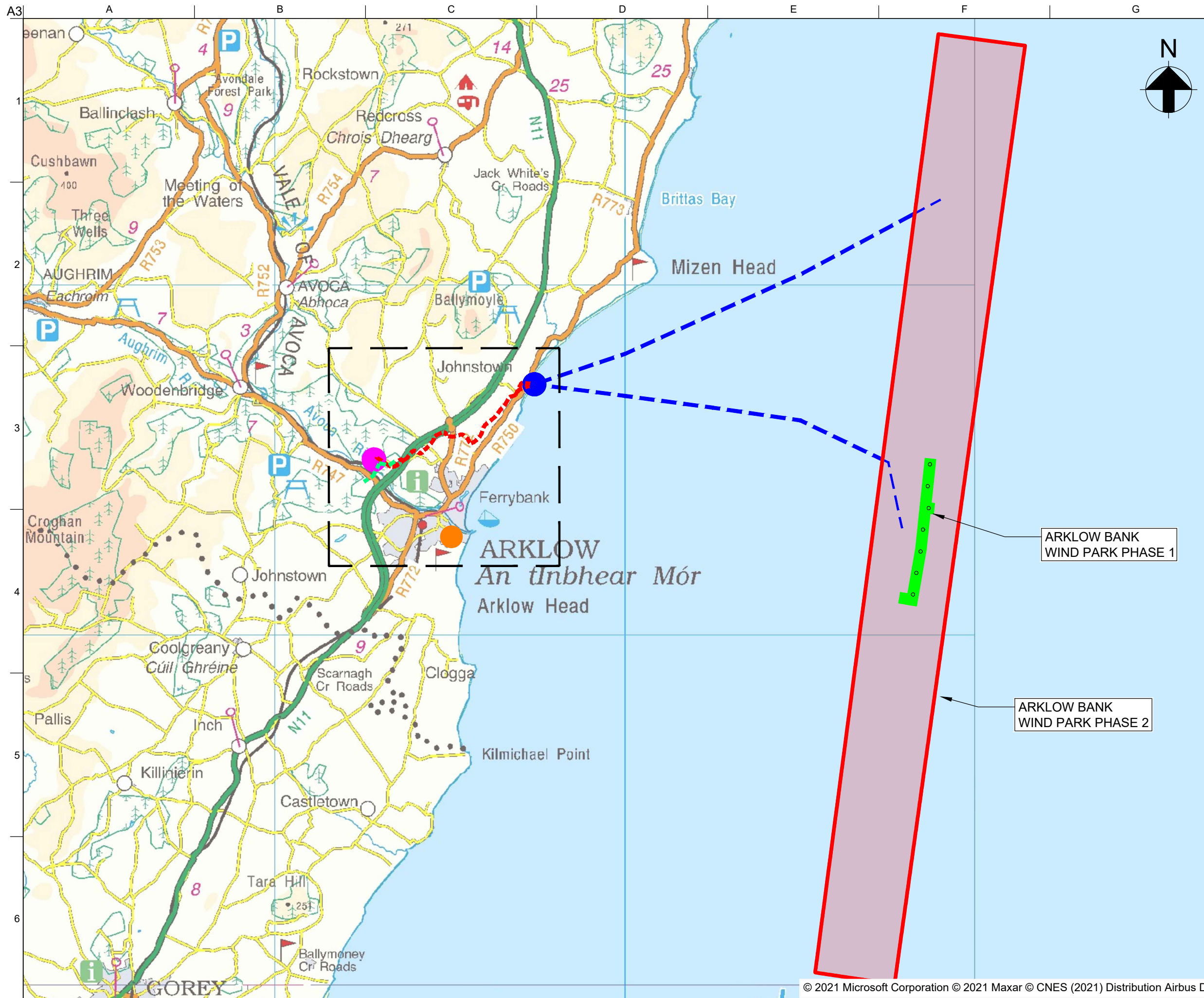
This document summarises, in non-technical language, the EIAR including the likely significant effects identified, the mitigation and monitoring measures proposed as well as any residual effects arising from the proposed development that have been identified.

A Foreshore Lease for the Arklow Bank Wind Park was granted in 2002, which allows for the construction of up to 200 wind turbines with a Maximum Export Capacity (MEC) of 520 MW. Arklow Bank Wind Park Phase 1 was constructed in 2003 – 2004 consisting of seven wind turbines. Phase 1 is owned and operated by Arklow Energy Limited under a sublease to the Foreshore Lease. Sure Partners Limited, the Developer, a wholly owned subsidiary of SSE plc (SSE), is now developing the remainder of the Arklow Bank Wind Park, Arklow Bank Wind Park Phase 2 (the Project). The Project and location context can be seen in **Figure 1.1**.

This overall project comprises three distinct elements:

1. Offshore Infrastructure
2. Onshore Grid Infrastructure (the proposed development)
3. Operations and Maintenance Facility

In order to build out the remainder of the Project, various terrestrial and maritime approvals are required, including planning approval for the proposed development.



LEGEND:

- ARKLOW BANK WIND PARK PHASE 1
- PROPOSED ARKLOW BANK WIND PARK PHASE 2
- PROPOSED OFFSHORE CABLE ROUTE
- ONSHORE GRID INFRASTRUCTURE
- PROPOSED LANDFALL
- PROPOSED ONSHORE CABLE ROUTE
- PROPOSED SUBSTATION SITE
- PROPOSED NETN CONNECTION
- PROPOSED OPERATION AND MAINTENANCE FACILITY

P1	08.02.21	SB	EO'G	MW
Rev	Date	By	Chkd	Appd

ARUP

One Albert Quay
Cork, Ireland
Tel +353 (0)21 422 3200
www.arup.com

Client
Sure Partners Limited

Project Title
Arklow Bank Wind Park
Phase 2

Drawing Title
Overview of Project

Scale at A3
NTS

Role
Civil

Suitability
For Information

Arup Job No
271715-00

Rev
P1

Name

Figure 1.1

In summary, the proposed development will comprise of the following:

- Landfall for two offshore export cable circuits from the High Water Mark (HWM) to two Transition Joint Bays (TJB) at Johnstown North, located approximately 4.5km northeast of Arklow Harbour,
- Connection by two underground 220kV high voltage alternating current cable circuits, and fibre optic cables over a distance of circa (c.) 6km, from the landfall to the new onshore 220kV substation,
- A new onshore 220kV substation, to be located at Shelton Abbey, north of the Avoca River, approximately 2.1km northwest of Arklow Town consisting of two connected compounds:
 1. The transmission compound with the infrastructure to connect to the National Electricity Transmission Network, and
 2. The connection compound with the infrastructure to allow the connection of the windfarm in accordance with EirGrid grid code requirements.
- Flood defence improvement works to the existing Avoca River Business Park flood defences located c. 500m west of the substation site;
- A 220kV overhead line connection from the new 220kV substation at Shelton Abbey to the existing 220kV transmission network located c. 200m from the substation site.

The location of the proposed development is outlined in **Figure 1.2**.

A3 A B C D E F G

1
2
3
4
5
6



LEGEND:

- PROPOSED LANDFALL
- PROPOSED SUBSTATION SITE
- PROPOSED CABLE ROUTE
- PROPOSED M11 CROSSING HDD OPTION
- PROPOSED NETN CONNECTION
- RED LINE BOUNDARY
- PROPOSED OPERATION AND MAINTENANCE FACILITY

P1	08.02.21	SB	EO'G	MW
Rev	Date	By	Chkd	Appd

ARUP
 One Albert Quay
 Cork, Ireland
 Tel +353 (0)21 422 3200
 www.arup.com

Client
Sure Partners Limited

Project Title
**Arklow Bank Wind Park
 Phase 2
 Onshore Grid Infrastructure**

Drawing Title
**Overview of the Proposed
 Development**

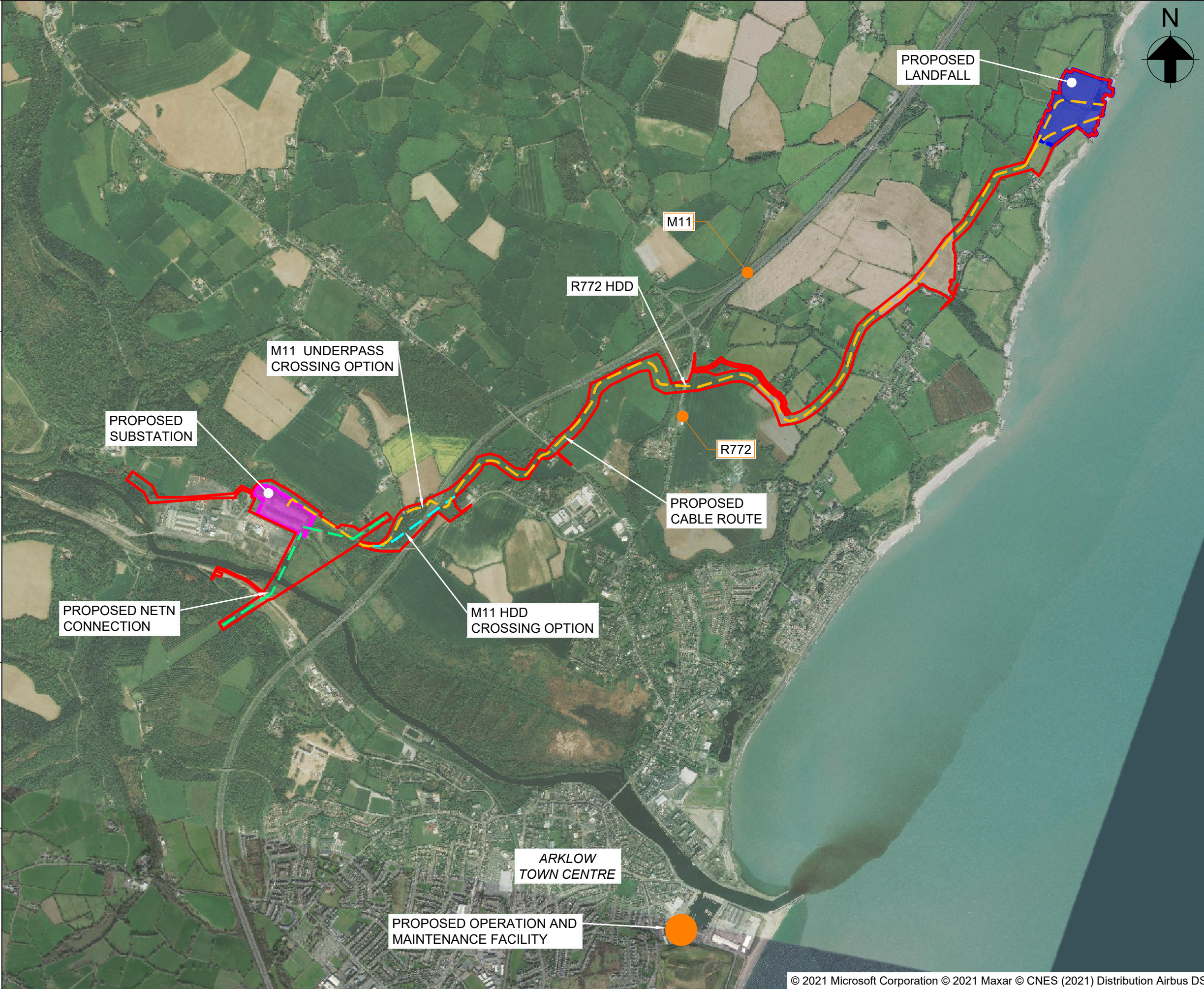
Scale at A3
 1:20,000

Role
 Civil

Suitability
 For Information

Arup Job No 271715-00	Rev P1
---------------------------------	------------------

Figure 1.2



1.2 Need for the Proposed Development

As outlined, the proposed development will form part of a project to transmit 520MW of renewably generated electricity from Arklow Bank Wind Park Phase 2 to the National Electricity Transmission Network. This will further the Irish Government's objectives with regard to increasing the generation and supply of renewable electricity and reducing the emissions of greenhouse gases.

This will be an important contribution to reducing the effects of climate change on biodiversity and the environment, facilitating economic development and providing renewable power for a growing population.

1.3 Economic Benefits

The Project will enable new infrastructure investment in Irish ports and maritime businesses.

The proposed development will create new jobs for the construction, operation, and maintenance phases. The overall Arklow Bank Wind Park Phase 2 Project and associated employment represent an opportunity for significant new investment and ongoing economic activity at County Wicklow's existing maritime facilities.

The overall Project (including the proposed development) will not only maximise regional economic benefits and create local sustainable jobs, it can also unlock focused community participation in the sector. Once the proposed development is operational, a multi-million-euro community benefit fund will be established to support communities near the wind farm for its lifetime.

2 Policy Context

The proposed development will contribute towards fulfilling the objectives of a wide range of European, national, regional and local energy, planning and development policies.

2.1 European

The European Green Deal, published by the European Commission in December 2019, provides an action plan to boost the efficient use of resources by moving to a clean, circular economy while cutting pollution and restoring biodiversity. The EU aims to be climate neutral by 2050. A European Climate Law has been proposed by the European Commission to turn this political commitment into a legal obligation. The EU Green Deal highlights that further decarbonisation of the energy sector is critical to reach climate objectives in 2030 and 2050.

