

---

# **MOANMORE LOWER GREEN ENERGY LIMITED**

---

**MOANMORE LOWER WIND FARM,  
MOANMORE, CO. CLARE**

## **ALTERNATIVE GRID CONNECTION ROUTE**

### **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**APRIL 2025**

**Moanmore Lower Green  
Energy Ltd.,  
C/O Greensource  
Sustainable Limited,  
Station Road,  
Adare,  
Co. Limerick,  
V94 C6HF.**



**Jennings O'Donovan & Partners Limited,**  
Consulting Engineers,  
Finisklin Business Park,  
Sligo.  
Tel.: 071 9161416  
Fax: 071 9161080  
email: [info@jodireland.com](mailto:info@jodireland.com)



**JENNINGS O'DONOVAN & PARTNERS LIMITED**  
*Project, Civil and Structural Consulting Engineers,*  
*FINISKLIN BUSINESS PARK,*  
*SLIGO,*  
*IRELAND.*

Telephone (071) 9161416  
Fax (071) 9161080  
Email [info@jodireland.com](mailto:info@jodireland.com)  
Web Site [www.jodireland.com](http://www.jodireland.com)



**DOCUMENT APPROVAL**

|                        |                                                                             |      |
|------------------------|-----------------------------------------------------------------------------|------|
| <b>PROJECT</b>         | Moanmore Lower Wind Farm, Co. Clare                                         |      |
| <b>CLIENT / JOB NO</b> | Moanmore Lower Green Energy Limited                                         | 6778 |
| <b>DOCUMENT TITLE</b>  | Alternative Grid Connection Route<br>Environmental Impact Assessment Report |      |

**Prepared by**

**Reviewed / Approved by**

|                    |                                                         |                     |
|--------------------|---------------------------------------------------------|---------------------|
| Document<br>FINAL  | Name<br>Sarah Moore/ Angelika Thiel /<br>Padraig O'Dowd | Name<br>David Kiely |
| Date<br>April 2025 | Signature<br>                                           | Signature<br>       |

This document, and information or advice which it contains, is provided by JENNINGS O'DONOVAN & PARTNERS LIMITED solely for internal use and reliance by its Client in performance of JENNINGS O'DONOVAN & PARTNERS LIMITED's duties and liabilities under its contract with the Client. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The advice and opinions in this document are based upon the information made available to JENNINGS O'DONOVAN & PARTNERS LIMITED at the date of this document and on current standards, codes, technology and construction practices as at the date of this document. Following final delivery of this document to the Client, JENNINGS O'DONOVAN & PARTNERS LIMITED will have no further obligations or duty to advise the Client on any matters, including development affecting the information or advice provided in this document. This document has been prepared by JENNINGS O'DONOVAN & PARTNERS LIMITED in their professional capacity as Consulting Engineers. The contents of the document does not, in any way, purport to include any manner of legal advice or opinion. This document is prepared in accordance with the terms and conditions of JENNINGS O'DONOVAN & PARTNERS LIMITED contract with the Client. Regard should be had to those terms and conditions when considering and/or placing any reliance on this document. Should the Client wish to release this document to a Third Party for that party's reliance, JENNINGS O'DONOVAN & PARTNERS LIMITED may, at its discretion, agree to such release provided that:

- JENNINGS O'DONOVAN & PARTNERS LIMITED written agreement is obtained prior to such release, and
- By release of the document to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against JENNINGS O'DONOVAN & PARTNERS LIMITED and JENNINGS O'DONOVAN & PARTNERS LIMITED, accordingly, assume no duties, liabilities or obligations to that Third Party, and
- JENNINGS O'DONOVAN & PARTNERS LIMITED accepts no responsibility for any loss or damage incurred by the Client or for any conflict of JENNINGS O'DONOVAN & PARTNERS LIMITED's interests arising out of the Client's release of this document to the Third Party.

**Directors**  
Nigel Board, Abigail Draper,  
David Kiely, Seamus Lee,  
David O'Hagan, Alan Ryder

**Chief Finance Officer**  
Rose Davis

**Technical Directors**  
Joe Healy, Sean Molloy

**Regional Director**  
Audrey Phelan

**Senior Associates**  
Seán Gilmartin, John McElvaney, Tomás McGloin

**Associates**  
Breena Coyle, Dermot Guilfoyle, Lindsey McCormack,  
Cáit O'Reilly, Monica Sullivan



**MOANMORE LOWER WIND FARM**  
**ALTERNATIVE GRID CONNECTION ROUTE**

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**CONTENTS**

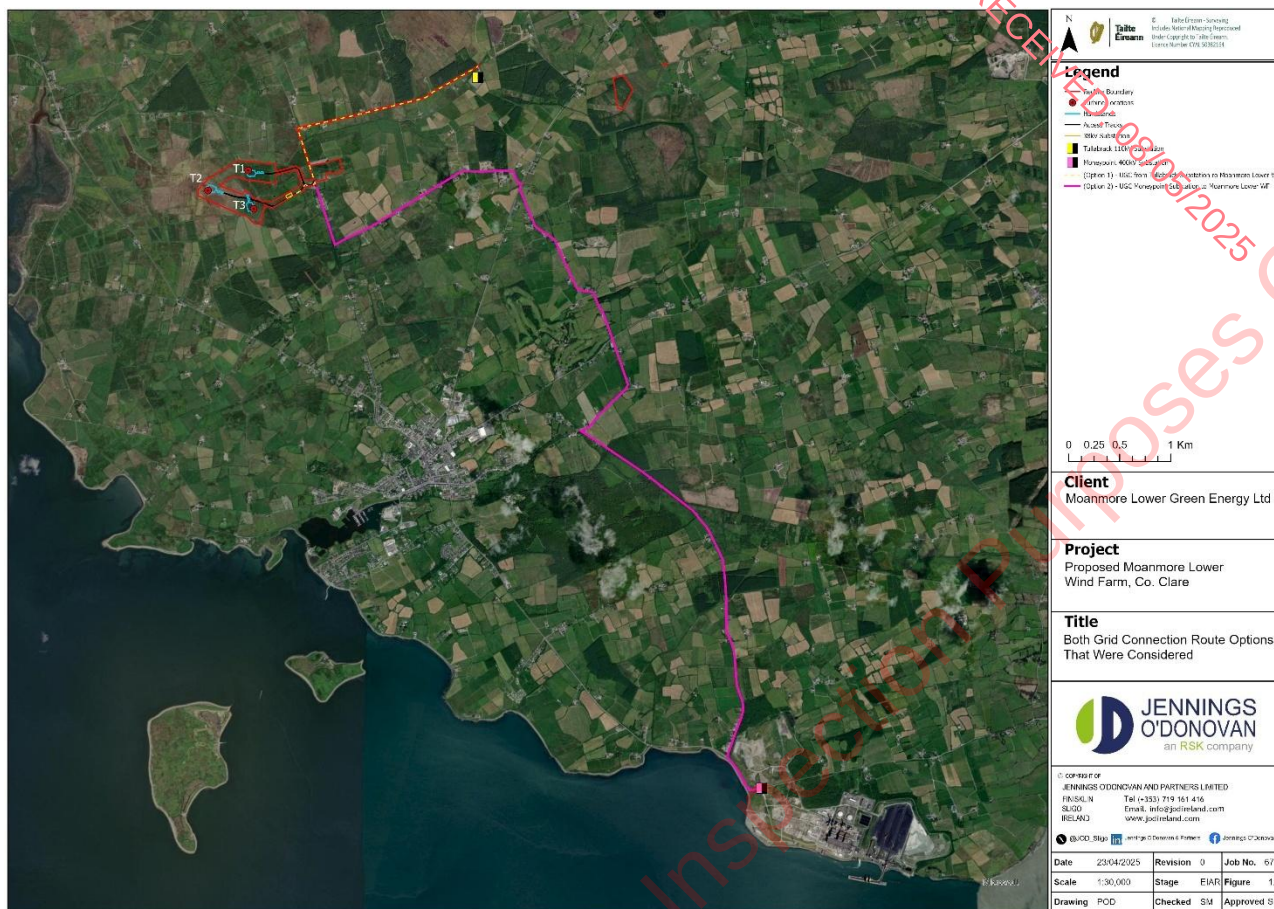
**1.1 BACKGROUND**

Brian Foley (BF) Consulting were contracted to undertake a detailed review of the GCR options for the proposed Moanmore Lower Wind Farm. Two grid connection cabling route options were considered and assessed as part of the initial design process to determine which route would be brought forward as part of the planning application during the iterative design phase. The two routes considered are shown on Figure 1.1 and can be described as follows:

- Option 1 GCR from Tullabrack Substation to Moanmore Lower Wind Farm utilising sections of underground cabling (UGC) primarily public roads, regional roads, and private lands to Tullabrack substation. [approx. 2.76km]
- Option 2 GCR from Moneypoint Substation to Moanmore Lower Wind Farm utilising sections of UGC in public road, primarily regional and local roads. [10.2km]

Both grid routes were considered viable options. However, it was decided only to seek planning permission for Option 1 GCR due to the shorter distance (2.76km) and related lower potential environmental effects as a result in accordance with relevant guidance. Option 2 GCR will not form part of the planning application at this time. This EIAR (**Appendix 3.1**) assesses the Option 2 GCR.

## 2 PROJECT DESCRIPTION



### 2.1 PROJECT DESCRIPTION

Option 2 - GCR from Moneypoint Substation to Moanmore Lower Wind Farm utilising sections of public road, primarily regional and local roads. [10.2km].

### 2.2 SITE LOCATIONS AND ENVIRONS

The townlands through which the proposed Option 2 GCR will transect are the townlands of Moanmore Lower, Breaghva, Ballykett, Moyadda Beg, Parknamoney, Rapepark, Kilcarroll, Feagarroge, Dysert, Clooneylissaun, Ballymacrinan, Carrowdotia North and Carrowdotia South.

### 2.3 SITE INFRASTRUCTURE AND CONSTRUCTION

Connection will be sought from the grid system operators by application to ESB Networks Limited. Moanmore Lower Green Energy assessed possible connection options for the Development and found that a Grid Connection can be accommodated via parallel twin underground 20kV cables to the ESN 400kV Moneypoint substation. The overall length of the Grid Connection between the proposed on site substation and the existing Moneypoint 400kV substation is up to 10.2km, of which, 428m is within the Site of the Development, with

the remainder being located in the L2034, R473, Monovana Road and N67 road network. The Grid Connection can be summarised as follows:

- **Option 2** GCR - Underground grid cable twin 20kV circuit from Moneypoint to Moanmore Lower WF utilising sections of UGC in public road, primarily regional roads, and private lands (approx. 10.2km).

The route of the above Grid Connection is provided in **Figure 1.1**. The Grid Connection route assessment report carried out by BFA Consulting can be found in **EIAR Appendix 2.2**.

The Grid Connection will be constructed to the requirements and specifications of ESB Networks Limited. The three conductors will be laid in separate ducts which will be laid in accordance with the ESN functional specifications for 20kV Networks Ducting/Cabling (Minimum Standards). The width of a 20kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 20kV cables is 0.925m. A separate duct will be provided within the trench for fibre optic communications.