The European Green Deal will increase the greenhouse gas emissions reduction 2030 target to at least 55% in comparison to 1990 levels. Targets for renewable energy and energy efficiency are also likely to be increased.

The proposed development would help meet the 2030 targets and objectives set out in the Climate and Energy Framework by providing a new renewable source of energy that will reduce reliance on fossil fuels and dependency on energy imports. It will also create opportunity for jobs and will bring environmental and health benefits.

The EU Strategy for Offshore Renewable Energy was adopted in November 2020. The strategy will integrate the environmental impacts of offshore renewable energy deployment in line with the commitments in the EU Biodiversity Strategy and European environmental legislation. The roadmap also highlights the EU response to the COVID-19 pandemic with regards to offshore renewable energy. The recovery from the COVID-19 crisis, will be based on investments in line with the European Green Deal priorities, including the EU Climate Adaptation Strategy.

2.2 National

Ireland has introduced significant climate and energy policy and guidance in recent years, with increasingly ambitious targets being set to address climate change.

In 2014, the Government published the Offshore Renewable Energy Development Plan setting out key principles, policy actions and enablers for delivery of Ireland's significant potential for offshore renewable energy.

The Energy White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030 was launched in 2015. This policy set out a framework to guide policy and actions that the government needed to take in the energy sector up to 2030.

The Government published its Climate Action Plan (to tackle Climate Breakdown) in 2019.

The Plan sets out the actions the Government intends to take to address climate breakdown across sectors such as electricity, transport, the built environment, industry and agriculture.

The National Energy and Climate Plan 2021 – 2030, which is required under the EU Clean Energy Package, will require the production of a climate strategy, with a statutory basis in EU law. This Plan incorporates all planned energy and climate policy measures (up to the end of 2019) and the objectives therein, to deliver a 30% reduction by 2030 in non-emissions trading scheme (non-ETS) greenhouse gas emissions (from 2005 levels). This plan also included a target of 3.5 gigawatts (GW) of offshore wind to be delivered by 2030.

The new Programme for Government *Our Shared Future*, agreed in June 2020, has accelerated the decarbonisation agenda even further, committing to a 7% average yearly reduction in overall greenhouse gases over the next decade, and to achieving net zero emissions by 2050, as well as setting a 5 GW offshore wind target by 2030.

The Climate Action and Low Carbon Development (Amendment) Bill introduced in October 2020, will, if enacted, commit Ireland, in law, to move to a climate resilient and climate neutral economy by 2050.

In terms of the planning policy context, Project Ireland 2040: National Planning Framework and the National Development Plan 2018 – 2027 were published in 2018 and set out a number of National Strategic Outcomes, one of which is to *Transition to a Low-Carbon and Climate-Resilient Society*.

Further, the Government published a draft of Ireland's first national framework for managing marine activities, National Marine Planning Framework (NMPF), in November 2019, which is due to be adopted in April 2021. The Draft NMPF is Ireland's first plan for more sustainable, effective management of marine activities and will inform the Government's objectives and priorities. The Draft NMPF supports the establishment of Ireland as a world leader in offshore renewable energy deployment, highlighting the importance of offshore renewable energy in Ireland's decarbonisation journey.

2.2.1 Regional

The Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines) set out the strategic policy for Dublin and the mid-east region over the twelve-year period to 2022. The Regional Planning Guidelines highlight the need to fully exploit renewable energy potential such as wind and wave energy and reduce national dependency on imported fuels for energy provision, to the benefit of the economy as well as the environment.

The Regional Spatial and Economic Strategy for the Eastern and Midlands Region 2019-2031 is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

The provision of infrastructure will be supported by the Strategy in order to facilitate a more distributed, renewables-focused energy generation system, harnessing off-shore energy potential and connecting sites of optimal energy production to the major sources of demand.

2.2.2 Local

The Wicklow County Development Plan 2016 – 2022 (County Development Plan) sets the overall strategy for planning and sustainable development within the administrative boundaries of County Wicklow. The County Development Plan through the policies and objectives contained therein, provides the direction for the future development of County Wicklow. One of the key strategic goals of the Wicklow County Development Plan is to integrate climate change and sustainable development into statements of plan policy, strategies and objectives.

The Arklow and Environs Local Area Plan 2018 – 2024 (Arklow LAP) is the land use framework for guiding future development in the settlement of Arklow Town.

Similar to the County Development Plan, the Arklow LAP contains a vision for development of the town infrastructure as well as a vision to address climate change, directly in the areas of flooding and renewable energy, and indirectly by integrating adaptation to climate change and sustainable development into the plan objectives.

3 EIA Methodology

The objectives of the Environmental Impact Assessment Report (EIAR) are to identify the likely significant environmental effects of the proposed development and to evaluate the magnitude and significance of likely effects and to propose appropriate measures to mitigate potential adverse effects.

3.1 Legislation and Guidance

The EIA Directive, as amended, requires the competent authority to undertake an Environmental Impact Assessment (EIA) of certain public and private projects that are likely to have significant effects on the environment as part of the consent decision making process. In Ireland, the requirements of the EIA Directive, as amended, in relation to planning consents have been transposed into Irish legislation in Part X of the Planning and Development Act, 2000, as amended (the Act), and in Part 10 of the Planning and Development Regulations, 2001, as amended (the Regulations).

The Environmental Impact Assessment Report has been prepared to comply with the requirements of the Act and Regulations. Additionally, due regard will be given to the overarching guidelines for EIA.

3.2 Consent Process

The proposed development is considered a ‘Strategic Infrastructure Development’, therefore the application for consent requires the preparation of an Environmental Impact Assessment Report (EIAR). For the purpose of the EIA, Sure Partners Limited is the ‘developer’ presenting the proposed development for approval and An Bord Pleanála is the ‘competent authority’ that will undertake the EIA and decide whether to grant consent for the proposed development. All relevant consent application documentation, including the EIAR, is available on the following website: www.arklowbankwindparkogiplanning.com.

3.3 Rating and Significance of Effects

Likely effects are considered to be those which are planned to take place and those which can be reasonably foreseen to be predictable consequences of normal construction and operation of the proposed development.

Significance of effects is understood to mean the importance of the outcome of the effect. The significance of the effect depends on both the character of the predicted impact and the sensitivity of the receiving environment.

3.4 Consultation Undertaken

A variety of third-party stakeholders have been consulted throughout the preparation of the Environmental Impact Assessment Report, statutory consent application and the scheme design for the proposed development.

These third parties include Wicklow County Council, relevant statutory bodies, utility/service providers, landowners, elected representatives, non-government organisations as well as residents and businesses in proximity to the proposed development.

4 Alternatives

4.1 The Do-Nothing Scenario

The do-nothing scenario refers to what would happen if the proposed development was not implemented and the Arklow Bank Wind Park remained at the Phase 1 current installed capacity.

If Arklow Bank Wind Park is to stay at its current (Phase 1) capacity, there will be no change to this existing situation. This means that the Arklow Bank Wind Park Phase 2 (enabled by the proposed development) would not contribute to Ireland's progress towards reaching EU, National and Regional planning objectives. Nor would it help to meet Ireland's renewable energy and decarbonisation targets, including in particular, the targets in the Climate Action Plan.

The 'do-nothing' scenario does not meet the project objectives and consequently was not the chosen alternative.

4.2 Alternative Landfall Options

To connect the power generated by the offshore wind park, it is necessary to bring cables onshore and connect to the National Electricity Transmission Network. The point at which the offshore cables come onshore (the landfall) is a key component in the overall proposed development.

4.2.1 Landfall Locations

Two potential cable landfall locations were identified, termed the 'northern' and 'southern' landfalls.

The northern landfall location is in the townland of Johnstown North approximately 4.5km northeast of Arklow, close to Ennereilly Beach, Co Wicklow. The southern landfall option is located within the town of Arklow on a parcel of land to the north of the Avoca River, adjacent to the coastline with the Irish Sea which is formed by a coastal erosion protection embankment at this location.

The two options for the landfall location were assessed through a multi-criteria assessment. It was found that the northern landfall location is preferable to the southern landfall location, both from a technical and an environmental perspective.

4.2.2 Landfall Construction Methods

There were 4 different construction methods considered for the landfall associated with the proposed development. These methods included:

- Open Cut-Trench
- Horizontal Directional Drilling (HDD)

- Direct Pipe (a proprietary method developed by Herrenknecht)
- Micro Tunnelling (pipe jacking)

Open cut trenching means digging a trench and laying the cable within the trench, while the other methods all relate to construction methodologies using ‘trenchless’ techniques, such as drilling or tunnelling, with the cable pulled through the duct or tunnel bore.

Horizontal Directional Drilling (HDD) methodology is determined as the favoured technique for the cable landfall both in terms of the likely environmental impact and on technical feasibility grounds when compared to other methods.

Therefore, the northern landfall option, using a method of horizontal directional drilling, is the preferred option for the cable landfall.

4.3 Alternative Substation Options

Alternatives were considered with regard to the proposed 220kV onshore substation, particularly in respect of the substation configurations, the connection to the National Electricity Transmission Network and the location of the substation site. As all of these alternatives are inter-related, these alternatives were considered in parallel, before a decision on the preferred substation design was made.

4.3.1 Substation Connection and Configuration

Two technologies for the onshore substation were assessed; Air Insulated Switchgear (AIS) and Gas Insulated Switchgear (GIS). The key disadvantage of AIS is the significantly larger footprint required, but this technology offers advantages in terms of cost, maintainability and future expansion over GIS. The key attribute that GIS offers relates to space saving and the ability to house the equipment which offers a distinct advantage with regards to noise abatement for example. This reduced land take does however require an increase of infrastructure height. The decision on whether AIS or GIS technology is used, is interdependent with the substation site selection process.

The substation must connect to the National Electricity Transmission Network to transmit the power from the offshore wind farm. Three methods to connect the new substation to the existing 220kV transmission grid were considered including:

- Type 1 – ‘Across the Fence’ Connection
The ‘Across the Fence’ connection comprises a connection directly to an existing National Electricity Transmission Network substation, requiring the new substation to be on an adjacent site.
- Type 2 - ‘Tail-Fed’ Connection
The ‘Tail Fed’ option describes potential connection options between the landfall and the existing Arklow substation.

It can be applied at distances greater than 500m from the existing substation. It requires both a transmission and connection compound within the overall proposed substation site.

- Type 3 - 'Loop-In' Connection.

The 'Loop-In' connection applies for potential locations where there is an existing 220kV Overhead Line (OHL) traversing the area. This option also requires both a transmission and connection compound within the proposed substation site.

The 'across the fence' option for connection to the National Electricity Transmission Network was ruled out on technical feasibility grounds. This option was not taken forward for further evaluation. Both the 'tail fed' and 'loop in' options were then considered in more detail. Following this assessment, the selected option was the 'loop-in' connection, due to the technical feasibility with the selected GIS configuration in combination with the selected substation location.

4.3.2 Substation Location

The location of the proposed substation is dictated in part, by the proximity to the National Electricity Transmission Network. Following an initial sifting process, where a number of criteria, including environmental and technical aspects were considered to arrive at a shortlist of sites. Four potential sites were shortlisted for further detailed assessment. This assessment included site surveys, to determine the site most suited for the proposed substation. The shortlisted sites were:

- Site A – Carrycole, situated approximately 4.9km north of Arklow Town in an agricultural setting with an approximate area of up to 6.4 hectares.
- Site B – Shelton Abbey, situated approximately 2.1km north of Arklow Town, with an approximate area of up to 4.5 hectares.
- Site C – Johnstown North, situated approximately 5.3km north-east of Arklow harbour with an area of approximately up to 7.3 hectares.
- Site D – Seabank, situated in an agricultural setting approximately 3.1km north of Arklow Town with an area of approximately up to 5.5 hectares.

The multi-criteria assessment, which included consideration of environmental aspects, enabled the selection of Site B, which was concluded to have the most advantages and the least disadvantages and thus is the selected site for the proposed substation.

4.3.3 Substation Site Remediation Alternatives

Given the brownfield nature of the proposed substation site, the site will require remediation prior to commencing the construction of the above ground structures. While the substation site is currently covered by asphalt, the recent site investigations indicate that some fertiliser by-product material from the manufacturing facility is present on the site.

In order to inform the site remediation strategy decision process, Arup prepared a remedial strategy assessment. Five remediation options were considered as part of this assessment, including:

- Geosynthetic Liner Layer - This option proposes to cap the made ground with a geosynthetic liner barrier layer to minimise the percolation of rainwater through the contaminated material.
- No Barrier - This option represents the ‘Do-Nothing’ option.
- Blinding Concrete - This option includes the use of a blinding concrete layer as a barrier layer.
- Asphalt Barrier - This option omits the use of a buried barrier layer and includes for the site to be entirely covered by asphalt outside the buildings and infrastructure.
- Excavate Material - This option includes the excavation and disposal of all made ground and contaminated soils from the site.

The geosynthetic liner option was selected as the preferred option. This option will reduce the movement of rainfall through the ground and will also act as a physical barrier. This reduces the potential for any groundwater contamination from above and any contact between site users and any potential contaminants in the soils.

4.4 Alternative Cable Route Options

The onshore cable route (2 no. 220 kV high voltage alternating current circuits) will run from the proposed landfall at Johnstown North, to the proposed 220kV substation at Shelton Abbey.

Both overhead lines and underground cables would be technically feasible to connect the offshore infrastructure to the National Electricity Transmission Network. However, given the objectives of the coastal Area of Outstanding Natural Beauty (AONB), in addition to public opposition to overhead lines, an early decision was taken to disregard an overhead grid connection option and therefore only underground cable route options were considered for the proposed development.

The approach to cable routing for this project is to traverse cross-country (off-road) where possible, to minimise disruption to traffic and to avoid in so far as possible, areas of congested utilities and proximity to residential areas.

The cable route appraisal comprised a detailed desktop study and site walkovers. The constraints and potential impacts of the various routes and route combinations were compared in the assessment, which was undertaken in three phases, as follows:

- Phase 1 – Desktop comparator assessment between northern (north of M11) and southern (south of M11) route options
- Phase 2 – Desktop assessment of various potential route combinations associated with the southern route options.

- Phase 3 – Survey and ground truthing of selected route combinations
- Phase 4 – Further engineering assessment and landowner consultation

The Phase 1 assessment determined that the southern route options were more suitable and these options were progressed to the Phase 2 evaluation, as the terrain is better and the routes more direct.

There were six route combinations of the three main southern route options assessed. Following the detailed, individual assessment (Phase 2) of each of the southern route options, two of the routes were recommended for further consideration.

Following the Phase 3 ground truthing and survey exercise in respect of the two remaining route combinations, the findings were that both routes are suitable options, particularly in respect of environmental constraints considered in the assessment.

Further detailed engineering and technical assessment of the road and water crossings was undertaken as part of the Phase 4 assessment. The Developer also engaged in further landowner and stakeholder consultation, following which, the final preferred cable route option was selected.

4.5 Alternative National Electricity Transmission Network Connection Options

The alternative connection methods to the National Electricity Transmission Network were considered, with a ‘loop in’ connection chosen as the preferred option. Changes in the alignment of the existing 220kV overhead lines are required to accommodate this connection, including new/replacement towers. In considering the preferred location of these new/replacement towers, the primary consideration was ensuring that it minimised the change from the existing alignment/locations, with environmental aspects also considered in respect of siting the towers.

The selected locations avoided sensitive areas, including the Environmental Protection Agency (EPA) licensed site adjacent to the proposed substation.

5 Proposed Development

5.1 Design of the Proposed Development

5.1.1 Overview

The proposed development will comprise the Onshore Grid Infrastructure associated with the Arklow Bank Wind Park Phase 2 Project, including 220kV onshore export circuits and fibre optic cables, from the landfall of the offshore export circuits at Johnstown North, to a proposed new 220kV substation at Shelton Abbey and overhead line connection from the new substation to the National Electricity Transmission Network.

5.1.2 Land Requirements

The proposed development will require temporary land take to accommodate construction activities and permanent land take to accommodate specific above ground elements of the proposed development.

Landfall - The Developer will acquire lands at the landfall at Johnstown North, to facilitate construction and to allow permanent access for future maintenance activities.

Cable Route - The Developer will require a permanent wayleave along the cable route to allow access for future maintenance. Most of the cable route is routed across agricultural land, with the width of the permanent wayleave being typically 15m and the temporary cable construction corridor being typically 30m.

Substation - The land at the proposed substation site will be permanently acquired for the purposes of the proposed development.

Connection to National Electricity Transmission Network - A permanent wayleave corridor of approximately 53m for the overhead line tie-in connection will be established. A permanent 4m corridor within this wayleave, directly under the overhead line, will be kept clear at all times for access.

5.1.3 Landfall

The landfall location is in the townland of Johnstown North, Co. Wicklow, approximately 4.5km northeast of Arklow Harbour.

The landfall is where the two export circuits from the offshore wind farm come onshore (which will be high voltage alternating current), with the boundary for planning purposes being at the foreshore (i.e. high-water mark of ordinary or medium tides, shown as the high water mark on Ordnance Survey maps).

The landfall comprises:

- Two 220kV export circuits, approximately 100 to 180m in length, from the high water mark to two onshore Transition Joint Bays;

- Transition Joint Bays allow connection between onshore and offshore circuits. The Transition Joint Bays are buried chambers with a concrete plinth and concrete walls, where the cables and joints are anchored;
- A temporary horizontal directional drilling compound and associated access road, in one of two potential locations;
- A temporary cable construction compound to facilitate construction of the eastern section of the onshore cable, located in the alternate location (from the selected temporary horizontal directional drilling compound); and
- Fibre optic cables, for operation and control purposes, laid underground with the export circuits.

There are two adjacent site options for the horizontal directional drilling compound, dependent on the alignment of the offshore export cable routes. Only one HDD compound will be used for the HDD operations, even in the case where both offshore export cable routes are used (i.e. one offshore export cable circuit on each export cable route). Whichever site is chosen for the HDD compound at construction stage, the other site will be utilised for a temporary cable construction compound. Both options are assessed within this Environmental Impact Assessment Report.

There will be a permanent access road, consisting of crushed stone, approximately 4.5m wide constructed to the Transition Joint Bays from the existing access point on the R750 regional road.

A coastal woodland area of c. 16,000m² is to be planted at the landfall, in the form of biodiversity enhancement.

Maintenance of the cables at the landfall will comprise an inspection, once every year, by means of the link box and communication chambers located at the Transition Joint Bay.

The cables will be decommissioned when the project ceases operation, at the same time as decommissioning of the substation. On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice.

5.1.4 Cable Route

Two 220kV HVAC circuits with associated fibre optic communication and earthing cables will be laid underground from the landfall at Johnstown North, to the proposed onshore 220kV substation at Shelton Abbey.

The onshore cable route is c. 6km long, with joint bays positioned at strategic locations along the cable route to facilitate the installation and later the operation and maintenance of the cable circuits during the operational lifetime of the proposed development.

The cable route will traverse agricultural lands, off-road where practicable, to minimise disruption to traffic during cable construction and to avoid, in so far as possible, areas of congested utilities and proximity to residential areas.

The land along the cable route will be reinstated and returned to its current use post-construction, although future access for inspection and maintenance purposes will be required. The chosen route reduces the crossings of roads and watercourses to a practical minimum and avoids significant environmental constraints.

Once construction is completed, the only visible above ground structures along the cable route will be small marker posts to indicate the location of the cables and manhole covers associated with joint bays.

Each of the two circuits comprises three power cables, one earthing conductor plus two fibre optic cables. In total therefore, there are six export cables, two earthing conductors plus four fibre optic cables. Each set of three cables is normally installed, in the trench, either in flat or trefoil (pyramid) formation. The cables will be placed in ducts which will be either Polyvinyl Chloride (PVC) or High Density Polyethylene (HDPE).

There will be two joint bays, one joint bay per circuit, required approximately every 700m of a cable installation and in places, at a closer spacing depending on the complexity of the route and the preferences of the landowners.

The joints between the three cables for each circuit will be made at a joint bay. A maximum of 20 joint bays will be required along the cable route.

Each joint bay comprises of:

- a joint chamber;
- a communications chamber; and
- an earth link box.

At each joint bay, the communications chamber and earth link box are covered by manhole covers which need to be accessed at regular intervals for maintenance purposes over the lifetime of the project. Where possible, the joint bays will be positioned near to field boundaries.

Horizontal directional drilling will be required for the crossing of the R772 (including the Templerainy watercourse) and a second horizontal directional drilling may be required for the crossing of the M11 (including the Sheepwalk watercourse). Should horizontal directional drilling not be utilised for crossing the M11, the cables will be laid within an existing underpass.

Other crossings including of watercourses, roads and one gas pipeline will be constructed using open cut trenched techniques.

In the case of road crossings, these will be accompanied by appropriate traffic management measures to ensure impacts are minimised and access is maintained. For watercourses, water flow is maintained by damming the watercourse and over pumping or using temporary flume pipes. The gas pipeline crossing will be

constructed in accordance with Gas Networks Ireland Safety Advice for Working in the Vicinity of Natural Gas Pipelines (2019).

Suitable access is required to facilitate safe access of plant and equipment to joint bay locations over the lifetime of the proposed development. Where a joint bay cannot be accessed by an existing track, a new permanent access track, approximately 4.5m wide, will be constructed using crushed stone to the joint bay locations.

Maintenance of the cables will comprise an inspection, once every year, by means of the link box and communication chambers, which will be located at every joint bay.

The cables will be decommissioned when the project ceases operation, at the same time as decommissioning of the substation. On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice.

5.1.5 Substation

The site at Shelton Abbey for the proposed onshore 220kV substation is located 2.1km to the west of Arklow Town. The site covers an area of approximately four hectares and is part of the Avoca River Business Park. The Avoca River forms the southern boundary of the Avoca River Business Park. The site is currently owned by Crag Digital Avoca Ltd, which has planning permission to develop a data centre on the site and an adjacent area (planning reference 18940). A subsequent application (notification of grant by Wicklow County Council, subject to appeal) has also been made by Crag Digital Avoca Ltd for this site (Planning Reference 201285). The Avoca River Business Park was occupied by the Irish Fertiliser Industries (IFI) manufacturing plant until 2003.

The Shelton Abbey Canal and Right of Way track are along the southern boundary. The Right of Way track consists of a mixture of soil and gravel. There is a small area of woodland between the site and the public road.

The proposed substation consists of two connected compounds:

- The transmission compound, with the infrastructure to physically connect to the National Electricity Transmission Network, including:
 - 2 no. new 220kV overhead line towers;
 - 220kV GIS substation building;
 - house transformer;
 - diesel generator; and
 - medium voltage (MV) unit substation.
- The connection compound, with the infrastructure to allow the connection of the windfarm in accordance with EirGrid Grid Code requirements, including:
 - 220kV GIS substation building;
 - 2 no. STATCOM buildings, associated control buildings and transformers;
 - 2 no. harmonic filters;

- 2 no. voltage regulation devices;
- telecommunications mast;
- house transformer;
- diesel generator; and
- lightning arrester masts.

The ‘loop-in’ connection will be made to the existing Lodgewood-Arklow 220kV overhead transmission line via the two new overhead line towers located adjacent to the GIS building in the transmission compound. There will be two new 220kV overhead line towers in the transmission compound to loop-in the Lodgewood-Arklow 220kV line. The maximum height of each of the towers will be 40m.

The substation will be operated remotely and will be unmanned during operation. It will receive occasional visits for inspection and maintenance.

Access to both the transmission compound and connection compound will be via the existing road network, from the R772, which is c. 2km to the east, to the L6179 Kilbride Road leading to the private Avoca River Business Park access road.

The normal asset life of a substation is c. 50 years but it may be extended beyond this. When the proposed development reaches the end of its useful life, it may be either refurbished, replaced, or it will be decommissioned. If decommissioned, all buildings and above ground structures on the substation site will be removed.

Substation Site Remediation Strategy

The substation site is currently covered by asphalt underlain by made ground. The made ground is underlain by silts and clays which in places includes organic peat like material. A gravel aquifer underlies the silts/clay layer. Site investigations have found that the composition of the made ground varies throughout the site.

While the substation site is currently covered by asphalt the recent site investigations indicate that some fertiliser by-product material from the manufacturing facility is present on the site. As a result, the site will require remediation prior to commencing the construction of the above ground structures.

The proposed remediation strategy for the site, following removal of the asphalt, is to cap the made ground with a barrier layer. The barrier layer will minimise leachate generation, act as a gas barrier and also form a physical barrier for site users to prevent dermal contact with the heavy metals in the made ground during site operation.

In addition to the removal of the existing asphalt, relatively small volumes of made ground in localised areas will be excavated to facilitate the construction of footings, cable duct basements and the installation of drainage pipes.

5.1.6 Flood Defences

A flood defence embankment protects the Avoca River Business Park from flooding via the Avoca River. Approximately 500m to the west of the substation site, a low point in the existing flood defences requires improvement works to

protect the substation buildings, and associated ancillary external equipment from flooding (with protection provided for a flood with a statistical 1 in 1000 year occurrence, including an allowance for climate change).

The substation site flood defence improvement works will include localised raising of the existing flood defence embankment level in the location west of the substation site.

There will be possible maintenance and repair works to the existing flood embankment around the Avoca River Business Park as part of a regular inspection, maintenance and repair programme, to manage the residual risk of flooding from a potential breach of the embankment. The nature and extent of these maintenance and repair works will be confirmed by site investigation works, but if required, have the potential to give rise to cumulative effects with the proposed development. The potential cumulative effect of such works, if required, has been considered in the Environmental Impact Assessment Report.