The following is a summary of the main activities for the installation of ducts:

- All relevant bodies i.e. ESB Networks Limited, Gas Networks Ireland, Eir, Clare County Council, Uisce Éireann etc. will be contacted and up to date drawings for all existing services will be sought so that the grid connection ducting does not damage or interfere with existing services. This will be rechecked by the Contractor prior to excavations taking place.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CATSCAN (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse.
- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trenches to the dimensions of 600mm wide by 0.925m deep.
- Once the trench is excavated, a 50mm depth base layer of sand (in road trench) or 15 Newton CBM4 concrete will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.
- uPVC ducts will be installed on top of the compacted base layer material in the trench.

- Once the ducts are installed, couplers (a device used for joining pipes) will be fitted and capped to prevent any dirt entering the unjointed open end of the duct.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.
- The co-ordinates will be plotted on as-built record drawings for the Grid Connection cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and will be compacted.
- Timer spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.
- A layer of Lean-mix CBM4 (CL1093) (in road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.
- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road will then be reinstated on a temporary basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).
- When trenching and ducting is complete, the installation of the Grid Connection cable will commence between the Electrical Substation and the existing 110kV substation at Tullabrack or 400kV substation at Moneypoint.
- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.
- The cables will be jointed together within the precast concrete cable junction box (Joint Bay).
- The finished surface above each cable joint bay is reinstated on a permanent basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).

### 2.3.1 Joint Bays

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit.

The joint bay locations will be dictated by suitable terrain and access to facilitate the operation of cable pulling equipment at any phase of the Development and future operation of the installation in accordance with the ESB Networks Limited specifications.

Communication chambers, which are similar to small manholes, will be installed at the joint bay locations to facilitate connection of fibre-optic communication cables.

### 2.3.2 Trench Layout

The trench layout will be as per the appropriate ESB Networks Limited specifications. The specification of Clare County Council will be followed for the excavation and reinstatement of the ducted cable trenches which is expected to be in accordance with the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).

### 2.3.3 Joining Ducts

All joining ducts shall be laid in accordance with ESB Networks specifications. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will be thoroughly cleaned by pulling the appropriate size of ESB Networks Limited approved duct brush through the duct.

Details of the construction methodology are summarised below:

- Preparatory Works
  - Preparatory trial pit survey along the cable route
  - Access to the start point and setting out
  - Access to joint bays
  - Silt attenuation features and watercourse set back buffer
  - Joint Bay excavation
- Trenching Works
  - Storage of materials
  - Trench operations
  - Managing excess material from trench works

### 2.3.4 Directional Drilling Works

Option 2 GCR to Moneypoint 400kV would require 8 watercourse crossings. It is envisaged all watercourse crossings carrying Grid Connection ducts will be routed within the existing road and verges and no directional drilling work is anticipated to be carried out in the event that Option 2 GCR utilised.

### 3 POPULATION & HUMAN HEALTH

#### 3.1 BASELINE DESCRIPTION

A Grid Connection between the Development and the national grid will be necessary to export electricity from the Development. If Option 2 GCR is undertaken it is intended that the Development will connect to the national grid via the existing Moneypoint 110kV Substation (Moneypoint Substation), located in the townland of Carrowdotia South, Co. Clare. The Moneypoint Substation is located approximately 7.4km southeast of the Development at its closest point. Any Grid Connection route between Moanmore Lower Windfarm and Moneypoint 400kV ESB substation would be underground (UGC), utilising sections of cabling in public roads, primarily regional and local public roads. The length of Grid Connection Option 2 is c. 10.2km long.

The Townlands and DED's associated with the grid connection Option 2 GCR are outlined in Table 3.1.

**Table 3.1: DEDs and townlands that will be affected as a result of the Development and all associated works.**

| Element of the Development | District Electoral Division (DED)        | Townlands                                                                                                                                                                                            |
|----------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 2 GCR               | Clooncoorha<br>Killimer<br>Kilrush Rural | Moanmore Lower<br>Breaghva<br>Ballykett<br>Moyadda Beg<br>Parknamoney<br>Rapepark<br>Kilcarroll<br>Feagarroge<br>Dysert<br>Clooneylissaun<br>Ballymacrinan<br>Carrowdotia North<br>Carrowdotia South |

### 3.2 ASSESSMENT OF POTENTIAL EFFECTS

#### 3.2.1 Population and Settlement Patterns

The predicted effect on the immediate settlement patterns and social patterns is also **slight to non-existent**.

### 3.2.2 Economic Activity

Employees involved in the construction of the Development will most likely use local shops, restaurants and hotels/accommodation. Therefore, overall, there will be a **slight, positive impact** on employment in the Study Areas.

### 3.2.3 Employment

There will be a **slight positive short-term** impact on employment in the area.

### 3.2.4 Land use and Topography

**EIAR Chapter 8: Soils and Geology** concludes that providing the mitigation measures proposed are fully implemented and best practice, as described, is followed on Site, it is not expected that there will be any significant effects associated with the Development. It is recommended that suitable monitoring programmes are proposed and implemented to ensure that there is adherence to the CEMP and to the mitigation measures outlined herein during construction, operation and Decommissioning of the Development.

### 3.2.5 Tourism

Overall effects of the Development with regards to tourism are considered to be, **slight, negative** during the construction, operational and Decommissioning phases.

### 3.2.6 Human Health

Electromagnetic fields from wind farm infrastructure, including the Grid Connection to the Moneypoint 400kV substation, are very localised and are considered to be **imperceptible, long-term** impact.

### 3.2.7 Property Value

The Development will have a medium-long-term, imperceptible impact on property values.

## 3.3 CUMULATIVE EFFECTS

The cumulative effects of the Project can be predicted to be a **small, short-term negative** impact on tourism and amenity during construction. There is predicted to be a **short-term, moderate positive** effect in terms of employment from the Project.

## 3.4 MITIGATION MEASURES

See **EIAR Chapter 5: Population & Human Health – Section 5.5 Mitigation Measures and Residual Effect**.

### 3.5 STATEMENT OF SIGNIFICANCE

The Development has been assessed as having the potential to result in effects of a **slight positive, long-term impact** overall. Cumulative effects are predicted as unlikely.

## 4 BIODIVERSITY

### 4.1 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### 4.1.1 Purpose of the Report

The purpose of this report is to:

- Establish and evaluate the baseline ecological environment as relevant to the proposed development, i.e. the Option 2 GCR
- Identify, describe and assess all potentially significant ecological effects associated with the proposed development.
- Set out the prevention and mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation.
- Provide an assessment of the significance of any residual ecological effects.
- Identify any appropriate enhancement and / or post-construction monitoring requirements.

#### 4.1.2 Relevant Legislation and Policy

The main pieces of legislation relevant to this chapter are as follows:

- The Wildlife Acts 1976 – 2022 as amended
- The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) as amended
- The Birds Directive (Council Directive 2009/147/EC) as amended
- European Communities (Birds and Natural Habitats) Regulations 2011 - 2021
- Flora (Protection) Order, 2022 (S.I. No. 235 of 2022)

In considering ecological survey and assessment of effects of the Development, regard was made to the following guidance and information documents:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).
- European Commission (2017) Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report. (Directive 2011/92/EU as amended).

- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes.
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- Fossitt (2000). A Guide to Habitats in Ireland. Heritage Council, Kilkenny.
- Northern Ireland Environment Agency, Natural Environment Division (2021) Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland. Belfast: Department of Agriculture, Environment and Rural Affairs (Northern Ireland).<sup>1</sup>
- Scottish Natural Heritage (2019). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.
- Bat Conservation Trust 'Bat Survey Good Practice Guidelines' 2012 (BCT Guidelines).
- Bat Conservation Ireland (2012). Wind Turbine/Wind Farm Development Bat Survey Guidelines, Version 2.8 December 2012. Bat Conservation Ireland, [www.batconservationireland.org](http://www.batconservationireland.org).
- Marnell, F., Kelleher, C. & Mullen, E. (2022). Bat Mitigation Guidelines for Ireland. V2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Dublin, Ireland.
- Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. Irish Birds, Volume 43, 1-22.
- Scottish Natural Heritage (2016). *Assessing Connectivity with Special Protection Areas (SPAs)*. Version 3. Scottish Natural Heritage.

#### 4.1.3 Desk Study

A comprehensive desktop review was carried out to identify features of ecological importance within the study area and surrounding region. This comprised a review of available ecological data, including the following:

- Online web-mapper of National Parks and Wildlife Service (NPWS) for data on sites designated for nature conservation (European & National) and on protected flora species and protected bryophytes (see [www.npws.ie/protected-sites](http://www.npws.ie/protected-sites)),
- Online web-mapper of National Biodiversity Data Centre for protected species datasets (see <http://maps.biodiversityireland.ie>)

<sup>1</sup> Survey work was conducted prior to the release of (NIEA, 2021) thus the survey strategy was based on (NatureScot, Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation, 2021). Mitigation measures outlined within the report take cognisance of the 2021 guidance.

For bats, a desktop review of publicly available relevant data was undertaken on the National Biodiversity Data Centre (NBDC) and National Parks & Wildlife Service (NPWS) websites. The National Biodiversity Data Centre was reviewed for relevant data, specifically i) existing species records for the 10km squares in which the study area is located and ii) an indication of the relative importance of the wider landscape in which the study site is located, based on Model of Bat Landscapes for Ireland (Lundy et al., 2011). In the latter, the index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. A protected species data request was submitted to NPWS for information not otherwise publicly available regarding protected species such as the Annex II (EU Habitats Directive) listed Lesser Horseshoe Bat.

Bat Conservation Ireland (BCI) conducted a search of their records database at the request of O'Donnell Environmental Ltd. on 5th May 2023. The relevant search area included a 30km radius from a central point within the proposed site. Known roost locations in the target area as well as results from BCI Volunteer based surveys and records submitted by Ecological Consultants were provided. Where roost locations occur in private dwellings the location provided refers to relevant 1km grid square.

Relevant ecological reports and correspondence submitted as part of previous planning applications relating to nearby sites (Clare County Council Ref. 24/60143; 18/679) were considered in the preparation of this current report. For birds, a desktop study was conducted prior to the commencement of the field surveys. The following principal information sources were examined:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping, and other sources of online aerial imagery (to assess physical features and habitats which may potentially support important bird species)
- Review of Bird Atlases: (Sharrock 1976; Lack 1986; Gibbons *et al.* 1993; Balmer *et al.* 2013).
- Review of Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 (Gilbert *et al.* 2021).
- Review of BirdWatch Ireland I-WeBS (Irish Wetland Bird Surveys) site information.
- General ornithological information available from BirdWatch Ireland ([www.birdwatchireland.ie](http://www.birdwatchireland.ie)).
- Review of the 2015 National Survey of Breeding Hen Harrier in Ireland Report (Ruddock *et al.* 2016).

#### 4.1.4 Field Surveys

##### 4.1.4.1 Habitats, vegetation and flora

Option 2 GCR was surveyed in April 2023 and September 2023. This comprised a survey by car, with stops at intervals to review habitats and flora present alongside the roads and at watercourse crossing points.

Habitats within the study area were classified in accordance with 'A Guide to Habitats in Ireland' (Fossitt 2000). The dominant plant species present in each habitat type were recorded during the field surveys. This is considered sufficient to allow accurate classification of the habitats present. The extents and details of classified habitats were recorded and mapped using GIS. Where relevant, linkages with the EU Habitats Directive classification system are given.

During the Site survey particular attention was paid to the possible occurrence of plant species listed in either the Flora (Protection) Order 2022 or the Irish Red Data Book (Curtis and McGough 1988). Vascular plant species nomenclature in this report follows Stace (2010) while that of mosses follows Smith (2004).