5.1.7 Connection to the National Electricity Transmission Network

An overhead line connection from the new proposed 220kV transmission compound to the existing 220kV National Electricity Transmission Network will be required. This connection will be via a 'loop in' arrangement consisting of a northern and southern tie-in to the transmission network.

The 'loop in' connection will consist of:

- Building two new double circuit lattice steel angle towers, to the east and to the south of the new substation and re-stringing the overhead line from the existing towers to the new towers.
- Stringing new overhead lines from the new towers into the transmission compound to new towers.
- Two existing towers, to the east and south of the new substation, and the existing overhead line spanning between the new towers will be decommissioned.

5.1.8 Community Gain

It is estimated that a development of the scale of Arklow Bank Wind Park Phase 2 could lead to the creation of around 80 direct long-term jobs in operation and maintenance work. In addition, the project will support companies in the operation and maintenance supply chain, including vessel services, water and fuel, technical inputs, and loading and unloading of project cargoes.

With the Arklow Bank Wind Park project, a multi-million euro community benefit fund will be established once the project is operational to support communities near the wind farm. This will be in addition to any commercial rates payable to Wicklow County Council for any onshore infrastructure.

6 Construction Strategy

6.1 Construction

Subject to obtaining planning approval and the relevant permits and licences, on-site construction of the proposed development is expected to commence in 2023 and is expected to be completed in 2024. The schedule of works is as follows:

- The landfall works at Johnstown North are currently scheduled to take approximately ten months and are planned to be undertaken between September 2023 and June 2024. This includes the compound establishment, horizontal directional drilling, joint bay construction and cable pulling and jointing;
- The works along the cable route are scheduled to commence in 2023 and be complete in 2024, including enabling works and compound construction, cable trenching, joint bay and access road construction, horizontal directional drilling at crossings, cable installation and jointing, reinstatement, cable testing and energisation;
- The onshore 220 kV substation works are scheduled to commence in 2023 and be complete in 2024, including site set-up, site preparations (including remediation), civil construction and GIS building construction, flood defence improvement works, electrical installation and pre-commissioning, commissioning and energisation;
- The overhead line connection from the substation to the transmission network is scheduled to take a total of four months and is planned to be undertaken within the timeframe of August to November 2024.

Several temporary construction compounds and working areas are required to allow construction of the proposed development. These include the following:

- The planning application includes two temporary construction compounds at Johnstown North. One temporary construction compound will support horizontal directional drilling operations. The other temporary construction compound will support the construction of the eastern end of the onshore export cable. There are two options for the location of these compounds with one in each of the two adjacent fields (whichever one is utilised for the horizontal directional drilling compound, the other will be utilised for the temporary cable construction compound).
- Temporary construction compounds will be required for the horizontal directional drilling operations at the crossings of the M11 and R772 roads.
- A temporary construction compound will be required for the substation site, as well as to support the construction of the western end of the onshore export cable from the landfall to the new 220kV substation and the connection from the substation to the National Electricity Transmission Network.
- The cable construction corridor, from the transition joint bay at the landfall to the onshore 220kV substation site

- Working areas for the flood defence improvement works, the installation of the two new overhead line towers and the decommissioning of the two existing overhead line towers

Pre-construction activity

There will be pre-construction confirmatory surveys completed at all temporary construction compounds and working areas. Temporary fencing and warning signs will be erected as required to provide safe working areas.

Prior to commencing any works, the Developer will inform the appointed landowner agents and the landowners about the activities, access, specific works, and the construction schedule.

Prior to commencement of site work, the appointed contractor(s) will produce detailed construction method statements, work programmes and risk assessments.

Landfall

Owing to the steep coastal cliffs in the vicinity of the landfall, HDD will be used to bring the offshore export cables ashore, before connecting to the onshore cables.

Horizontal directional drilling is a trenchless cable installation technique whereby a hole is drilled under a feature so that the cable installation avoids disturbance of the cliffs and any sensitive habitats in the area. There will be two horizontal directional drilling bores at the landfall and each bore and duct will contain one circuit.

The horizontal directional drilling bore would extend to a point at 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. The cable for each circuit will be pulled through the ducts to join with the onshore cable at the Transition Joint Bay. The Transition Joint Bay will be located below ground level in the horizontal directional drilling compound, at Johnstown North. The onshore cables, which will be to a different specification to the offshore export cables, will be joined at the Transition Joint Bay.

Onshore Cable Route from Landfall to 220kV Substation

For the majority of the length of the cable corridor, an open cut trench method will be used to construct the two 220kV cable circuits. The cables will be pulled through cable ducts which will be installed in such a manner to ensure the cables can be pulled into them without damage. The joints between cable sections will be made at a joint bay after each length of cable has been winched into position in the ducts.

The cable corridor will be fully reinstated following the completion of works along the cable route. Similarly, once the cable is installed, joints made and joint bay infilled, the joint bay area will be fully reinstated.

The cable route crosses a number of public roads, as well as some private access roads. Where the works cross existing farm tracks or farm roadways, obstruction will be minimised while the work is underway.

Horizontal direction drilling will be used to cross the R772 and the adjoining Templerainy watercourse, as shown in the typical horizontal directional drilling schematic in **Figure 1.3**.

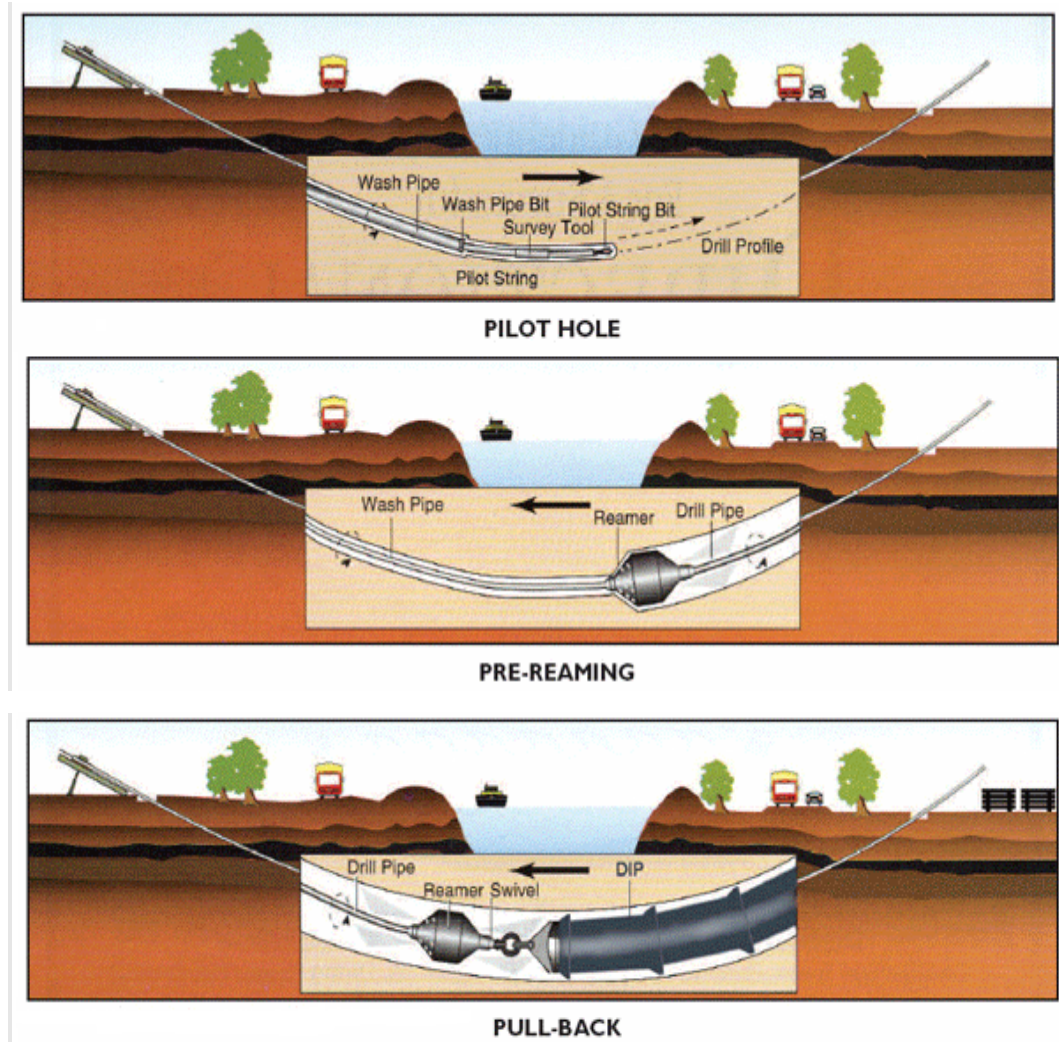


Figure 1.3: Typical Horizontal Directional Drilling Schematic

Two options are being considered to cross the M11 motorway. One option is horizontal directional drilling, with a length across the M11 (including the Sheepwalk watercourse) of approximately 500m, with an approximate depth of 25m. This option will require felling of up to approximately 4000m² of immature woodland on the west side of the M11 to facilitate the works. The other option to cross the M11 is to install the cable in an existing underpass, comprising a concrete box-culvert.

The cable corridor crosses a Gas Networks Ireland gas pipeline. Where the crossing of the gas pipeline is achieved by use of an open cut trench, this will be undertaken by hand digging.

Along the cable route, a number of watercourses will be crossed by open cut trench techniques. These watercourse crossings are required for cable trench installation. To allow these works to take place, water flows will first be controlled to maintain free flow, this will either be achieved using temporary damming and an over-pumping method or alternatively, using a flume pipe method, with the invert of the pipe typically 100mm below the invert of the existing stream bed, to replicate the natural flow.

Substation

In preparation for commencing construction of the substation, site enabling works, including securing the site and clearing the works area, will be undertaken. Temporary fencing and warning signs will be erected as required to provide safe working areas.

Initial access to the substation site will be via the existing access road to the Avoca River Business Park. To avoid re-work, construction of the new site entrances, will be undertaken once the platform and permanent drainage works in the vicinity are complete. All entrance junctions will tie-in to the existing Avoca River Business Park access road levels and provide safe sightlines.

To control surface water runoff from the site during construction, temporary drainage will be installed. There will be permanent drainage installed as the area is constructed from foundations upwards.

A level platform of c. 4 hectares in area on which the substation will be constructed, will be created by bulk filling to bring site levels up to a level that will provide flood protection, provide suitable capping to the made ground and facilitate the buried services for the proposed development.

The substation will have an earthing grid installed typically 600mm below platform level. The earthing grid will be progressed in conjunction with drainage, ducts, cable troughs and foundations to ensure it is progressed safely and efficiently.

Electric and fibre optic cables will be installed in ducts and troughs to provide linkage between different elements of the electrical equipment.

The substation will have various reinforced concrete foundations to provide support to buildings and external electrical equipment.

The superstructure of the substation buildings will be structural steel. The structural steel will be erected, once the foundations have been completed. The wall and roof metal cladding will be fixed, making the buildings weather-tight, when the structural steel frames are in place.

Once external foundations are constructed or buildings are weather-tight, the electrical fit-out will be undertaken.

When site construction traffic is no longer a risk to finished surfaces, access road surfacing will be completed, permanent site signage will be erected, unpaved areas within the substation will be surfaced with stone chippings.

Connection to the National Electricity Transmission Network

In preparation for commencing construction of access routes, towers and stringing, site enabling works including clearing the works area and levelling of the tower foundation area will be undertaken. Temporary fencing and warning signs will be erected as required to provide safe working areas.

Temporary access routes, capable of accommodating construction plant, construction materials and personnel, are required for the construction of each tower, the installation of the overhead line and the setting up of temporary guarding positions.

The tower foundations will consist of a reinforced concrete block at each tower leg, which will be founded on a suitable bearing layer and of sufficient size to anchor the tower in position.

Portions of the tower body will be preassembled from the steel sections and bolted together at a location beside the foundation. Assembled tower portions will be lifted into position and bolted together.

Once the towers are constructed the stringing of the overhead lines will be carried out which includes the installation of phase conductors and earth wires on the supporting tower structures.

The decommissioning of the existing towers will be completed by ESB Networks in line with the ESB's standard policy and procedures.

Once all works are complete, the access route and the working areas around the towers and overhead line stringing areas will be reinstated as close as possible to their original condition.

Commissioning

Commissioning of all electrical equipment will be required to ensure the operational readiness of the equipment and to demonstrate the equipment meets the functional and operational specifications.

Management

A Construction Environmental Management Plan has been prepared to provide minimum requirements that the contractor(s) will be required to implement during the construction of the proposed development. This Plan includes all of the environmental mitigation measures to be implemented during the construction stage and includes (among others) a Construction Traffic Management Plan, Invasive Species Management Plan and a Construction Waste Management Plan. The Construction Environmental Management Plan will be further developed by the contractor, and prior to construction, will be agreed with Wicklow County Council and fully implemented.

The project is anticipated to provide employment to approximately 165 people during the construction phase.

The normal construction working hours for the proposed development will be 7am – 7pm: Monday to Saturday.

These hours correspond to the current construction programme. Subject to further construction planning and resourcing, certain activities (such as the horizontal directional drilling) may occur 24-hours a day, 7-days a week for the duration of those activities and this has been taken as a worst case for the purpose of the Environmental Impact Assessment Report.

A site boundary in the form of temporary hoarding will be established around each of the temporary construction compounds with hoarding or fencing used around each of the working areas, before any significant construction activity commences.

Temporary site services will be installed in parallel with the rearrangement and diversion of existing utilities, where relevant.

The Developer will implement a Community Liaison Plan in order to ensure nuisance to residents and the general public during the works is minimised, to ensure public safety and welfare, and to help ensure the smooth running of construction activities.

A Health and Safety Plan has been formulated which addresses health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

An Environmental Incident and Emergency Response Plan has also been prepared, which will cover all foreseeable risks during the construction stage, including fire, flood, collapse and accidental spills and releases of hazardous substances. The plan will be further developed by the contractor, prior to construction commencing.

Every effort will be made to ensure that any significant environmental effects will be avoided, prevented or reduced during the construction phase of the proposed development.

7 Air Quality

The air quality assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on air quality. The assessment focusses on the main sources of pollutants likely to be associated with a development such as this. Possible pollutants include dust emissions which might arise during construction as well as traffic related pollutants, such as nitrogen oxides and particulate matter.

Given that there are a number of sensitive receptors located relatively close to the proposed works, there is potential for air quality effects arising from dust during construction activities, arising from activities such as earthworks, construction and track-out. A qualitative assessment was undertaken and the effects are predicted to be not significant, temporary effects prior to the implementation of mitigation measures.

There are four locations (R750, the L6179, the L2180 and Forest Road) where construction traffic will result in a significant increase in traffic flows due to traffic diversions and numbers of anticipated construction vehicles. At these locations, pollutant increases were assessed at the nearest sensitive receptor and are considered negligible.

The contractor will be required to implement standard mitigation measures during construction to minimise air quality effects, such as erecting hoarding around construction compounds, keeping site areas clean, revegetating earthworks and exposed areas as soon as practicable, ensuring vehicles entering/leaving site are covered and that appropriate wheelwash systems are provided and controlling dust generation through appropriate dust control measures.

A Construction Environmental Management Plan has been prepared and details the dust mitigation measures to be implemented, such that dust effects will be minimised.

During the operational phase, as the proposed development will not generate any significant additional volumes in traffic, there will be no significant air quality effects and therefore a detailed assessment is not required.

As there are no significant adverse effects on air quality predicted during the operational phase of the proposed development, no mitigation or monitoring measures are proposed.

No significant residual effects are predicted on air quality during the construction, operation or decommissioning of the proposed development having regard to the effectiveness of the mitigation measures proposed above.

8 Climate

The climate assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on climate.

The potential effects of emissions of carbon due to the construction, operation and decommissioning of the proposed development are considered in the context of Ireland's national climate change obligations.

The assessment of carbon emissions was carried out in order to determine the likely greenhouse gas emissions (CO₂ equivalent) predicted due to the construction phase of the proposed development, relative to Ireland's projected baseline for 2024 (the predicted final year of construction), as reported by the Environmental Protection Agency. This assessment focuses on the embodied carbon of the material used during the construction phase and compares this to the Environmental Protection Agency's projected greenhouse gas emissions for both the Emission Trading Scheme sector and total emissions for 2024.

The carbon emissions associated with the construction of the proposed development is estimated to be 0.15% of the projected Emission Trading Scheme Sector CO₂ equivalent emissions (with additional measures) in 2024. The carbon emissions of the construction of the proposed development is estimated to be 0.04% of the projected total CO₂ equivalent (with additional measures) emissions from Ireland in 2024. On this basis, the effects to climate are considered slight, negative and permanent.

Mitigation measures, such as the use of low carbon construction materials, such as less carbon intensive concrete blends, will be implemented to minimise impacts.

During operation, the transmission and connection substations will use electrical equipment insulated with Sulphur Hexafluoride (SF₆) gas. The handling and maintenance of the equipment will lead to very low-level losses of SF₆. The design and manufacture of this equipment will follow industry best practice to reduce losses to a practical minimum and the emission of SF₆ is not expected to have a significant effect on climate during the operational phase.

The proposed development as part of the overall Arklow Bank Wind Park Phase 2 Project, would support an increased capacity of 520MW of additional clean energy which offsets 530,225 tonnes of carbon emissions annually, representing a significant contribution towards Ireland's 2030 targets for carbon emission reduction. It is anticipated that this will have an indirect significant positive effect on climate and will offset the slight negative, permanent effect predicted during the construction phase.

As there is an indirect significant positive effect on climate predicted during the operational phase of the proposed development, no mitigation measures are proposed.

Following the implementation of mitigation measures, no significant residual negative effects on climate are predicted during the construction, operation and decommissioning phases.

9 Land and Soils

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on land and soils (i.e. land, soils, geology and hydrogeology).

The study area for this land and soils assessment extends 2km from the proposed development planning (red line) boundary. A baseline environment was established from publicly available information, site walkovers and site investigation.

The soils and subsoils in the study area at the landfall and the cable route consist mainly of glacial deposits (Irish Sea Tills). Alluvium deposits are identified close to river or stream crossings along the cable route. Alluvium refers to a deposit of clay, silt and sand left by flowing floodwater in a river valley. No significant soil contamination was found at the landfall and along the cable route.

At the substation site, the soils and subsoils mainly consist of made ground which refers to soil which has been either been altered or placed by man. The made ground is underlain by alluvium deposits, approximately 6m thick. A gravel aquifer underlies the alluvium deposits and this gravel aquifer rests upon bedrock that is classified as a locally important aquifer (LI). An aquifer is an underground layer of permeable water-bearing rock, fractures in the rock, or soil.

At the substation site, the geological and hydrogeological features of importance include potentially contaminated land and groundwater; gravel and bedrock aquifers. Contaminated land was designated a 'High' importance ranking, both aquifers were designated a 'Medium' importance ranking.

Soils in the study area are identified as being of 'Low' importance.

A conceptual site model was created based on this information. This in turn determined the baseline environment to be a Type B environment i.e. a naturally dynamic hydrogeological environment.

The impact assessment identified works required during the construction phase which may have an impact on the baseline environment. These included earthworks; horizontal directional drilling (HDD), trenching by open cut methods, installation of piles, storage or transmission of leachable and/or hazardous materials; lowering of groundwater levels by pumping or drainage; excavation of materials above the water table and excavation of materials below the water table. During construction, these works may have an effect on the baseline due to:

- Loss and damage of topsoil and subsoil;
- Excavation of potentially contaminated ground;
- Loss of solid geology;
- Effect on the surrounding ground;
- Earthworks haulage;
- Soil improvement for platform works;

- Improvement work for flood defences;
- Change to groundwater regime;
- Loss or damage of proportion of aquifer through pollution accident;
- Loss or damage of a groundwater dependant habitat.

The magnitude of these potential impacts during the construction phase, and prior to the implementation of mitigation measures, was determined to range from negligible to moderate adverse, with the significance of the impacts ranging from imperceptible to moderate.

Mitigation measures are included in a project-specific Construction Environmental Management Plan, which will be further developed by the contractor prior to the commencement of works. This covers all potentially polluting activities and includes an Environmental Incident and Emergency Response Procedure. All excavated material that is not to be re-used as part of the works, would be disposed of at a suitable licensed facility in respect of which a waste permit or waste licence is granted. A remediation strategy has been outlined for works at the substation site which will minimise the impact of the works on the surrounding environment.

Appropriate storage will be put in place to prevent the accidental release of hazardous materials. Mitigation during the construction phase will include implementing good practice, as well as specific mitigation measures during excavation works, to avoid sediment entering watercourses, including the Avoca River.

At the proposed substation site, the implementation of the remediation strategy will result in a reduction in the percolation of rainfall through the potentially contaminated made ground. This in turn will reduce the potential for leachate generation from the made ground and reduce groundwater contamination on the site. This will result in a slight beneficial impact on the underlying aquifer.

The operational phase of the proposed development will have an overall imperceptible long-term effect on land and soils. Potential impacts associated with operational phase include accidental spillage of potentially polluting substances. With the implementation of the proposed design, no additional mitigation measures for land and soils are considered necessary for the operation of the proposed development.

Following the implementation of mitigation measures, no significant residual negative effects on land and soils are predicted during the construction, operation and decommissioning phases.

10 Water

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on both surface water quality and the existing hydrological regime, including flood risk.

The Avoca River, the principal river in the region, is located 280m south of the substation site. Land drainage at, and in the vicinity of, the substation site has been significantly modified by drainage channels and flood defence embankments. The onshore cable route crosses eight smaller watercourses. Other surface water features of importance considered in this assessment include the Avoca Estuary, Irish Sea and a number of protected habitats (Arklow Town Marsh, Avoca River Valley, Arklow Sand Dunes and Buckronev-Brittis Dunes and Fen).

The EPA classify the Avoca River as being moderately polluted and as Poor status under the Water Framework Directive. Additional water quality analysis of the groundwater at the substation site found pollution which has the potential to migrate into surface water bodies including the Avoca River and Shelton Abbey Canal. The EPA has noted that there are anthropogenic pressures on the Johnstown North watercourse and that the Templerainy Stream is at Good water quality status.

A desktop study was undertaken to establish the baseline information for the study area in relation to flood risk. Due to the elevated topography of the proposed landfall site above the existing watercourses and the sea, the risk to the landfall site from flooding is considered to be low. Similarly, the risk along the cable route from flooding is low. The main risk of flooding at the substation site is from the Avoca River. The existing flood defence embankment which surrounds the entire (former) IFI site protects the substation site from flooding. Flood risk to the substation site arises from potential failure of these existing flood defences, high groundwater levels, modification of the natural drainage and reliance on a pump system for drainage. The site for tower 6B (which is part of the National Electricity Transmission Network connection) sits within an area of marshland but, based on the flood mapping completed as part of the Flood Risk Assessment, is outside the area of risk for fluvial flooding.

The potential effects on surface water during the construction phase of the proposed development, in the absence of mitigation measures, include the following:

- Potential for sediment-laden surface run-off during site preparation, site clearance, excavation and construction of site access roads.
- The washing of construction vehicles and equipment may pose a pollution risk to watercourses in the area if undertaken in inappropriate locations.
- Excavations at the landfall site, trench excavation for the onshore cable, substation site and tower foundations may require temporary dewatering at some locations, which has the potential to generate runoff containing sediment;

- Excavation and removal of potentially contaminated ground at the substation site has the potential to release pollutants into surface water bodies.
- The dry open cut trench watercourse crossings have the potential to temporarily alter river shape, release sediment into the watercourse and result in increased velocities in streams.
- The dry open cut trench watercourse crossings also have the potential to locally increase flood risk to adjoining agricultural land, and associated risk to construction personnel;
- The proposed horizontal directional drilling at the landfall site (which includes the R750 crossing), the R722 and M11 crossings have the potential to generate runoff containing sediment onto the adjoining land and/or into the sea. Other major pollutants associated with the HDD include bentonite, lubricants and cooling fluids.
- There is the potential for water contamination resulting from accidental spillages of effluent and sanitary waste from construction welfare facilities
- Exceptionally high intensity rainfall has the potential to cause localised flooding on the substation site and associated damage during the construction stage

Prior to the operation of the proposed development land will be reinstated to its original use post construction at the proposed landfall site, along the proposed cable route as well as along the access route and the construction areas around the towers and overhead line stringing areas (for the connection to the National Electricity Transmission Network). Potential negative effects on hydrology from these elements of the development during the operational phase will be solely in the event of any spills and leaks from machinery during any ongoing maintenance or inspection of the proposed development.

Once the flood defence improvement works are complete, as well as the proposed drainage works (attenuation, over-pumping, etc), this will mitigate the current flood risk at the site, which will be a long-term slightly positive effect. There will also be an ongoing inspection, maintenance and repair programme for the flood embankment at the substation site, during the operational phase.

Once constructed the proposed substation remediation measures will prevent rainwater from infiltrating into the contaminated material located beneath the footprint of the site and therefore limit the mobilisation of any contamination from the substation site to adjacent surface waterbodies, namely the Avoca River and Shelton Abbey canal. As a result, the operational phase is considered to have a long-term slight positive effect on water quality.

No significant effects on water are predicted for the decommissioning of the proposed development.

Mitigation measures will be implemented to ensure that the construction of the proposed development will not have a significant negative effect on water. The measures will include control of rainwater runoff, sediment and excavated material, control of sediment in rivers and measures to contain drilling fluids.

The mitigation measures are described in the Construction Environmental Management Plan. This plan will be implemented for the duration of the construction phase. Operational phase mitigation measures include the installation of hydrocarbon interceptor tanks at the substation site, which will remove oil from water, as part of the surface water drainage system.

Following the implementation of mitigation measures, no significant residual negative effects on water are predicted during the construction, operation and decommissioning phases. Temporary slight negative effects will result for the open cut trench watercourse crossings during the construction phase. The reduction in flood risk at the site will be a long-term slight positive effect.

11 Noise and Vibration

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development due to noise and vibration.