During the surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2021 was conducted<sup>2</sup>. Invasive alien species which are widespread in Ireland include Japanese knotweed and Rhododendron.

##### 4.1.4.2 Terrestrial fauna

During the habitat assessment, note was made on the potential of the habitats within the route corridor to support species such as otter and badger.

##### 4.1.4.3 Bats

The Option 2 GCR was surveyed in its entirety for bats in November 2024 (see Chapter 6: Appendix 6.2 of wind farm project EIAR). Visual survey and inspection of Potential Roosting Feature (PRFs) which may be directly or indirectly impacted by the proposed grid connection works was carried out. Trees and structures, including bridges, recorded along the Option 2 GCR were assessed in terms of their suitability to support roosting bats.

<sup>2</sup> <http://Invasives.biodiversityireland.ie/>

## 4.2 BASELINE ECOLOGICAL CONDITIONS

### 4.2.1 Designated sites

The potential for the Option 2 GCR corridor to impact on sites that are designated for nature conservation is considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are designated under the EU Habitats Directive as amended and EU Birds Directive as amended respectively and are collectively known as 'European Sites' or 'Natura 2000' sites.

Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this Ecological Impact Assessment (EclA).

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these sites is fully considered in this EclA.

All designated sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European and national sites within a distance of 15km surrounding the Development Site have been considered (following guidance from the Department of Environment, Heritage and Local Government, 2010).

From this review, only two European sites have been identified which could conceivably be affected by the Option 2 GCR, namely:

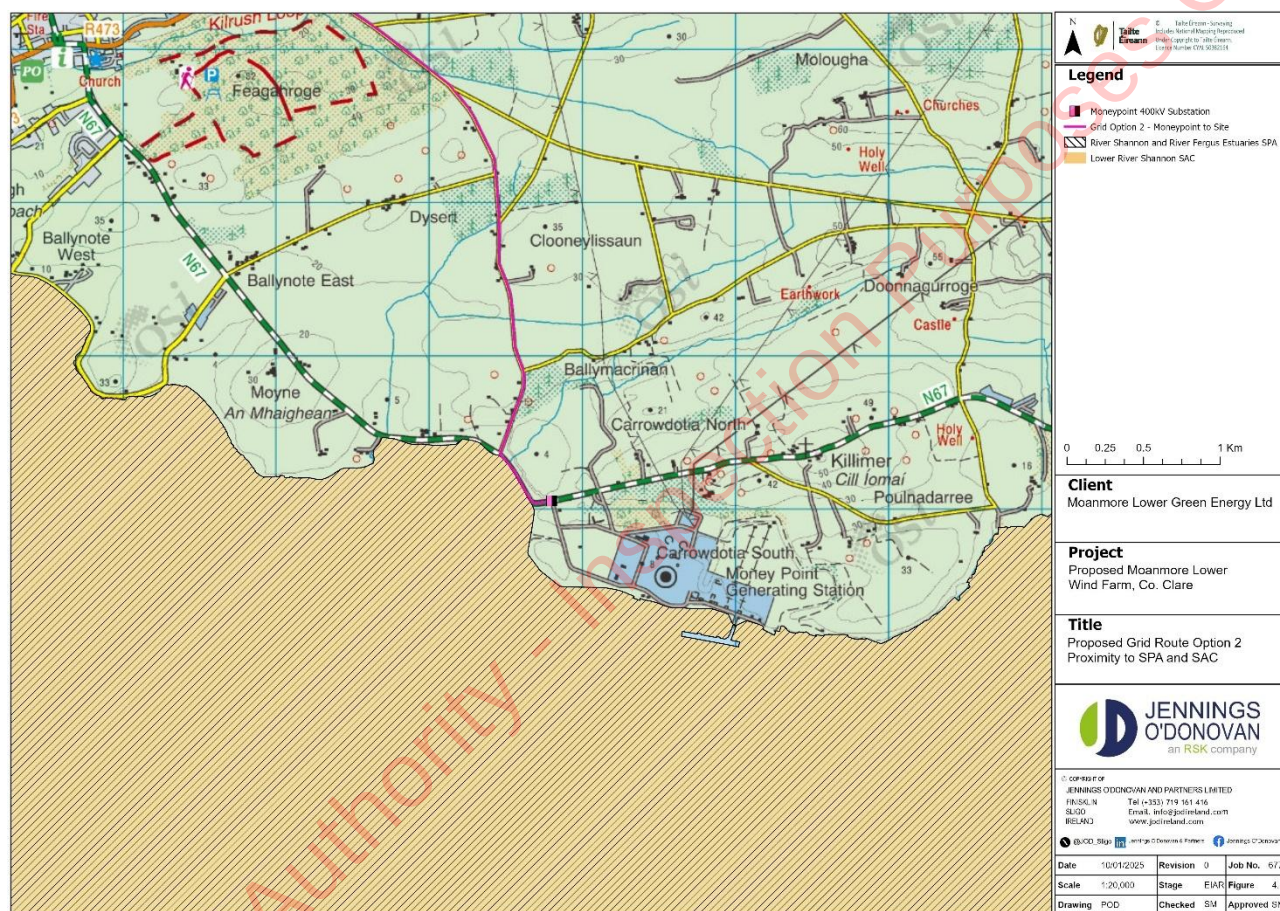
- Lower River Shannon SAC
- River Shannon and River Fergus Estuaries SPA

Full details of these two sites are presented in Table 4.1.

The Poulmasherry Bay pNHA (code 00065), which is part of the above-mentioned European sites, is also linked to the Option 2 route corridor as water-crossings WCC2 and WCC3 are over tributaries of the Moyasta River.

While no part of the Option 2 GCR is within an area with a nature conservation designation, the grid connection route runs alongside the N67 for approximately 500 m at Moneypoint

Power Station and is adjacent to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA – the designated area includes all the shoreline which adjoins the road and extends onto part of the actual N67 road (see npws.ie/protected-sites). The cable route, however, is along the eastern side of the road (with shoreline to west of road) where there is a grass verge of approximately 7.5 m at its narrowest point (see Grid Route Assessment by BFA consulting – EIAR Appendix 2.2 & Plate 4.5). This section of the route is shown in Figure 4.1 below, along with the designations.



**Figure 4.1:** Proposed route of Option 2 GCR with proximity to European sites at Moneypoint.

Drainage from the grid route corridor is to the River Shannon system and hence there is hydrological connectivity to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, as well as to the Poulasherry Bay pNHA.

**Table 4.1: Relevant European sites, reasons for designation, distances from subject site and summary of connectivity.**

| European Site                                | Reasons for designation (information correct as of 7 <sup>th</sup> January 2025) (*denotes a priority habitat)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Distance from proposed Option 2 GCR corridor and summary of connectivity                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | <b>SPECIAL AREAS OF CONSERVATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Lower River Shannon SAC (site code 002165)   | <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p>According to SAC's site Conservation Objectives document (Version 1.0. Department of Arts, Heritage and the Gaeltacht, 07 August 2012), for each of the listed QIs, the Conservation Objective is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.</p> | <p>The route of Option 2 GCR to the ESB 400kV Moneypoint substation will cross multiple watercourses which drain to the Shannon system.</p> <p>The route runs alongside the N67 for approximately 500m at Moneypoint Power Station (all of the shoreline here and part of the road carriageway is included within the SAC).</p> <p>It is concluded that hydrological connectivity exists between the Project area and the SAC.</p> |
|                                              | <b>SPECIAL PROTECTION AREAS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| River Shannon and River Fergus Estuaries SPA | <p>Cormorant (<i>Phalacrocorax carbo</i>) [A017]</p> <p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</p> <p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The route of Option 2 GCR to the ESB 400kV Moneypoint substation will cross multiple                                                                                                                                                                                                                                                                                                                                               |

| European Site       | Reasons for designation (information correct as of 7 <sup>th</sup> January 2025) (*denotes a priority habitat)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Distance from proposed Option 2 GCR corridor and summary of connectivity                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (site code: 004077) | <p>Wigeon (<i>Anas penelope</i>) [A050]<br/> Teal (<i>Anas crecca</i>) [A052]<br/> Pintail (<i>Anas acuta</i>) [A054]<br/> Shoveler (<i>Anas clypeata</i>) [A056]<br/> Scaup (<i>Aythya marila</i>) [A062]<br/> Ringed Plover (<i>Charadrius hiaticula</i>) [A137]<br/> Golden Plover (<i>Pluvialis apricaria</i>) [A140]<br/> Grey Plover (<i>Pluvialis squatarola</i>) [A141]<br/> Lapwing (<i>Vanellus vanellus</i>) [A142]<br/> Knot (<i>Calidris canutus</i>) [A143]<br/> Dunlin (<i>Calidris alpina</i>) [A149]<br/> Black-tailed Godwit (<i>Limosa limosa</i>) [A156]<br/> Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]<br/> Curlew (<i>Numenius arquata</i>) [A160]<br/> Redshank (<i>Tringa totanus</i>) [A162]<br/> Greenshank (<i>Tringa nebularia</i>) [A164]<br/> Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]<br/> Wetland and Waterbirds [A999]</p> <p>According to this SPA's site Conservation Objectives document, Conservation Objectives Series: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0, 17<sup>th</sup> September 2012, Department of Arts, Heritage and the Gaeltacht), for each of the listed SCIs, the Conservation Objective is to maintain the favourable conservation condition of the species for which the SPA has been selected.</p> | <p>watercourses which drain to the Shannon system.</p> <p>The route runs alongside the N67 for approximately 500m at Moneypoint Power Station (all of the shoreline here and part of the road carriageway is included within the SPA).</p> <p>The Option 2 GCR corridor does not provide suitable ex-situ habitat to support any of the SCIs of the SPA.</p> <p>It is concluded that hydrological connectivity exists between the Project area and the SPA.</p> |

#### 4.2.2 Habitats and Vegetation

**Note:** technical details on the grid route options, including the numbering of watercourses, are given in **EIAR Appendix 2.2**, 'Technical Note' by BFA Consulting. A full description of aquatic ecology along the Option 2 GCR is given in section 5 of the present report.

On leaving the Site, Option 2 GCR runs southwards within the local road for approximately 500 m to the first junction where it turns eastwards. Much of this road section has residential ribbon development and is edged by grass verges and low hedgerows of hawthorn, with some tall ash, sycamore and alder at the approach to the junction. On turning east onto the local road running towards Breaghva (and water-crossing no. 2), there are low hedgerows and scattered treelines along both sides of the road (see **Plates 4.1 & 4.2**). Ash and sycamore are the principal tall tree species. This local road joins the R483 just north of

Cavanagh's Bridge (water-crossing no. 3), which is a substantial stone arch bridge (see **Plate 4.3**).

The Option 2 GCR route then veers southeast onto a local road leading towards the N68 (distance of c.1.5 km). This road, which runs through agricultural land, is edged by narrow grassy verges and low hedging, mostly hawthorn, blackthorn and scattered ash (see **Plate 4.4**). A minor watercourse (no. 4) is crossed. The route crosses the N68 and runs for a few hundred metres on a local road towards the R473.