An assessment of the noise and vibration effects arising from the proposed development on the existing noise environment was carried out. The baseline noise environment was determined by conducting noise surveys at sensitive locations in the vicinity of the proposed development. The assessment considers noise and vibration from the proposed development construction works, including road traffic; and noise from the proposed development substation once operational.

The noise and vibration assessment considered multiple phases during construction of the proposed development including; construction of the landfall site, the cable route, flood defences, connection to the National Electricity Transmission Network and the substation site, and associated construction road traffic. Good industry standards, guidance and practice procedures will be followed in order to minimise noise and vibration effects during construction. A communication strategy will be adopted to ensure that negatively affected receptors are aware of the timing and duration of construction activities. Additionally, all communications will contain contact details to direct any questions or complaints.

The construction noise assessment identified temporary negative (not significant) effects at closest receptors to landfall works, cabling works and substation works. Temporary negative (not significant) effects due to construction vibration have been identified at the closest receptors to cabling works. No significant residual effects due to construction noise and vibration are predicted.

During operation of the substation, the relevant noise limits are predicted to be complied with at the closest receptors. A long-term negative effect, which is not considered to be significant, has been identified at nearby receptors due to the operational substation. Noise generated from the site will be periodically reviewed through examination of noise sources, examination of noise propagation factors, noise monitoring and reviewing complaints. No significant residual effects due to operational noise are predicted.

12 Biodiversity

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on biodiversity.

To assess the ecological effects of the proposed development, a range of assessments and surveys were undertaken. These surveys were conducted to identify the presence or likely presence of protected species and habitats within the study area. The value of these ecological receptors was determined and the possible effects that the proposed development may have upon them was assessed. Mitigation measures were proposed in order to offset any identified negative impacts. The National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) were consulted and their findings integrated into the assessment.

Buckroney-Brittias Dunes and Fen candidate Special Area of Conservation (cSAC) is located 320m northeast of the proposed development site. Significant effects on this and all other European designated sites (Natura 2000 sites) have been ruled out as per the separate '*Report for Screening for Appropriate Assessment and Natura Impact Statement*'.

Three proposed Natural Heritage Areas (pNHAs) are potentially hydrologically connected to the proposed development site, namely Buckroney-Brittias Dunes and Fen pNHA (320m northeast), Arklow Sand Dunes pNHA (500m east) and Arklow Town Marsh pNHA (750m southeast). No significant effects are predicted to occur with respect to these pNHAs.

General mammal surveys were carried out in conjunction with habitat surveys. The majority of habitats within the planning boundary were of local value, with none recorded as being of international value. No rare plant species were recorded within the planning boundary during the site survey and, given the modified nature of the habitats within the proposed development site, are highly unlikely to occur.

No evidence of Otter was recorded during site surveys within the planning boundary, although they are likely to occur along larger watercourses namely the Avoca River, Templerainy Stream and Kilbride Stream. Signs of Badger were recorded within the planning boundary, but no Badger setts were identified. Linear features within the planning boundary are likely to provide moderate foraging habitat for bats. The loss of hedgerows/treelines and woodland habitats within the planning boundary will reduce the feeding area available for bats. However, no mature trees, with the potential to be used as significant bat roosting sites were recorded within the planning boundary. Common mammal species such as Hedgehog are also likely to occur within the planning boundary. No evidence of amphibian or reptile species was recorded within the planning boundary.

Breeding bird surveys concentrated on habitats within the planning boundary. Winter bird surveys were carried out along the coastal waters near the landfall location and within terrestrial habitats northeast of the landfall location, where potentially valuable habitat for wintering birds had been identified (in consultation with the NPWS).

Overall, the study area is of a local value for a range of terrestrial bird species that are relatively common in the Irish countryside and the proposed development area is not of significant value for birds.

A fish stock assessment confirmed that fish are present within the Templerainy and Kilbride Streams and therefore Otter and Kingfisher could potentially occur. IFI noted that Brown Trout occur in the Johnstown North Stream downstream of the planning boundary.

The high-risk invasive species Japanese Knotweed and Himalayan Knotweed were recorded west of the proposed substation site in the vicinity of the flood defence improvement works on the banks of the Avoca River. Measures to treat invasive species are specified.

Overall, the majority of ecological impacts will arise during the construction phase as a result of disturbance to Otter, fish, birds and bats, damage to and loss of areas of habitats, including treelines/hedges and woodland and potential water pollution incidents, in particular from open cut watercourse crossings and bentonite spillage. None of the impacts are considered to be significant.

A range of mitigation measures have been proposed in the EIAR and are included in the Construction Environmental Management Plan (CEMP), to offset potential negative impacts, including appropriate timing of the works, replacement planting, pollution prevention measures and habitat reinstatement. An Invasive Species Management Plan (ISMP) is included in the CEMP to prevent the spread of invasive species during the construction phase. All construction works and mitigation measures relating to ecology will be monitored by a suitably qualified Environmental (Ecological) Clerk of Works (ECoW).

It is noted that the majority of habitats within the working width will be reinstated following construction. Within the temporary working width, outside the c.15m permanent wayleave, hedgerows and treelines will be reinstated with a range of native tree and hedgerow species. Biodiversity enhancement planting will also be provided at the landfall to ensure that there is no net-loss of habitat as a result of the proposed development.

Following the implementation of mitigation measures, no significant residual negative effects on biodiversity are predicted during the construction, operation and decommissioning phases.

13 Traffic and Transport

This assessment describes the likely significant effects on traffic and transportation associated with the construction, operation and decommissioning of the proposed development.

Within the proposed development zone of impact (study area) there are a number of different road types including regional roads and local roads. The character of the roads within the study area is generally rural in nature. The construction of the cable route requires six road crossings. The crossing of the R750 Sea / Coast Road, R772 Dublin Road and the M11 Motorway will be undertaken by horizontal directional drilling (HDD) (although an alternative option using an existing underpass may be used for the M11 Motorway crossing). Other road crossings will be via open cut for the L95115, L2180 Beach Road and L6179 Kilbride Road. The cable will also run within two roads for short stretches (Forrest Road and L6179 Kilbride Road).

Traffic counts were carried out during October 2020 on the surrounding road networks to establish baseline traffic conditions and were adjusted to account for lower than normal traffic flows as a result of the ongoing COVID-19 pandemic. The highest traffic volumes were recorded along the R772 Dublin Road; and L2180 Beech Road, with lower traffic flows using the remaining roads such as the L95115.

Construction traffic generated by the proposed development will consist of expected export of excavated waste, fill materials imported, construction materials delivered, construction equipment being delivered, staff commuting to and from the study area and service trips associated with the construction (i.e. compound set up, maintenance, external visitors, etc.). This construction traffic will travel to and from the seven temporary construction compounds, four working areas and two additional haul route accesses points proposed.

Most of the construction site staff will be on site for normal working hours between 07.00-19.00, Monday to Saturday and will arrive before and depart after these times. However, for the purposes of this assessment, it was assumed that the peak traffic generation associated with the construction activities will coincide with the peak periods on the receiving road network, to ensure a robust assessment.

The daily trip generation expected during the construction phase are 340 light vehicles and 545 heavy goods vehicles (HGV). During the operational phase less than 30 trips per day are expected. During the decommissioning phase trip generation is likely to be no more than the trip generation of the construction phase.

The distribution of traffic assumes that all externally generated traffic will arrive to and from Junction 20 on the M11 and this is the designated access point from the Motorway to the construction site(s).

As part of the assessment for the landfall area it was assumed that 100% of the traffic will travel along the R772 Dublin Road and R750 Sea / Coast Road.

For the cable route construction, it was assumed that during construction 100% of the traffic could travel along the R772 Dublin Road and R750 Sea / Coast Road. Alternatively for the cable route, 100% of the traffic could travel along the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road.

Forest Road will be used to support the construction of the cable route along the road, and to access the HDD temporary construction compound west of the M11 from the L6179 Kilbride Road. For the purpose of the assessment 30% of the overall cable route construction traffic is expected to be generated by the works along Forest Road.

For the substation area, it was assumed that 100% of the traffic will travel along the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road.

The R747 Vale Road will be used to access the working area for the new tower 6B and the decommissioning of tower 7 via a temporary access track.

It is assumed in the assessment, that all construction traffic will occur at the same time and that:

- No construction traffic will be permitted to use the L95115 during the course of the construction works, however some short term activity will be expected during the construction of the cable crossing this roadway.
- No construction traffic will be permitted to use Love Lane during the course of the construction works.

The analyses showed that the proposed development will have a slight effect (a temporary change in traffic flows without causing a real change in travel conditions) on the L6179 Kilbride Road, L2180 Beech Road, R750 Sea/Coast Road and Forest Road and not a significant effect (a small temporary change in traffic flows without causing a real change in travel conditions) on the R772 Dublin Road.

Traffic generated during the operational phase of the proposed development will be solely confined to inspection and maintenance vehicles accessing the landfall area, joint bays along the cable route and the substation including the connection to the NETN. The levels of traffic generated will be minimal (between 10 and 15 trips a month), and therefore no significant effects are envisaged.

The impact on future traffic conditions associated with the decommissioning works will be less than that associated with the construction works themselves due to the nature of decommissioning works, as described above. Any future impacts are expected to be a temporary change in traffic flow resulting in a minor change in travel conditions and the effects would be slightly negative.

A Construction Traffic Management Plan has been prepared and will be in place for the duration of the proposed works. This Construction Traffic Management Plan is included in the Construction Environmental Management Plan and will be further developed by the contractor prior to commencement of works in consultation with Wicklow County Council and An Garda Síochána.

This Construction Traffic Management Plan outlines the key measures to be implemented, such as planning and programming of deliveries, the management

of lane closures, queuing and parking requirements, speed limits, designated routes and control of emissions. In addition to the HDD crossing of the three roads listed above and the banning of construction traffic along the L95115 and Love Lane, the plan also recommends stop / go (single lane closure) or localised diversion (full closure) be put in place along Forest Road, L2180 Beech Road and L6179 Kilbride Road during the cable construction within these two roads. Temporary traffic management measures such as the use of a banksman will also be implemented for the R747 Vale Road to provide safe access/egress from the site.

No mitigation or monitoring measures are required for the operational phase. The mitigation measures, described for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase.

Following the implementation of mitigation measures, no significant residual negative effects on traffic and transport are predicted during the construction, operation and decommissioning phases.

14 Landscape and Visual

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on landscape.

The site of the proposed development comprises two distinct but related parts, the underground onshore export cable circuits from the landfall to the substation and the proposed substation, connection to the national electricity transmission network and the flood defence improvement works, at Shelton Abbey.

The route of the proposed underground circuits extends through a number of *Landscape Character Areas (LCAs)* as identified in the Wicklow County Development Plan 2016-2022, including the *Urban Area LCA*, the *M11 East Corridor Area LCA* and the southern extent of the *Southern Coastal Area AONB LCA*. The proposed substation lands are within the designated *Urban Area LCA*.

The proposed 220 kV cable circuits will be routed through agricultural lands and small settlement areas towards the coast. The cable circuits will be entirely underground, with minimal expression above ground in the form of manhole covers and marker posts. The underground circuits will run through or around fields with temporary and localised disturbance of the existing landscape that will be reinstated as cables are installed. There will be localised disturbance of field boundary trees and hedgerows where the route passes beneath these features, however, new trees and hedgerows will be planted upon completion (shallow rooted planting for cable protection). In some locations, such as at road or watercourses crossings, cut and cover trenching may not be possible and horizontal directional drilling will be utilised instead.

Similarly, the landfall site at Johnstown North will be located within agricultural fields on the inland side of the coast road. The landfall connection infrastructure will include substantial concrete chambers (transition joint bays), however these will be entirely underground. Construction will result in considerable, but short term, disturbance of the landscape within these fields, however, upon completion, the fields will be reinstated to their pre-construction condition with the exception of surface manhole access covers and the access road to the chambers (transition joint bays).

The site of the proposed substation is within a larger industrial facility which is part of the former Shelton Abbey. Shelton Abbey is a late 18th century mansion and protected structure (RPS No. 16404005) which was sold in the early 1950's to NET Irish Fertiliser Industries who built a facility on the low-lying grounds which were the eastern part of the demesne. Shelton Abbey became an open prison facility.

The fertiliser facility was closed in 2003 and much of the infrastructure was demolished or dismantled, leaving the prilling and drying towers and a number of smaller structures together with extensive areas of flat tarmac marshalling and storage areas. Today, Holfeld Plastics have a factory on the western part of the lands, and a wood processing facility operates in part of the eastern portion of the lands.

A small existing substation is located centrally along the northern side of the lands and Shelton Abbey remains in use as an open prison.

The Avoca River lies along the southern edge of the lands, and the Dublin to Rosslare railway and the R747 Vale Road run to the south of the river. The northern and southern sides of the valley rise steeply from the low lying (3.0 to 6.0m OD) industrial lands to the north and south of the Avoca River valley and are mostly in mixed woodland. The M11 motorway spans the valley and river c. 375m to the east of the industrial lands and is elevated. An existing 220 kV overhead powerline crosses the valley to the east of the site and a number of medium and lower voltage powerlines are apparent in the wider locality as they converge on the Arklow substation located at Kilbride to the north of Arklow.