Option 2 GCR continues for approximately 500m on the R473 and then turns onto a local road running in a southeast direction. After crossing over watercourse no. 5, there is a stretch through an area of woodland to both sides of the road, part of which appears to be prone to flooding. The woodland along the road has a wet character and is mainly willow, alder and birch with some ash (see **Plate 4.5**) but the majority has been planted with conifers. The Coillte Kilrush Forest Recreation Area occurs to the south side of the road. The road is edged by narrow grassy strips. The route then veers in a southerly direction and passes through agricultural land though fields are largely unmanaged on the eastern side of the road. After passing through tall conifer plantation for several hundred metres, the route continues southwards through improved agricultural lands (crossing two minor watercourses no. 7 & no. 8). At the Ballymacrinan junction, there is a stand of mixed woodland to the southeast. The route runs south for another 500 m (approximately) to join the N67. On this final stretch of local road, there are residences along much of the western side.

On the N67, there is an approximate 500 m stretch south-eastwards towards the Moneypoint facility. The road is just above the shoreline, with grassy strips to both sides (see **Plate 4.6**).



**Plate 4.1.** After leaving the site for the wind farm - tall trees, mainly ash and sycamore, are a feature of sections of road running towards Breaghva (September 2023).



**Plate 4.2.** Other sections of the route are characterised by low hedging along the local roads. (September 2023).



**Plate 4.3.** Option 2 GCR runs along the R483 for a short stretch and passes over Cavanagh's Bridge, which is a substantial stone arch structure (April 2023).



**Plate 4.4.** On leaving the R473, Option 2 GCR follows a local road through an agricultural landscape. Typically, the local roads are edged by grassy verges and low hedging, with ash the principal tree standard (April 2023).



**Plate 4.5.** Option 2 GCR passes through this afforested area – while mainly conifer plantation, there are strips of woodland with a wet character along both sides of the road (April 2023).



**Plate 4.6.** Option 2 GCR runs along the N67 leading towards the Moneypoint facility for approximately 500 m. The road is above the shoreline, with grassy verges along both sides. Looking southeast (April 2023).

#### 4.2.2.1 Invasive species

During the bat survey in November 2024, Japanese knotweed was recorded along the local road (both sides) near the Coillte Kilrush Forest Recreation Area.

#### 4.2.3 Terrestrial fauna

As the entire Option 2 GCR is within roads, there is no potential for badger setts (though badger is likely to be fairly widespread in the adjoining countryside).

The various water crossings are relatively minor in scale and the aquatic assessment notes that the watercourses within the study area have been modified to receive input from man-made arterial drains, are culverted beneath roads or have been made available to provide cattle access for water. Surface water quality in the watercourses surveyed for the grid connection route is moderate to poor. The aquatic survey did not record any signs of otter tracks or spraints at any of the sites surveys. While it is considered that the watercourses are not suitable for breeding otter, it is likely that otter may at times move along streams, as well as the shoreline at Moneypoint.

The mixed woodland at the Coillte Kilrush Forest Recreation Area is likely to support pine marten and red squirrel, as well as badger.

#### 4.2.4 Bats

The Option 2 GCR is approx. 10.2km in length and crosses eight watercourses (see **Table 4.2** and **Figure 4.2**). All structures and trees along the Option 2 GCR, thought to have potential to support roosting bats, which might be impacted directly or indirectly by the proposed works were considered as part of this assessment. A total of three structures (excluding bridges and culverts) and five trees which were thought to have above 'Negligible' suitability for potential roosting bats were considered and are listed in **Table 4.3**.

No evidence of roosting bats, current or historic, was found along the grid connection route at the time of the survey. No trees considered above 'PRF-I' suitability for roosting bats were identified along the route. The general habitat was of agricultural grasslands, residential dwellings and coniferous plantation. The habitat in general is suitable for foraging bats.

No structures or trees of roosting potential along the alternative route are likely to be significantly impacted by the proposed works. The zone of influence of the proposed grid connection route is limited, confined to the immediate works area and is temporary in nature. In the event a bat roost was present within a structure or tree along the route, no potential

effects are likely to arise during the construction or operation of the cable route. The locations of both structures and trees assessed are shown in **Table 4.3** and **Figure 4.2**.

The eight watercourse crossings were assessed for their potential to support roosting bats. Based on the assessment carried out by BFA Consulting it was determined that the eight watercourse crossings will not require HDD and the 20kV underground cables can be installed above the bridge deck and within the road carriageway.

According to Billington & Norman (1997) September and October are the best months of the year to identify bridge occupation by bats. These bridges and culverts were surveyed in November, outside of the optimal season (full details in Chapter 6: Appendix 6.2).

All other watercourse crossings along this alternative grid connection route are culverts (and one outfall pipe 'WC#9') which are considered to be of 'Negligible' suitability for potential roosting bats given their size and nature.

**Table 4.2: Watercourse crossings proposed to facilitate the Option 2 GCR connection to Moneypoint Power Station.**

| Ref.* | Type    | Installation Method                 | Latitude | Longitude | Suitability** |
|-------|---------|-------------------------------------|----------|-----------|---------------|
| WC#2  | Bridge  | Trench in roadway or open crossing. | 52.66439 | -9.48269  | Low           |
| WC#3  | Bridge  | Trench in roadway or open crossing. | 52.66399 | -9.47231  | Low           |
| WC#4  | Culvert | Trench in verge.                    | 52.65403 | -9.461    | Negligible    |
| WC#5  | Bridge  | Trench in roadway or open crossing. | 52.64107 | -9.45902  | Low           |
| WC#6  | Culvert | Trench in verge.                    | 52.63647 | -9.4481   | Negligible    |
| WC#7  | Culvert | Trench in verge.                    | 52.62785 | -9.44122  | Negligible    |
| WC#8  | Culvert | Trench in verge.                    | 52.62205 | -9.4398   | Negligible    |
| WC#9  | Culvert | Trench in verge.                    | 52.6117  | -9.43802  | Negligible    |

Note: \*Crossing references refer to the Grid Assessment Report (BFA Consulting, 2024).

\*\* Suitability is assigned based on the highest suitability feature present within the structure.

Three structures and five trees considered to be above 'Negligible' in terms of their suitability to support roosting bats were recorded along the Option 2 GCR. These trees and structures are listed in **Table 4.3** and shown in **Figure 4.2** below.

Both structures recorded are remnants of old stone farm buildings. Gaps between the stonework are present within both structures which have the potential to at least support individual roosting bats occasionally. Neither structure possesses the features or conditions considered necessary to support a large number of bats on a regular basis or for longer periods of time given their condition and size.

No trees considered to be of 'PRF-M' suitability (i.e. suitable for multiple bats and may therefore be used by a maternity colony) were recorded along the alternative grid connection route. Five trees of 'PRF-I' suitability were recorded and are listed in **Table 4.3** below. None of the below listed features are likely to be impacted as a result of the proposed works.

**Table 4.3: Suitability of structures and trees (above negligible) along Option 2 grid connection route for potential roosting bats.**

| Ref. | Type      | Description                                                                                                                                                                                                                                   | Latitude  | Longitude | Suitability |
|------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-------------|
| S_09 | Structure | Remnants of two old stone farm buildings. No roof on either. Moderate Ivy cover. Gaps in the stonework present minor PRFs. Open and exposed not likely to support large numbers of bats. May be used opportunistically by single individuals. | 52.646132 | -9.455983 | Low         |
| S_10 | Structure | Remnants of old stone farm structure. No roof. Dense Ivy cover at one gable end. Gaps in the stonework present minor PRFs. Open and exposed not likely to support large numbers of bats. May be used opportunistically by single individuals. | 52.630561 | -9.441580 | Low         |
| T_01 | Tree      | Group of trees along the roadside. Semi-mature to mature specimens. Moderate to dense Ivy cover. View of PRFs restricted at height. May be used opportunistically by single individuals.                                                      | 52.658338 | -9.499084 | PRF-I       |
| T_02 | Tree      | Mature specimen. Dense Ivy cover. Minor PRF visible. Torn limb at approx. 1.5m height 80cm in length, facing north. Shallow but with potential to support individual bats opportunistically.                                                  | 52.658664 | -9.499186 | PRF-I       |
| T_03 | Tree      | Mature specimen. Dense dead Ivy cover. No other PRFs visible.                                                                                                                                                                                 | 52.658657 | -9.498582 | PRF-I       |
| T_04 | Tree      | Semi-mature specimen. Moderate Ivy cover. No PRFs visible.                                                                                                                                                                                    | 52.655743 | -9.464345 | PRF-I       |
| T_05 | Tree      | Mature Beech. No Ivy cover. Large hole approx. 2 meters height. 40 cm length. Not possible to determine how deep. May be used opportunistically by                                                                                            | 52.655603 | -9.464377 | PRF-I       |

| Ref. | Type | Description                                                                                                      | Latitude | Longitude | Suitability |
|------|------|------------------------------------------------------------------------------------------------------------------|----------|-----------|-------------|
|      |      | single individuals. Large torn limb approx. 1 meter in length. Shallow and not considered suitable for roosting. |          |           |             |

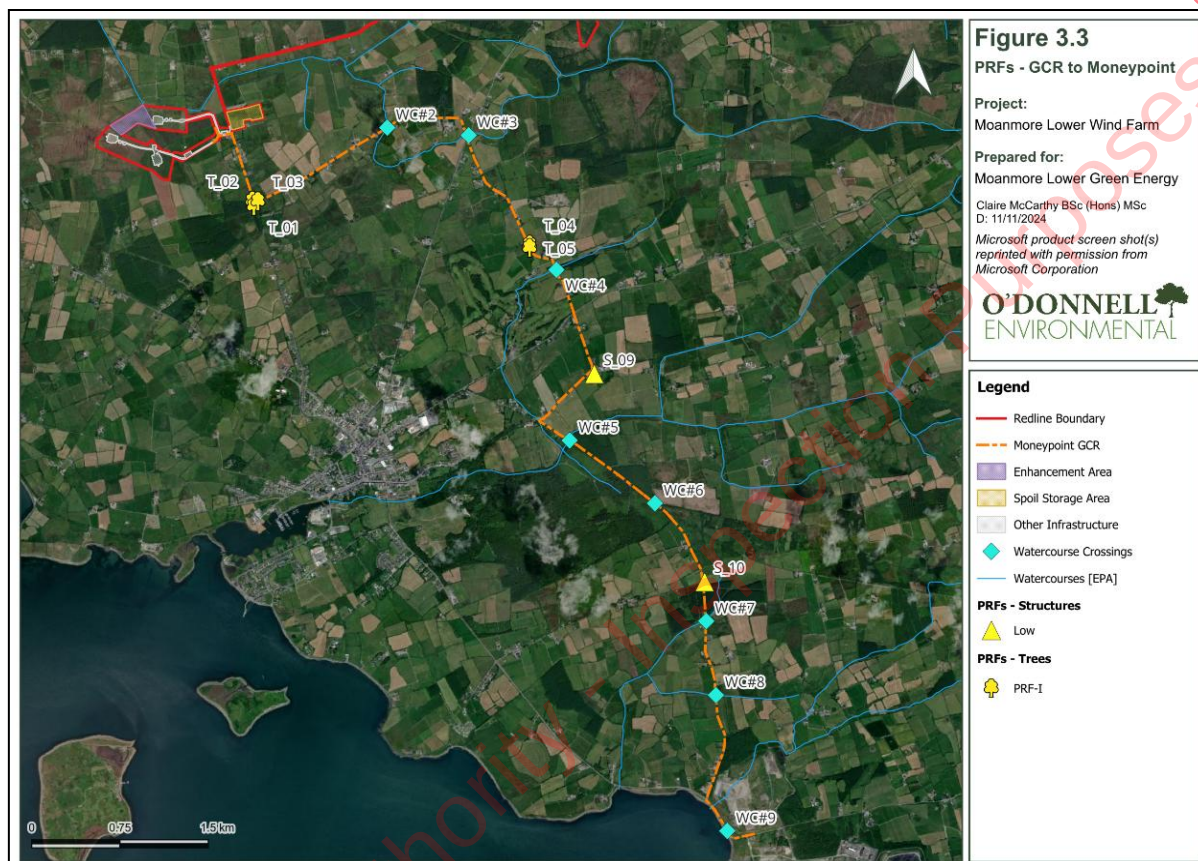


Figure 4.2: Locations of structures and trees assessed for bats along Option 2 GCR.

#### 4.2.5 Birds

The habitats along the Option 2 GCR corridor have limited potential to support breeding and/or feeding birds. Passerine species associated with hedgerows were the principal species recorded. All of these, such as wren, blackbird, dunnock, blue tit and chaffinch, are widespread species of the countryside. Sparrowhawk is likely to hunt along the roadside margins at times.

### **4.3 ASSESSMENT OF POTENTIAL EFFECTS**

#### **4.3.1 The 'Do-Nothing' Impact**

Without the development proceeding, the ecology of the Option 2 GCR would be expected to remain fairly similar as at present.

#### **4.3.2 Potential Effects on European Conservation Sites**

In the absence of mitigation, likely or possible significant effects could not be excluded during the construction, operational and/or Decommissioning stages of the proposed Development on the following sites:

- Lower River Shannon SAC (code 002165)
- River Shannon and River Fergus Estuaries SPA (code 004077)

Effects of potential concern may arise as a result of contaminants originating within the project area, and especially during the construction phase, reaching the relevant designated site and causing harmful effects on the qualifying interests and/or the Special Conservation Interests of the designated site. The significance of any effect would be dependent on the magnitude and duration of a pollution event. Mitigation is therefore required to minimise this risk.

#### **4.3.3 Potential Effects on National Conservation Sites**

##### **4.3.3.1 Proposed Natural Heritage Areas**

In the absence of mitigation, effects of potential concern may arise as a result of contaminants originating within the site of the proposed grid route Option 2 reaching Poulmasherry Bay pNHA via the Moyasta River and causing potential harmful effects on the ecology of the bay. Of particular concern would be the effect of particles on infaunal species and particularly filter feeding invertebrates. Feeding and roosting bird species could be adversely affected by surface deposits, including hydrocarbons. The significance of any effect would be dependent on the magnitude and duration of a pollution event. Mitigation is therefore required to minimise this risk. The issue of potential effects on the interests of Poulmasherry Bay pNHA, which is an integral part of the Shannon estuarine system, is assessed in the EIAR.

#### **4.3.4 Effects on Habitats, Vegetation and Flora**

The principal impact by the construction of the proposed Development is disturbance to habitats. There would be no permanent loss of habitat.

##### **4.3.4.1 Disturbance to habitats**

The laying of the grid connection cable will cause localised disturbance to marginal vegetation alongside the roads due to trenching works and use of plant machinery. The amount of

disturbance would vary depending on the exact line of the trench, which may affect grassy verges and roadside banks or ditches. However, hedging or trees are not expected to be removed to facilitate the works. Generally, there are no habitats of significant ecological interest alongside the roads taken by the grid route.

While a 500m (approx.) section of the Option 2 route runs alongside the N67 and is adjacent to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA (see **Figure 4.1**), it is noted that the component of the SAC and SPA closest to the grid route is the actual road which is not of ecological interest (this appears to be an anomaly, as the boundary mapping for the designated areas is at the former high tide mark (as shown on OS 1:10,560 mapping - see [www.npws.ie/maps-and-data](http://www.npws.ie/maps-and-data)) which has since been built upon. Trenching and cable laying within the grassy margin along the eastern side of the road (see details in **EIAR Appendix 2.2**) would not have any effect on the designated shoreline area to the other side of the road as there are no watercourses or drains to be crossed.

Overall, the disturbance caused to habitats as a result of the works associated with the grid connection is not considered a significant effect for the Option 2 route. After trenching and the works are complete, full recovery of the marginal vegetation is likely to take place within 1-2 years.

#### **4.3.4.2 Spread of invasive species**

As Japanese knotweed was recorded at one location along the route, there is potential for the spread of this highly invasive species as a result of construction works. Further survey and mitigation will be required as detailed in Section 4.5.2 below.

#### **4.3.5 Effects on Fauna**

The construction of the Option 2 proposed development is not expected to have any direct significant effects on terrestrial mammal species.

As the crossing of streams has some potential to result in run-off entering the watercourses and possibly effecting the food supplies of otter downstream of the crossing points, mitigation is required to be put in place to prevent pollution in the form of suspended solids and dissolved substances entering the watercourses.

#### **4.3.6 Effects on Bats**

None of the structures (3 no.) or trees (5 no.) identified as having some suitability to support roosting bats are likely to be impacted as a result of the proposed works.

#### 4.3.7 Effects on Birds

The proposed works required to facilitate the laying of the grid cable would have local disturbance effects on birds feeding and/or nesting in the hedgerows. However, this would be temporary and the effect is not considered significant.

#### 4.4 CUMULATIVE EFFECTS

Other developments or proposed developments (larger than one-off houses) within 10 km of the proposed Development are listed in **Table 2.2 Chapter 2 Project Description**. These include agricultural facilities, a solar energy development, refurbishment of the existing Moneypoint – Oldstreet 400kV overhead line, a waste water treatment works, amenity facilities (9-hole pitch and putt course) and an apartment development. All of these projects have been rigorously assessed for environmental and ecological effects and where such effects are identified, mitigation has been incorporated into the planning. As the proposed Development, with mitigation in place, will not be likely to result in any significant effect on terrestrial ecological interests at the Development Site or in the wider area, it will not contribute to any possible cumulative impact when considered with the various other projects within a 10 km radius.

The surveys undertaken for the Aquatic Ecology study (see section 5 of this report) have shown that the local watercourses have Moderate to Poor water quality. With respect to hydrology, the proposed Development, with mitigation in place (as detailed in **Chapter 9 Hydrology and Hydrogeology** of EIAR), is not considered likely to significantly contribute to such cumulative effects in terms of water quality.

#### 4.5 MITIGATION MEASURES

##### 4.5.1 Water Quality

Robust mitigation measures to preserve water quality in local streams and to prevent run-off having harmful effects on species such as otter, as well as on the interests of the Lower River Shannon SAC, the River Shannon and Fergus Estuaries SPA, and the Poulmasherry Bay pNHA, will be implemented and enforced throughout the construction phase of the project.

These are detailed in **Chapter 9: Hydrology and Hydrogeology** and **Appendix 2.1** (CEMP, SWMP) of EIAR, as well as **EIAR Chapter 6: Biodiversity** and **Chapter 7: Aquatic Ecology**.

#### 4.5.2 Invasive species

As a stand of Japanese knotweed occurs within the study area for Option 2, strict mitigation will be implemented to prevent the spread of this species, and indeed any other invasive species, during the construction phase. Measures to be followed are detailed in EIAR Chapter 6: section 6.5.7.

Prior to the commencement of any works, a confirmatory survey will take place for invasive species along the route.

Implementation of the mitigation measures will ensure that there will be no significant effect with regard to Third Schedule invasive species as a result of the proposed development.

#### 4.6 STATEMENT OF SIGNIFIANCE

With the implementation of mitigation through avoidance principles, pollution control measures, surface water drainage measures and other preventative measures which have been incorporated into the project design in order to minimise potential significant adverse effects on water quality and biodiversity at the site of the proposed grid route Option 2, the potential for adverse effects on downstream designated sites, as well as downstream otter populations, is reduced to Imperceptible or Not Significant.

Following surveys for bats within and surrounding the Site, it is considered that the proposed Development will not have a significant long term negative effect on the local bat populations in the area.

It is also considered that the proposed Development will not have any significant long term negative effects on the terrestrial mammal or bird populations in the area.

## 5 AQUATIC ECOLOGY

### 5.1 INTRODUCTION

#### 5.1.1 Purpose of the Report

This appendix contains the additional survey work carried out by Aquafact (APEM Group) for the assessment of Option 2 of the Grid Connection Route (GCR) from the Moanmore Lower Wind Farm site to Moneypoint.

The purpose of this report is to:

- Establish and evaluate the baseline aquatic ecological environment as relevant to the proposed development, i.e. the Option 2 GCR
- Identify, describe and assess all potentially significant aquatic ecological effects associated with the proposed development.
- Set out the prevention and mitigation measures required to address any potentially significant aquatic ecological effects and ensure compliance with relevant nature conservation legislation.
- Provide an assessment of the significance of any residual aquatic ecological effects.
- Identify any appropriate enhancement and / or post-construction monitoring requirements.

### 5.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

#### 5.2.1 Assessment Methodology Aquatic Biodiversity

The general approach used for the evaluation of ecological receptors and assessment of significant likely effects for this current assessment is based on the '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (Chartered Institute of Ecology and Environmental Management, 2018 (Updated 2022)). The evaluation of ecological receptors contained within this report uses the geographic scale and criteria defined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009).

#### 5.2.2 Desktop Study

A desktop study review was carried out of existing data and records for fish, protected aquatic species and habitats (including Annex II species and aquatic Annex I habitats), and invasive species listed under the Third Schedule of S.I No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)) on watercourses at or hydrologically connected (i.e., downstream) to the development on the National Biodiversity Data Centre (NBDC) and National Parks and Wildlife Service (NPWS) websites.

### 5.2.3 Field Surveys

Surveys of watercourses crossed by the Option 2 GCR were undertaken on the 8<sup>th</sup> of November 2022. The surveys identified and mapped aquatic habitats, determined fisheries value and potential, and determined presence or suitability for Annex listed species or invasive alien species. The aquatic habitat assessment conducted at all sites was based on the Environment Agency's '*River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003*' (Environment Agency, 2003) and the Irish Heritage Council's '*A Guide to Habitats in Ireland*' (Fossitt, 2000). The EPA Biotic Index Biological River Quality Classification System (Q-value) (Toner *et al.*, 2005) (**Error! Reference source not found.**) has been used to monitor the ecological quality of streams and rivers in Ireland since 1971. It is routinely employed by the EPA. All sites were assessed in terms of:

- Stream width, depth, and other physical characteristics
- Substrate type, listing substrate fractions in order of dominance, *i.e.*, bedrock, boulder, cobble, gravel, sand and silt
- Flow type, listing percentage of riffle, glide and pool in the sampling area
- In-stream macrophyte, bryophytes occurring and their percentage coverage of the stream bottom at the sampling sites
- Riparian habitats and species composition

A Biosecurity protocol was rigidly followed to avoid the potential for transfer of invasive alien species to, or from the Site in accordance with guidance from *Invasive Species Ireland and Inland Fisheries Ireland* (IFI, 2010). A specific Biosecurity Method Statement was produced for the survey operation.

This aquatic ecology analysis will be referring to watercourses by the local river names identified using the "Indicative Flow" layer [e.g. the Gowerhass] on EPA maps website to assess potential effects on each stretch rather than the river catchment as a whole. For Chapter 9 Hydrology and Hydrogeology local river names have been included as well as the WFD river section ID [Moyasta\_010 for example] which aligns with the overall WFD catchment or sub-catchment name.