There are limited residences along the Vale Road in the vicinity of the site. North of the site on the more elevated agricultural land, there are some individual houses on private roads and clusters of dwellings adjoin the L2180 just over 1 km to the north of the site.

By virtue of the industrial site area being low lying and substantially secluded within the Avoca River valley, the zone of visual influence of the lands and the proposed substation is localised to the immediate area of the R747 Vale Road and the M11 overbridge.

The proposed 220kV substation development will occupy c. 4 hectares including the connection and transmission compounds, each with a 220kV GIS substation building, a control building and a range of transformers, filters, regulation equipment and associated substation infrastructure. The GIS substation buildings will be the largest structures, however, they are moderate in size relative to the existing Holfeld Plastics factory. The development site area will be along the northern side of the industrial lands where the north face of the valley affords a high degree of screening and immediately west of the existing Shelton Abbey substation.

The northbound carriageway of the M11 has the most open aspect towards the industrial lands, however, the proposed substation development will be readily absorbed within the context of existing larger industrial buildings and structures set along the northern side of the river valley. From the portion of the R747 Vale Road along the southern side of the industrial lands, the proposed substation site area is substantially screened by the elevated railway line and intervening landscaping and landscape and visual effects of the proposed development will be imperceptible or minor. From the elevated lands to the north and south of the valley, the proposed development site is not visible as it is set low within the valley corridor.

In summary, the proposed substation development is moderate in scale and will be located within an established industrial area which is substantially screened within its wider landscape setting by virtue of being low lying along the Avoca River corridor. The proposed development will be sited and has been designed to take maximum advantage of the screening characteristics of the valley topography and of the established industrial character of the site area. The proposed underground circuit connection and landfall site infrastructure will be entirely underground.

Mitigation in relation to the landfall site and the underground cable circuits primarily relates to constructing the infrastructure underground and to localising construction operations. There will be areas along the route where vegetation is removed and cannot be replaced. An area of 16,000m² of biodiversity enhancement coastal woodland will be planted at the landfall site to ensure there is no net-loss of vegetation as a result of the development.

Landscape and visual effects of the proposed development will not be significant.

15 Archaeology, Architecture and Cultural Heritage

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on archaeology, architectural and cultural heritage.

A detailed desktop and walkover survey of the baseline environment was carried out as part of the assessment. There are 19 recorded archaeological sites within the receiving environment of the proposed development, half of which date to the prehistoric period. The remaining archaeological heritage sites date to the early medieval and post-medieval periods. Further, archaeological work carried out in advance of the construction of the M11 Bypass uncovered evidence of a rich prehistoric landscape dating from the Neolithic period with particular emphasis on the Bronze Age.

The Record of Protected Structures for Wicklow and the National Inventory of Architectural Heritage Building Survey list two built heritage sites; a mausoleum (BH 1) and Shelton Abbey (BH 2) within the receiving environment of the proposed development. The mausoleum is also an archaeological site (AH 7). Two demesne landscapes have also been identified within the receiving environment that comprise the landscape associated with Shelton Abbey (DL 1) and the northern limit of the demesne of Ballyrairie House (DL 2) to the south of the Avoca River.

Whilst no specific sites of archaeological potential have been identified within the footprint of the proposed development, it should be noted that the overall landscape contains moderate to high archaeological potential due to the proximity of the coastal resource, the Avoca River and the known archaeological monuments.

It is possible that ground disturbances associated with the proposed development may result in direct negative effects on previously unrecorded features or deposits that have the potential to survive beneath the current ground level without surface expression. Effects, prior to the application of mitigation measures, may range from moderate to profoundly negative, dependant on the nature, extent and significance of any such archaeological remains.

In order to mitigate any negative impacts, a programme of archaeological testing will be carried out in advance of construction within all greenfield areas of the proposed development. This will be undertaken by an archaeologist under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the project extents. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage.

The proposed development will cross eight small watercourses (AAP 2-10). The River Avoca will not be affected, with only restringing of overhead lines in the vicinity. Disturbances associated with the construction of the development may result in direct negative effects on previously unrecorded features or deposits that have the potential to survive in and within the immediate vicinity of the watercourses. Effects, prior to the application of mitigation measures, may range from moderate to profoundly negative, dependant on the nature, extent and significance of any such archaeological remains.

In order to mitigate any negative impacts a programme of underwater archaeological assessment, in the form of wade surveys, will be carried out on each watercourse to be directly impacted by the proposed development. This will be carried out by an archaeologist (or archaeologists) under licence and will aim to identify the nature, extent and significance of any archaeological remains that may be present within the sections of watercourses to be affected. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record and/or archaeological monitoring. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage.

No negative impacts are predicted upon the architectural heritage resource as a result of the construction of the development. The impact of the development at Shelton Abbey demesne is deemed to be neutral based on the denuded form of the landscape and the presence of existing industrial development.

No operational impacts are predicted upon the archaeological, architectural or cultural heritage resource.

Following the implementation of the mitigation measures, no significant negative residual effects to the archaeological, architectural, or cultural heritage resource as a result of the proposed development are predicted.

16 Resource and Waste Management

This assessment considered the likely significant effects of the proposed development on resource and waste management, proposing mitigation measures where required and predicting the residual effects that would result.

The principal objective of sustainable resource and waste management is to use material resources more efficiently, to re-use, recycle and recover material and to reduce the amount of waste requiring final disposal. Where residual waste is generated, this should be dealt with in a way that follows the waste hierarchy (prevention, re-use, recycle, recovery, disposal) and as set out in EU and Irish legislation and best practice guidance.

Waste from the proposed development will be generated during the construction, operation and decommissioning phases. Site clearance works will include the felling of trees and removal of vegetation from each of the working areas within the proposed development site and will be kept to the minimum necessary. This organic waste will be removed from site by a waste collection permit holder and delivered to an authorised composting or organic waste facility. Where organic waste contains invasive species, this will need to be handled and treated separately, as outlined in the Invasive Species Management Plan, in the Construction Environmental Management Plan.

Most of the waste generated from the proposed development will be from the earthworks associated with the construction phase. There will be considerably more re-use of excavated material on site than material disposed off-site, due to the sustainable earthworks design. Excavated material as part of the construction works will generally consist of:

- Rock, at the landfall compound;
- Topsoil and subsoil; and
- Made ground.

Spoil management measures have been included in the CEMP and will be further developed by the contractor. These measures set out how volumes of excavated material in and out of the area are managed. A significant proportion of the surplus excavation material from the landfall site and cable route will consist of uncontaminated soil, stone and naturally occurring material which may be reused in its natural state within the site. Surplus clean, inert material, which meets the re-use requirements set down in legislation will be re-used off site at suitable locations.

On the substation site, small quantities of made ground, in the form of asphalt and potentially contaminated soils (from the historical industrial use of the site) will require excavation. This material will be stockpiled, tested and classified in accordance with the waste categorisation (List of Waste Codes) and will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility.

Small volumes of soil and bentonite will need to be handled during the horizontal directional drilling (HDD) operations. This material is non-hazardous and will be handled and disposed of or recovered in accordance with applicable waste legislation.

Construction works and temporary works facilities are likely to generate construction waste. The most likely type of construction waste will be bituminous material from excavation, surplus concrete and unusable or damaged ducting segments which will arise on site. Waste material will be segregated on site and will be removed from site using a permitted waste carrier for recycling or disposal at a licensed site. Liquid wastes (such as contained wheel-wash runoff, and sanitary waste) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

It is considered that the predicted quantities of waste streams generated by the proposed development are low in the wider context of the national generation of waste materials.

The proposed development will require imported materials, primarily concrete, crushed stone, road paving materials and steel, for the construction of the substation and crushed stone and cable material and High Density Polyethylene (HDPE) ducting for the installation of the cables. Recycled and reused materials will be used where feasible subject to material testing to ensure they are appropriate for the proposed use and subject to all regulatory and environmental requirements.

The likely effects of the proposed development on resource and waste management during the construction phase, prior to mitigation measures being implemented, are considered to be slight, negative and short-term. During the decommissioning phase, it is expected that materials will be recycled or re-used off site where possible. Consequently, it is expected that the effects on resource and waste management from the decommissioning phase, prior to mitigation measures being implemented will be slight, negative and long-term.

When compared to the waste generated during the construction phase, the waste generated during operation will be negligible as it will mainly be associated with occasional maintenance works. Therefore, the likely effects on resource and waste management during the operational phase of the proposed development are considered to be not significant.

A Construction Waste Management Plan (CWMP) has been prepared and is included in the Construction Environmental Management Plan (CEMP).

Following the implementation of mitigation measures, the proposed development will have a minor, negative and short-term effect on resource and waste management, during the construction and decommissioning phases, with no significant effects during the operational phase.

17 Material Assets

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on material assets. Specifically, material assets were considered in the form of:

- Land Use and Properties;
- Electricity;
- Telecommunications;
- Gas;
- Water Supply Infrastructure; and
- Foul and Surface Water Drainage.

The potential for significant effects associated with material assets will primarily be experienced during construction and will consist mainly of local re-routing of existing services and utilities, if required, as well as temporary effects on land use and properties.

Construction of the proposed development will require temporary land take to accommodate construction activities and permanent land take to accommodate specific above ground structures and maintenance works. Construction phase effects on land use and property, within the planning (red line) boundary, are expected to be significant, negative and short-term for the duration of the construction phase. Mitigation measures for all land temporarily acquired will involve reinstatement to its original condition so far as is reasonably practicable.

The change in use of land (through permanent acquisition or wayleaves) is predicted to result in a slight, negative and long-term effect on the existing landowner's due to the changes in access and operational restrictions within the permanent wayleave that will be agreed with landowners.

All construction activities in the vicinity of existing services and utilities will be carried out in consultation with the relevant service providers and undertaken in compliance with any requirements or guidelines that they may have. The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and utilities unless this has been agreed in advance with the relevant service provider.

The substation will be unmanned, with only occasional staff on site for maintenance works. There will only be a minimal demand on utilities and services during the operation of the proposed development. Irish Water will provide a potable water connection to the proposed development, via a proposed watermain connection upgrade.

Following implementation of the mitigation measures, it is anticipated that the proposed development will have no significant residual effects on land-use and property, electricity, telecommunications, gas, water supply or the sewer network and drainage infrastructure.

The operation of the proposed development would enable the supply of an additional 520MW of renewable energy which would increase the capacity of the existing power supply network. Therefore, the Arklow Bank Wind Park Phase 2 Project (which includes the proposed development) would have a significant, long-term positive effect on electricity supply in Ireland.

18 Population and Human Health

This assessment considers the likely significant effects associated with the construction, operation and decommissioning of the proposed development on population and human health.

Population aspects of relevance to this assessment include residential amenity, community severance, business, tourism and employment opportunities.

Human health aspects are primarily considered through an assessment of the environmental pathways by which health may be affected (i.e. the determinants of health) such as air, noise, water or soil. These aspects are covered in detail in other chapters within the Environmental Impact Assessment Report.

The proposed development is anticipated to provide employment for c. 165 people in the locality during the construction phase, with significant investment in materials and services. This employment will have a positive short-term effect on the local economy with local businesses likely to benefit from an increase in demand for their goods and services.

The likely significant effect on human health associated with traffic is negligible, given the duration of the construction phase and the mitigation measures proposed.

The background concentrations of air pollutants are well below the air quality standard limits determined for the protection of human health. Any increase in the concentrations, due to the construction of the proposed development, are not expected to cause an exceedance of the air quality standards and therefore the effects on human health are likely to be imperceptible.

Noise levels from HDD works (night-time) and vibratory sheet piling (evening time) at the R772 crossing, will exceed relevant thresholds. However, given the duration of works, the effect is expected to be negative, but not significant. Along the cable route, at a number of receptors in close proximity to the works, there will be a negative, but not significant effect from the use of excavators. Similarly, the closest receptors to the substation may experience a negative effect during the piling works, which is expected to be not significant.

There will be no emissions of toxic substances to the environment, during the construction phase, which could have an effect on human health. The construction works are not expected to cause any change to disease vectors. The risk of exposure to contaminated substances, or groundwater contamination will be minimised by best practice methodologies and a phased removal of asphalt at the substation site as per the substation site remediation strategy.

The construction phase will have no effect on living conditions or on vulnerable groups in the vicinity or wider area.

Apart from mild, temporary, annoyance due to traffic disruption and temporary negative effect due to construction noise and vibration, significant effects on human health are not likely during construction.

To minimise the effects of the proposed development on human health during construction, project specific measures are included in the Construction Environmental Management Plan. These include the Construction Waste Management Plan and Construction Traffic Management Plan. These detailed and robust measures (mitigation and monitoring) will be implemented in full during construction.

The development will have an indirect positive operational effect on climate and will help to meet 2030 emission reduction targets. This will have a positive effect on population as there will be an additional renewable energy source reducing the population's reliance on fossil fuels.