**Table 5.1: EPA Water Quality and Status Summary.**

| Biotic Index | Quality Status | Water Quality | WFD Ecological Status |
|--------------|----------------|---------------|-----------------------|
| Q5           | Unpolluted     | Good          | High                  |
| Q4-5         | Unpolluted     | Fair-to-Good  | High                  |

| Biotic Index | Quality Status      | Water Quality    | WFD Ecological Status |
|--------------|---------------------|------------------|-----------------------|
| Q4           | Unpolluted          | Fair             | Good                  |
| Q3-4         | Slightly Polluted   | Doubtful-to-Fair | Moderate              |
| Q3           | Moderately Polluted | Doubtful         | Poor                  |
| Q2-3         | Moderately Polluted | Poor-to-Doubtful | Poor                  |
| Q2           | Seriously Polluted  | Poor             | Bad                   |
| Q1-2         | Seriously Polluted  | Bad-to-Poor      | Bad                   |

### 5.3 BASELINE DESCRIPTION

#### 5.3.1 Aquatic Environment

There are 6 watercourses which could potentially be impacted by the development of the Option 2 GCR to Moneypoint. These are Moyasta, Parknamoney, Wood, Moyne, Ballynote East and the Molougha as outlined in Figure 5.1 below.

Six of the stations surveyed were at small streams/rivers that can be classified as FW2 depositing/lowland rivers under the Fossitt (2000) classification system. **Error! Reference source not found.** outlines the stations surveyed and what sampling took place at each one. FW2 depositing/lowland rivers includes all watercourses where fine sediments are deposited on the riverbed. These types of streams are typically characterised by slow flowing water, low discharge and muddy substrates. In a natural state these types of streams and rivers erode their banks and meander across floodplains. Due to this, most have been modified to some extent to control water flow, facilitate navigation or prevent flooding and erosion (Fossitt, 2000).

Along the Option 2 Grid Connection Route the watercourses have been modified to receive input from manmade arterial drains, are culverted beneath roads or have been made available to provide cattle access for water.

Surface water quality in the watercourses surveyed for the Option 2 GCR was moderate to poor and is discussed below. Macroinvertebrate biodiversity is low and characterised by pollution tolerant taxa such as *Gammarus*, chironomids and gastropods. The most likely source of the degraded water quality is diffuse pollution from agricultural run-off. Some of the survey stations (S2 and S3) displayed characteristics of eutrophication, having an abundance of macrophytes such as *Potamogeton*. All streams are subject to seasonal fluctuations in discharge, velocity, temperature, species richness and abundance, but eutrophication and agricultural pollution are a persistent issue degrading water quality in the area. The 2<sup>nd</sup> and 3<sup>rd</sup> Cycle reports for the Shannon Estuary North Catchment identified excess nutrient input from

agricultural run-off as the dominant issue in the catchment, followed by alteration of hydromorphological (or physical) features of the waterbody (EPA 2018, EPA 2021).

None of the watercourses surveyed for the Option 2 grid connection route were identified as suitable habitats for Annex II listed species or species of high conservation value. The fine sediments on the streambed are unsuitable for freshwater pearl mussel (*Margaritifera margaritifera*) or spawning salmonids. There was no sign of otter tracks or spraint, river lamprey (*Lampetra fluviatilis*) or white-clawed crayfish (*Austropotamobius pallipes*). The streams are considered to be of low value local importance. The flora and fauna present in the streams are widespread, of low ecological significance and relatively tolerant to pollution.

Option 1 GCR which is assessed in the main EIAR crosses one watercourse – Moyasta\_27. Option 2 GCR crosses the Moyasta, Parknamoney, Wood, Moyne and Ballynote East. The watercourses crossed by the Option 2 GCR are hydrologically connected to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Following the two-water crossing on the Moyasta, the Moyasta flows for 6.5km before flowing into the SAC and SPA. The Moyne confluences with Ballynote East and flows into the SAC and SPA c.1.9km downstream of the Ballynote East watercrossing. The SAC and SPA are of international importance and have very high conservation value. The location of the SAC and SPA in relation to the proposed site is illustrated in **Figure 5.1**. Option 2 GCR crosses the Parknamoney, Wood, Moyne, Ballynote East and Molougha. The Moyne confluences with Ballynote East and flows into the SAC and SPA c.1.9km downstream of the Ballynote\_East GCR watercrossing. The Molougha watercrossing is c.8m upstream of the SAC and SPA.

Grid connection Option 2 crosses the Moyasta 27 (EPA Code: 27M04)) which flows c. 6.5km downstream into Poulnasherry Bay. Poulnasherry Bay is a designated shellfish water body under the Quality of Shellfish Water Regulations (S.I 208 of 2008). Poulnasherry Bay measures about 5km<sup>2</sup> and using a mean depth of 1m, this gives a total volume of 50,000m<sup>3</sup> which is tidally refreshed twice a day. The Moyasta river is 24.75km in length and the Moyasta catchment is 26.12km<sup>2</sup>. According to the EPAs River Flow Estimate tool the flow at the segment of the Moyasta river that enters Poulnasherry Bay is above the Q95 of 0.063m<sup>3</sup>/sec for the majority of the time (the flow that is present 95% of the time, or across 95% of measurements). Q95 is often used as the precautionary flow when looking at capacity studies. The average flow at this section (Q50) is above 0.29m<sup>3</sup>/sec.

The size of the River Shannon catchment is ca. 18,000 km<sup>2</sup> and land use is, to a large extent, agricultural/silviculture. Run off from such land use will bring in nutrients such as nitrogen (N),

phosphorus (P), and humic acids into the river. Given the tidal exchanges as described above, there is sufficient dilution to prevent the potential effects of run-off (for which mitigation measures have been designed) from the proposed wind farm. With regard to flows in the Shannon Estuary, if all inflowing rivers are included along with the flows in the river, the total flow rate is 300m<sup>3</sup> sec. In comparison, the flow of the Moyasta as presented above is >0.29m<sup>3</sup>/sec at average. With Poulmasherry Bay having an estimated volume of 50,000m<sup>3</sup>, which is tidally refreshed by the Shannon at a flow rate of 300m<sup>3</sup>/sec, a flow rate of >0.29m<sup>3</sup>/sec entering Bay would be massively diluted. Without mitigation in place there would only be a slight to moderate short-term significant effect.

Robust mitigation measures, as outlined in Chapter 8 Soils and Geology, Chapter 9: Hydrology and Hydrogeology and Appendix 2.1 (CEMP, SWMP), will be put in place to prevent pollution in the form of suspended solids and dissolved substances entering the watercourses, and potentially transporting to Poulmasherry Bay. With mitigation rigorously enforced, it can be concluded there would not be any significant effects on the designated shellfish water body as a result of the Option 2 grid connection route.

### 5.3.2 Aquatic Habitat Assessment

**Table 5.2** presents a list of the watercourses and the 8 survey station locations. Three stations were assessed for the Site survey (M1-M3), of which only M1 is analysed as a water crossing, and 7 stations (S2-S7 & S13) were assessed along the Option 2 GCR. EPA watercourse names, EPA codes and EPA segment codes are also presented. **Error! Reference source not found.** provides a summary of the stations surveyed and sampling undertaken at each location. **Error! Reference source not found.** presents the locations of the sampling stations and the two GCR options.

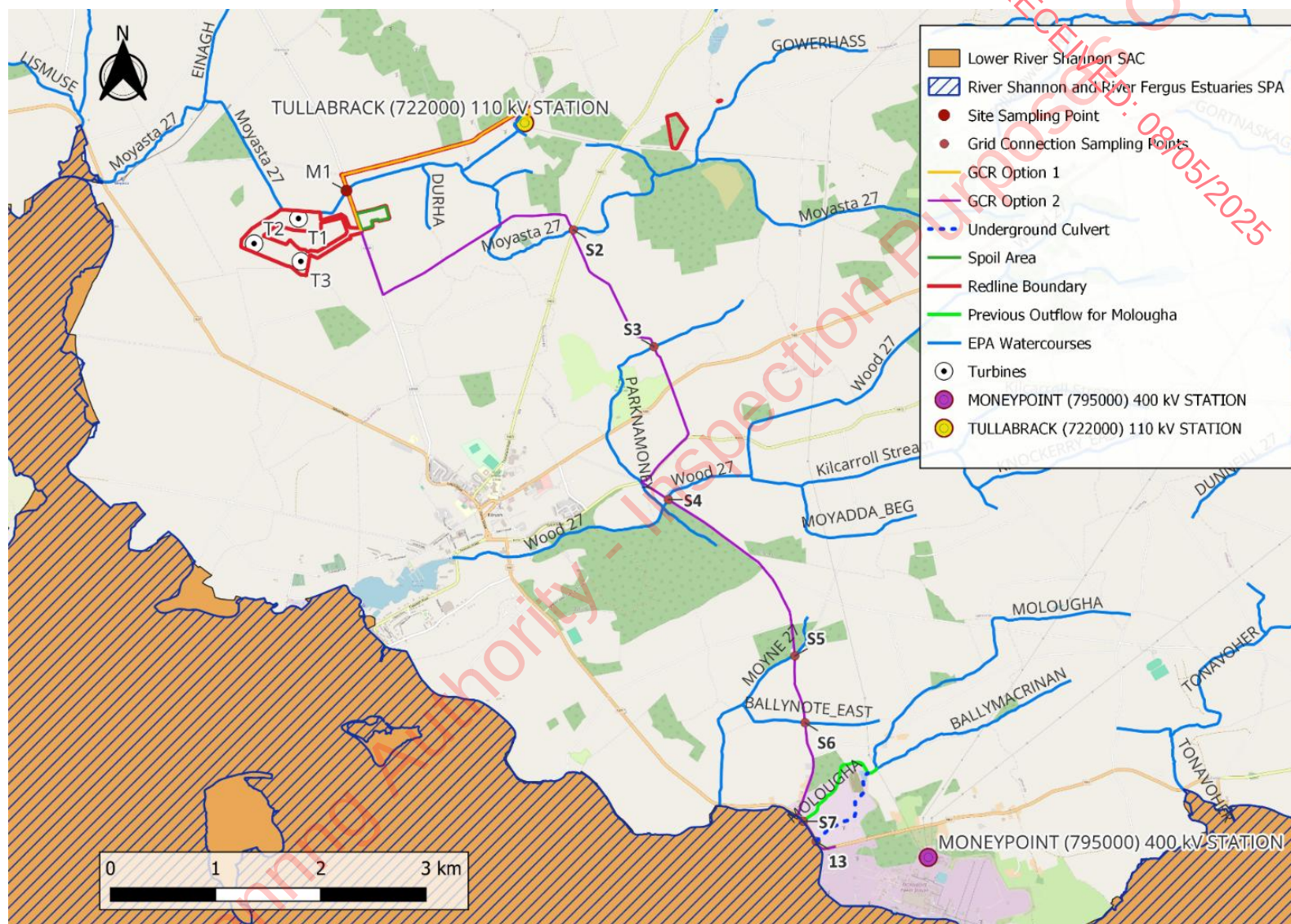


Figure 5.1: The two proposed Grid Connection Route options from the proposed Development Site to Tullabrack 110kV substation (Option 1 GCR) and Moneypoint 400kV station (Option 2 GCR).

Table 5.2: Descriptions of the survey station locations and watercourse names for GCR option 2<sup>3</sup>.

| Grid Connection Route<br>(Option 2)<br>Survey Stations | EPA Name   | EPA Code | EPA<br>Watercourse<br>Segment Code | Photograph of survey station                                                        |
|--------------------------------------------------------|------------|----------|------------------------------------|-------------------------------------------------------------------------------------|
| M1                                                     | MOYASTA 27 | 27M04    | 27_952                             |  |

<sup>3</sup> An additional watercourse crossing, labelled WC#6 was included in Moanmore EIAR Lower Appendix 2.2 - Grid Route Assessment, BFA 2024. This watercourse is not noted on the EPA maps source, used to complete this study. This is most likely due to the fact that it was observed to be within or adjacent to areas of forest and appear to be artificial drains (and culverts) associated with forestry. As it was dry and unsuitable for survey it was not assessed further.

| Grid Connection Route<br>(Option 2)<br>Survey Stations | EPA Name    | EPA Code | EPA<br>Watercourse<br>Segment Code | Photograph of survey station                                                         |
|--------------------------------------------------------|-------------|----------|------------------------------------|--------------------------------------------------------------------------------------|
| S2                                                     | MOYASTA 27  | 27M04    | 27_1158                            |   |
| S3                                                     | PARKNAMONEY | 27P01    | 27_967                             |  |

| Grid Connection Route<br>(Option 2)<br>Survey Stations | EPA Name | EPA Code | EPA<br>Watercourse<br>Segment Code | Photograph of survey station                                                         |
|--------------------------------------------------------|----------|----------|------------------------------------|--------------------------------------------------------------------------------------|
| S4                                                     | WOOD 27  | 27W01    | 27_963                             |   |
| S5                                                     | MOYNE 27 | 27M23    | 27_1023                            |  |

| Grid Connection Route<br>(Option 2)<br>Survey Stations              | EPA Name          | EPA Code | EPA<br>Watercourse<br>Segment Code | Photograph of survey station                                                         |
|---------------------------------------------------------------------|-------------------|----------|------------------------------------|--------------------------------------------------------------------------------------|
| S6                                                                  | BALLYNOTE<br>EAST | 27B81    | 27_1022                            |   |
| S7<br>(previous location of<br>outflow for Molougha<br>watercourse) | MOLOUGHA          | 27M19    | 27_1024                            |  |

| Grid Connection Route<br>(Option 2)<br>Survey Stations           | EPA Name | EPA Code | EPA<br>Watercourse<br>Segment Code | Photograph of survey station                                                        |
|------------------------------------------------------------------|----------|----------|------------------------------------|-------------------------------------------------------------------------------------|
| S13<br>(Culverted watercourse<br>previously outflowing at<br>S7) | MOLOUGHA | 27M19    | 27_1024                            |  |

### 5.3.2.1 Proposed Grid Connection Route

Two Grid Connection Route options, listed below and shown in Error! Reference source not found., were assessed for the proposed Moanmore Lower Windfarm. The results of the assessment concluded both routes were feasible, but Option 1 GCR was optimal due to it being the shortest distance (i.e., 2.76km), connecting the Development to the existing Tullabrack 110kV Substation. Additionally, with only one water crossing it has the least potential environmental effects.

- **Option 1 GCR** – underground single 38kV circuit from Tullabrack substation to the proposed Moanmore Lower wind farm utilising sections of UGC primarily public roads, regional roads, and private lands. (approx. 2.76 Km).
- **Option 2 GCR** – underground twin 20kV circuit from Moneypoint to the proposed Moanmore Lower Wind Farm utilising sections of UGC in public road, primarily regional roads, and private lands (approx. 10.2 Km). This route includes eight watercourse crossing points.

The survey work was preceded by a period of heavy rainfall and the watercourses were fast flowing, with higher-than-normal velocity and discharge. Multiple fields were waterlogged and slightly flooded. There were eight sampling stations along GCR Option 2, as shown in **Figure 5.1**. Six of these stations were at habitats classified as FW2 lowland depositing streams under the Fossitt (2000) classification system. However, the sampling station S5 was not accessible due to overgrowth of hedgerow as seen in the image in Error! Reference source not found..

The sampling station S6 was flooded at the time of the survey so kick sampling could not be completed, but water chemistry was analysed. Also, S7 is the previous location of the Molougha watercourse outflow. At present there is no outflow pipe or discharge as the watercourse has been diverted to a constructed pond and culverted under the Moneypoint Power Station Ash Storage Area and on to an outflow pipe into the Shannon Estuary at S13. The discharge level is above the low tide line. As S13 is an intertidal outflow pipe located on the shore of the Shannon Estuary it was unsuitable to sample for freshwater macroinvertebrates or water chemistry as the location is not a freshwater site. There is an additional outflow pipe located in close proximity to the north of S13, however this is not in use. All of the watercourses that were sampled showed signs they are experiencing moderate to serious levels of pollution, with the main source most likely diffuse nutrient input from agricultural run-off. Heavy siltation was present at five of the sampled stations, the exception being S4 which had a mixture of stone/gravel.

All stations across GCR Option 2 received a score of Q3 indicating moderate pollution. Eutrophication from diffuse organic nutrient input is the most likely cause of pollution at all sampling stations.

The water chemistry results also indicate that the streams are experiencing excessive nutrient loading, and all watercourses sampled failed to meet surface water regulations for nitrate as N. The period of heavy rainfall preceding the sampling event may have increased run-off from agricultural land into the watercourses and may be a factor in the increased nitrates. All stations were in spate due to the increased precipitation, and the higher velocity flow and lower temperatures may have lowered BOD and suspended solids to levels acceptable for salmonid rivers. The scarcity of pollution-sensitive macroinvertebrates indicate that agricultural pollution has an ongoing and widespread effect on watercourses in the area.

The water crossing at station M1 on GCR Option 1 was surveyed in a fisheries assessment and had no Annex II listed species present, most likely due to morphological alterations and siltation. This is discussed in full in **EIAR Chapter 7: Aquatic Ecology**.

None of the streams on Option 2 GCR are considered to be suitable habitats for Annex II listed species due to pollution, siltation and morphological alterations. In the case where GCR Option 2 was used, appropriate mitigation measures would be required to prevent further deterioration in the quality of the receiving waters and an indirect adverse significant effect on the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, which are hydrologically connected through the Moyne 27s and Moyasta 27 watercourses.

**Table 5.3: Stations surveyed on both Option 1 GCR and Option 2 GCR.**

| Stations surveyed | Photographed | Water Sampled                  | Kick Sampled                   |
|-------------------|--------------|--------------------------------|--------------------------------|
| M1                | ✓            | ✓                              | ✓                              |
| S2                | ✓            | ✓                              | ✓                              |
| S3                | ✓            | ✓                              | ✓                              |
| S4                | ✓            | ✓                              | ✓                              |
| S5                | ✓            | Inaccessible – not sampled     | Inaccessible - not sampled     |
| S6                | ✓            | ✓                              | Unsuitable – not sampled       |
| S7                | ✓            | Historic outflow – not sampled | Historic outflow – not sampled |
| S13               | ✓            | Unsuitable – not sampled       | Unsuitable – not sampled       |

### 5.3.3 Biotic Index (Q Value) Macro-invertebrate Assessment

Water quality was assessed using the Q-Value biotic index system. The Biological River Quality Classification System (Q-Scheme) has been in use in Ireland since 1971. For the purpose of this assessment, benthic invertebrates have been divided into five indicator groups according to the tolerance of pollution, particularly organic pollution.

In order to determine the biological quality of the river, the Q-scheme index is used whereby the analyst assigns a Biotic Index value (Q-Value) based on macroinvertebrate results. The Biotic Index is a quality measurement for freshwater bodies that range from Q1 – Q5 with Q1 being of poorest quality and Q5 being pristine/unpolluted (see Error! Reference source not found. below).

**Table 5.4: Water Quality Assessment of the alternative Option 2 GCR (Q Value and WFD Ecological Status).**

| Site No. | Current Q Value | WFD Ecological Status | Macrophytes | Comments                                                                                                                                                                                                                                                                                                                                                                 | Latest EPA Q Value and WFD Status        |
|----------|-----------------|-----------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| M1       | Q3-4            | POOR/<br>MODERATE     | Abundant    | Stream with steep thickly vegetated banks, riverbed mix of cobbles and fine gravel with siltation. High level of shading present. Pastoral land adjacent to stream with open access to cattle. Particularly high abundance of filamentous algae indicating eutrophication Hydrobiidae was the dominant species group that was present in July and Gammaridae in October. | Q3<br>POOR (last surveyed 1991)          |
| S2       | Q3              | POOR                  | Abundant    | Heavily vegetated, deep muddy substrate, bordering pastoral land. Chironomidae, <i>Potamopyrgus</i> and Sphaeriidae were the dominant taxa present                                                                                                                                                                                                                       | Q1 BAD<br>(last surveyed 1991)           |
| S3       | Q3              | POOR                  | Abundant    | Slightly vegetated, siltation present, cattle access to stream. Gammaridae and <i>Baetis rhodani</i> were the dominant taxa present.                                                                                                                                                                                                                                     |                                          |
| S4       | Q3              | POOR                  |             | Stone/gravel substrate, flow very fast, in flood during survey. Gammaridae, <i>Asellus</i> and <i>Hydropsyche</i> were the dominant taxa present.                                                                                                                                                                                                                        | Q3-4<br>MODERATE<br>(last surveyed 2022) |

#### **5.4 MITIGATION MEASURES**

See **EIAR Chapter 7: Aquatic Ecology– Section 7.5 Mitigation Measures.**

#### **5.5 CONCLUSION**

After rigorous surveys, sampling and analysis of the alternative GCR option (Option 2), this option is also viable but would require mitigation measures to be implemented to ensure water quality is not impacted downstream.

#### **5.6 STATEMENT OF SIGNIFIGANCE**

Implementation of the control measures outlined in the EIAR will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminant arising along the GCRs. The Grid Connection routes are not likely to significantly impact aquatic ecology.

## 6 SOILS AND GEOLOGY

### 6.1 INTRODUCTION

#### 6.1.1 Purpose of the Report

The purpose of this report is to:

- Establish and evaluate the baseline soils and geology as relevant to the proposed development, i.e. the Option 2 GCR
- Identify, likely positive and negative impacts of the Option 2 GCR on the receiving lands, soils and geology during the construction and operational phases of the GCR;
- Identify mitigation measures to avoid, remediate or reduce likely or significant negative effects
- Assess likely or significant cumulative effects of the Option 2 GCR because of other developments
- Identify any post-construction monitoring requirements

### 6.2 BASELINE

#### 6.2.1 Land cover

Consultation with Corine (2018) Land cover maps indicate the landcover along the alternate GCR is primarily classified as 'Pastures' (231) with small areas classified as 'Land principally occupied by agriculture, with significant areas of natural vegetation' (243), 'Mixed forest' (313) and 'Dump site' (132).

#### 6.2.2 Bedrock geology

The mapped geological formations underlying the Option 2 GCR are the same the sandstone and siltstones of the Central Clare Group and the Gull Island Formation (GSI, Bedrock 100k).

#### 6.2.3 Soils and subsoils

The soil types (EPA, National Soils) along the Option 2 GCR are summarised in **Table 6.1** below.