It is estimated that the Arklow Bank Wind Park Phase 2 Project will lead to the creation of around 80 long term jobs in operation and maintenance work. In addition, the project will support companies in the operation and maintenance supply chain.

The project will not only maximise regional economic benefits and create local sustainable jobs, it will also unlock focused community participation in the sector, particularly around port towns. Offshore wind energy can create industry sub-sectors delivering output and jobs across overlapping skill sets – from new roles in engineering, operation and maintenance, and offshore turbine servicing, to new opportunities for existing maritime businesses to provide supply chain services to the offshore energy industry.

A multi-million euro community benefit fund will be established once the Project is operational to support communities near the wind farm. This will be in addition to any commercial rates payable to Wicklow County Council for any onshore infrastructure.

In terms of human health, there will be no significant effects on human health associated with traffic, air quality, vibration, or other pollutants, including ground gas, contaminated surface or groundwaters.

Noise will be generated during the operational phase from the substation which will have the potential to affect the nearest receptors. However, noise emissions will not be significant from the operation of the proposed substation alone.

Electromagnetic fields will be generated by the 220kV underground cable route which will pass through areas with a number of sensitive receptors. There will be no significant impact from the proposed development from an electromagnetic field point of view as the development fully complies with the relevant guidelines and recommendations.

Following the implementation of mitigation measures, there will be no significant residual effects on population and human health in the area, from the construction or decommissioning phases of the proposed development. The proposed development will result in significant long-term positive effects on population and human health through additional renewable energy supply and economic benefits to the community.

19 Major Accidents and Disasters

This section presents an assessment of the likely significant effects on the environment arising from the vulnerability of the proposed development to risks of major accidents and/or natural disasters.

The site-specific risk assessment identifies and quantifies risks due to the proposed development, focusing on unplanned, but possible and plausible events occurring during the construction and operation of the proposed development.

An examination of all plausible risks associated with the proposed development was undertaken. The scenario with the highest risk score in terms of a major accident and/or natural disaster during the construction of the proposed development was identified as being ‘fire and/or explosion’, with a secondary effect of ‘fire water/foam/powder reaching nearby receptors’. The outcome of the assessment identified that this event is ‘very unlikely’ to occur and will have ‘serious’ consequences should it do so, representing a ‘low risk scenario’.

The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will include the storage of minimum volumes of fuels and oils in contained and bunded areas. This will mitigate, by prevention, the risk of fire/explosion resulting from the potential spillage of fuels or oils. There will be portable fire extinguishers available for use in the working areas. Site personnel will be trained as first aiders and fire marshals. Site activities will be monitored to minimise fire and explosion risk by the site safety officer and fire marshals.

Further, the Construction and Environmental Management Plan contains measures to ensure that potential risks of major accidents and/or disasters are identified, avoided and mitigated, as necessary.

The scenarios with the highest risk score in terms of a major accident and/or natural disaster during the operation of the proposed development were identified as being ‘fire and/or explosion’, with a secondary effect of ‘fire suppressant powder reaching nearby receptors.’ The outcome of the assessment identified that this event is ‘very unlikely’ to occur and will have ‘serious’ consequences should it do so, representing a ‘low risk scenario’.

The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will include fire detection and alarm (designed to BS 5839 Fire Detection and Alarm Systems for Buildings), the buildings being equipped with firefighting equipment for safe evacuation and that smoke detection will be provided throughout the substation building. Fire suppression systems will be fitted to enclosed areas where necessary.

The proposed development will comply with BS 9999 *Fire safety in the design, management and use of buildings*. A Fire Plan specific to the substation site will detail the pre-planned procedures in place for use in the event of a fire.

The risk of a major accident and/or disaster occurring during either the construction or operational phases of the proposed development is considered low.

20 Inter-related Effects

The assessment of inter-related effects considers the interaction between the various environmental aspects, for example the interaction between noise and traffic. The assessment of inter-related effects has been undertaken on a qualitative basis by each of the environmental topic leads based on best scientific knowledge.

This assessment considers whether the addition of many minor or significant effects of the proposed development itself have the potential to result in larger, more significant effects.

A number of likely significant residual inter-related effects have been identified.

There will be a significant residual inter-related effect between climate and population and human health. The operation of proposed development will enable the provision of an additional renewable energy source. The indirect positive effect on climate will have consequential significant long-term positive effects on population and human health.

There will be a significant residual inter-related effect between material assets and climate. The operation of the proposed development will enable the provision of an additional renewable energy source. The indirect, positive effect will be to reduce carbon emissions from fossil fuel power plants. This will result in a significant, long-term positive effect on climate.

There will be a significant residual inter-related effect between material assets and population and human health. The proposed development will support the provision of a clean electricity source in Ireland. This will provide economic and social benefits to electricity consumers, resulting in significant, long-term, positive effects to population and human health.

21 Cumulative Effects

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from the interaction between all of the different permitted and proposed projects in the same area in combination with this proposed development.

Cumulative effects will consider whether the cumulation of effects of other permitted or proposed projects have the potential to result in larger, more significant effects when combined with the effects of the proposed development.

The cumulative assessment considers the likely significant effects arising from a cumulation of effects associated with the proposed development and other projects in the local area of relevance.

The assessment considers a worst-case scenario, where both the proposed development and the proposed developments for which timelines are not known are under construction at the same time.

A tiered approach to the cumulative assessment has been undertaken, in which the proposed development is considered cumulatively with other projects as follows:

Tier 1 -

- Arklow Bank Wind Park Phase 2 Offshore Infrastructure;
- Arklow Bank Wind Park Phase 2 Operations and Maintenance Facility (OMF);
- EirGrid Grid Upgrade Works; and
- Irish Water Upgrade Works.

Tier 2 -

- Other relevant projects currently under construction;
- Other relevant projects with consent;
- Other relevant projects in the planning process; and
- Other existing projects that were not operational when baseline data were collected.

The Tier 1 developments encompass the various elements of the Arklow Bank Wind Park Phase 2 Project, which have the potential to give rise to cumulative effects with the proposed development.

The Tier 2 developments include a number of other permitted and proposed projects in the locality which have the potential to give rise to cumulative effects with the proposed development. These projects include the following:

- Crag Digital Avoca Ltd has received planning permission for a data centre adjacent to the proposed substation. Another application has been made by Crag Digital Avoca Ltd for a data centre on this site (notification of proposed grant of permission by Wicklow County Council).

If the proposed development is granted approval, one data hall, located on the substation site, will not be built.

- The Arklow Wastewater Treatment plant has received planning permission to provide foul wastewater treatment in the town of Arklow.
- Crag Digital Avoca Ltd has submitted an application for a 110kV gas insulated switchgear (GIS) substation within the Avoca River Park, beside the permitted data centre facility.
- The Arklow Flood Relief Scheme is proposed by Wicklow County Council and the Office of Public Works to address recurrent flooding in the town of Arklow. This scheme is still in the planning stages but if permitted has the potential to give rise to cumulative effects with the proposed development.
- Avoca River Business Park Flood Embankment – possible maintenance and repair works to the existing flood embankment around the business park as part of a regular inspection, maintenance and repair programme, to manage residual risk of flooding from a potential breach of the embankment. The nature and extent of these maintenance and repair works will be confirmed by site investigation works, but if required, have the potential to give rise to cumulative effects with the proposed development.

Further to these, a number of consented projects, in the vicinity of the Onshore Grid Infrastructure, have also been considered.

21.1 Tier 1 Developments and the Proposed Development

The combination of all of the Tier 1 developments and the proposed development results in the potential for cumulative effects across the different environmental pathways.

There will be a combined significant positive long-term effect to climate for the Tier 1 developments in combination with the proposed development due to facilitating an additional renewable energy supply, reducing reliance on fossil fuels. This results in a combined significant positive long-term effect to population and human health.

There is the potential for cumulative noise effects during the construction phase, associated with the proposed development, together with the Arklow Bank Wind Park Phase 2 Operation and Maintenance Facility, the EirGrid Grid Upgrade Works and the Arklow Bank Wind Park Phase 2 Offshore Infrastructure (the latter during night-time offshore piling and onshore HDD activities). Due to the distance from the proposed development for the Operation and Maintenance Facility and the EirGrid Grid Upgrade Works, no significant cumulative noise effects were identified. Both onshore and offshore noise was modelled at the nearest onshore receptor (landfall) and it has been concluded that significant cumulative construction noise and vibration effects are unlikely for the proposed development and the Offshore Infrastructure. The EirGrid Grid Upgrade Works were screened into the cumulative operational noise assessment, but there is unlikely to be a cumulative effect from noise with the proposed development.

While the construction stages of Tier 1 projects may overlap with the proposed development, having assessed the proposed works and the distance from the proposed development, no significant cumulative effects are expected.

There is the potential for cumulative effects in relation to resource and waste management, due to the increased demand in waste recovery and/or disposal facilities in the region during the construction phase.

However, there are a number of waste recovery and/or disposal facilities with capacity in the region and the Developer will liaise with the other developments with regards to selecting a suitable waste recovery and/or disposal site. Therefore, this cumulative effect not expected to be significant.

21.2 Tier 2 Developments and the Proposed Development

The combination of all of the Tier 2 developments and the proposed development results in the potential for cumulative effects across the various environmental pathways.

There will be a combined significant positive long-term effect to climate from the development of the solar farms in combination with the proposed development facilitating additional renewable energy supply in Arklow, reducing reliance on fossil fuels and helping to meet government targets. This also results in a combined significant positive long-term effect to population and human health.

The substation works that are to be carried out are on a raised platform level with only localised excavation. The Developer will ensure co-ordination with Crag Digital Avoca Ltd for the duration of the construction works to minimise any potential effects. This, together with the nature and scale of the other proposed developments, means that the Tier 2 projects within the vicinity of the Avoca River Business Park and the proposed development will have no likely significant cumulative effect on land and soils during the construction phase. There are no significant cumulative effects on land and soils predicted during operation.

Given the hydrological connection with a number of permitted Tier 2 projects, there is the potential for cumulative effects during construction. However, with the implementation of mitigation measures and adherence to the Construction Environmental Management Plan, no significant cumulative effects are anticipated. The capping of the substation site as part of the remediation strategy will limit the mobilisation of contamination from the substation site to adjacent waterbodies, during operation, and will therefore result in a long term slight positive effect on water quality.

There will be a combined long term positive effect to climate and water in terms of climate resilience and flooding, as any additional maintenance and repair works to the flood defence embankment works in combination with the proposed development will ensure that the Avoca River Business Park (including the proposed development) remain resilient to future flood events with protection for climate change.

The cumulative landscape and visual effects of the permitted and proposed data centre developments and 110kV substation have been assessed. Cumulative effects on landscape character and on visual amenity range from none to minor or moderate and negative.

There will be a combined positive effect to population and human health from the development of Tier 2 projects in combination with the proposed development from the economic and social benefits in the local area associated with increased employment opportunities due to construction and operation of the developments.

The combination of Tier 2 developments and the proposed development will result in the potential for cumulative effects in relation to resource and waste management and material assets due to the increased demand for services and waste recovery and/or disposal facilities in the region during the construction phase.

However, there is capacity in local supply for utilities and services with capacity increasing due to new infrastructure and upgrade works. There are also a number of waste recovery and/or disposal facilities with capacity in the region. Therefore, the cumulative effect is not expected to be significant.

The combination of the Tier 2 developments in the vicinity of the Avoca River Business Park and the proposed development will result in the potential for cumulative effects for traffic and transport, due to an increase in traffic. However, the developments with overlapping construction durations within the vicinity of the Avoca River Business Park will co-ordinate traffic management plans which will be prepared and agreed with Wicklow County Council. Therefore, the cumulative effect is not expected to be significant.

The potential for cumulative operational noise effects due to projects in the area has been considered. Cumulative operational noise due to the interaction of the onshore 220kV substation with the Crag Digital Avoca Ltd Data Centres (both applications) is unlikely to lead to a significant negative effect.

21.3 Tier 1, Tier 2 and the Proposed Development

The combination of the Tier 1 and Tier 2 developments with the proposed development will result in the potential for cumulative effects.

However, given the distance between the projects, and the implementation of mitigation measures and adherence to the Construction Environmental Management Plan, no significant cumulative effects, between Tier 1 and Tier 2 development, are anticipated.

The cumulative landscape and visual effects of the Tier 1 and Tier 2 developments with the proposed development have been assessed. Cumulative effects on landscape character and on visual amenity range from none to minor or moderate and negative.

There will be a significant long term positive cumulative effect to climate due to the increase in renewable energy supply which will result in a significant long-term positive effect to population and human health.

Any required maintenance and repair works to the existing flood embankment around the Avoca River Business Park, will ensure that there is no residual risk of the embankment being breached during operation, which will result in a cumulative long term, positive effect on flooding, for the proposed development and other developments in the vicinity.

There will be potential for cumulative effects in relation to resource and waste management and material assets due to the increased demand for services and waste recovery and/or disposal facilities in the region during the construction phase. However, considering the different nature of the projects (with varying wastes and resource requirements) and the distance between the projects, this is not likely to be significant.