**Table 6.1: Summary of soils along the Option 2 GCR**

| IFS Soil | IFS Description                | IFS Type                                                                        | Soil Group                               | IFS code | Parent material |
|----------|--------------------------------|---------------------------------------------------------------------------------|------------------------------------------|----------|-----------------|
| AlluvMIN | Mineral alluvium               | Alluviums                                                                       | Variable                                 | 51       | TNSSs           |
| AminDW   | Acid Deep Well Drained Mineral | Deep well drained mineral - Derived from mainly non-calcareous parent materials | Acid Brown Earths, Brown Podzolics       | 11       | TNSSs           |
| AminPD   | Acid Deep Poorly               | Deep poorly drained mineral - Derived from                                      | Surface water Gleys / Ground water Gleys | 31       | TNSSs           |

| IFS Soil | IFS Description                                      | IFS Type                                                                                              | Soil Group                                                                             | IFS code | Parent material |
|----------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------|-----------------|
|          | Drained Mineral                                      | mainly non-calcareous parent materials                                                                |                                                                                        |          |                 |
| AminPDPT | Acid Poorly Drained Mineral Soils with Peaty Topsoil | Poorly drained mineral soils with peaty topsoil - Derived from mainly non-calcareous parent materials | Peaty Gleys                                                                            | 41       | RckNca          |
| AminSP   | Acid Shallow Poorly Drained Mineral                  | Shallow poorly drained mineral - Derived from mainly non-calcareous parent materials                  | Surface water Gleys (Shallow), Ground water Gleys (Shallow), Some outcropping rock     | 33       | RckNca          |
| AminSW   | Acid Shallow Well Drained Mineral                    | Shallow well drained mineral - Derived from mainly non-calcareous parent materials                    | Shallow Acid Brown, Earths/Brown Podzolics, Lithosols, Regosols, Some outcropping rock | 21       | BktPt           |
| BktPt    | Blanket Peat                                         | Peats                                                                                                 | Blanket Peats                                                                          | 63       | Cut             |
| Cut      | Cutaway/ cutover peat                                | Peats                                                                                                 | Basin Peats, Blanket Peats (some)                                                      | 65       | Made            |
| Made     | Made/ Built land                                     | Miscellaneous                                                                                         |                                                                                        | 74       | TNSSs           |

The subsoil types (EPA, National Subsoils) along the alternate GCR are summarised in Table 2 below.

**Table 6.2: Summary of subsoils along the Option 2 GCR**

| Parent material | Category           | Description                           | Texture  | Class                          |
|-----------------|--------------------|---------------------------------------|----------|--------------------------------|
| A               | Alluvium           | Alluvium undifferentiated             | Variable | Alluvium                       |
| BktPt           | Peat type          | Blanket Peat                          | Peaty    | Peat                           |
| Cut             | Peat type          | Cutover peat                          | Peaty    | Peat                           |
| Made            | NA                 | Man made                              | NA       | NA                             |
| Rck             | Other deposit type | Bedrock at Surface                    | NA       | Bedrock at or close to surface |
| TNSSs           | Till type          | Shales and sandstones till (Namurian) | Clayey   | Tills (diamictos)              |

#### 6.2.4 Economic geology

There are no active quarries and pits or mapped mineral localities within 200m of the Option 2 GCR. There is some mapped coal to the northwest of Moneypoint Power Station and slate to the southeast.

#### 6.2.5 Geological heritage

There are no geological heritage sites along the alternate GCR route.

### 6.2.6 Designated Sites

As outlined in Section 4.2.1 above no part of the Option 2 GCR is within an area with a nature conservation designation, the grid connection route runs alongside the N67 for approximately 500 m at Moneypoint Power Station and is adjacent to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA – the designated area includes all the shoreline which adjoins the road and extends onto part of the actual N67 road (see npws.ie/protected-sites). The cable route, however, is along the eastern side of the road (with shoreline to west of road) where there is a grass verge of approximately 7.5 m at its narrowest point (see Grid Route Assessment by BFA consulting – EIAR Appendix 2.2 & Plate 4.5). This section of the route is shown in Figure 4.1, along with the designations.

### 6.2.7 Geohazards

The alternate GCR transverses mainly public roads and therefore the risk of geohazards is low.

Landslide risk susceptibility (GSI Map Viewer) is generally 'low' with a few minor areas 'moderately low' landslide risk along the alternate GCR. There are no recorded landslide events close to the GCR.

There are no mapped karst features, or limestone along the alternate GCR.

## 6.3 POTENTIAL EFFECTS

All of the potential effects associated with the alternative Grid Connection route are the same as those outlined for the Tullabrack Grid Connection route in **EIAR Chapter 8: Soils and Geology Section 8.4** and include land take, excavation – subsoil removal, temporary spoil storage and hydrocarbon spill.

## 6.4 CUMULATIVE EFFECTS

The potential effects of the alternative Grid Connection Routes in terms of soils and geology are generally localised and the land take is temporary. The proposed off-shore wind farm Sceirde Rock's grid connection overlaps with Option 2 GCR for 13.1km. The works associated with both grid routes are small-scale and temporary in nature and there are **no significant cumulative effects** anticipated from this project or other projects during the construction phase of the Proposed Development.

## 6.5 MITIGATION AND RESIDUAL EFFECTS

The mitigation and residual effect associated with Option 2 GCR are the same as those outlined for the Tullabrack Grid Connection route in **EIAR Chapter 8: Soils and Geology Section 8.5.2.1, 8.5.2.2, 8.5.2.6, 8.5.2.7 and 8.5.2.6.**

## 6.6 STATEMENT OF SIGNIFICANCE

The significant potential effects that could specifically arise from the Option 2 GCR during the construction of infrastructure elements including the excavation activities associated with cable trenches, and temporary spoil storage and potential drill arisings are soil contamination, unmitigated waste management and temporary loss of land.

Elements of the construction and operation of the GCR that may potentially impact on the soils and geological receptors have been identified and their pathways for effects have been assessed.

Implementation of the control measures outlined in the EIAR will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminant arising along the GCR. The Grid Connection routes are not likely to significantly impact land and soils.

## 7 HYDROLOGY & HYDROGEOLOGY

### 7.1 INTRODUCTION

The purpose of this report is to:

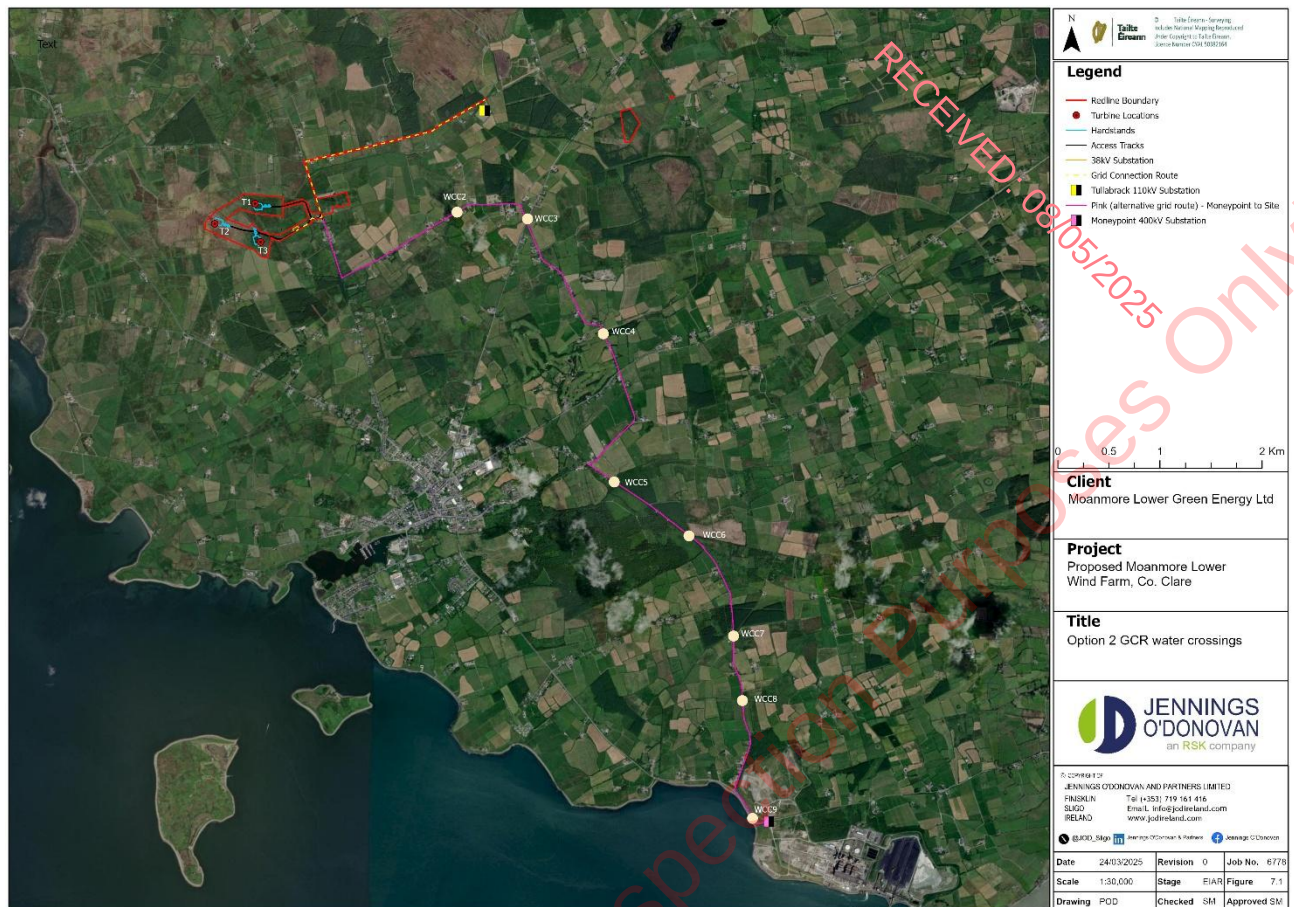
- Establish and evaluate the baseline of the existing water environment (surface and groundwater) in the area of the Option 2 GCR
- Identify, likely positive and negative effects of the Option 2 GCR on the receiving lands, soils and geology during the construction and operational phases of the GCR;
- Identify mitigation measures to avoid, remediate or reduce likely or significant negative effects
- Assess likely or significant cumulative effects of the Option 2 GCR because of other developments
- Identify any post-construction monitoring requirements

#### 7.1.1.1 Watercourse Crossings

There are 8 watercourse crossings along the Option 2 GCR outlined in the table 7.1 and Figure 7.1. All have been assessed by BFA Consulting (**Appendix 2.2**). and it was determined that no upgrades or new structures will be required for at the 8 crossings assessed. Option 2 GCR would traverse eight (no.8) existing bridge or watercourse culvert crossings. The Option 2 GCR will be constructed via trenching in the public roadway, or in the verge, in its entirety. The type of crossing and the approximate centre point coordinates for each of the crossings along the GCR is outlined in **Table 7.1**. Cabling will be installed without the requirement of Horizontal Directional Drilling (HDD) and there will be no direct impact on watercourses. The watercourse crossings identified along Options 2 GCR, are as follows:

**Table 7.1: Watercourse crossings on Option 2 GCR**

| ID   | Grid Coordinated (ITM) |        | Category | Related GCR |
|------|------------------------|--------|----------|-------------|
| WCC2 | 499707                 | 658055 | Bridge   | Option 2    |
| WCC3 | 500408                 | 657996 | Bridge   | Option 2    |
| WCC4 | 501150                 | 656872 | Culvert  | Option 2    |
| WCC5 | 501255                 | 655428 | Bridge   | Option 2    |
| WCC6 | 501984                 | 654901 | Culvert  | Option 2    |
| WCC7 | 502430                 | 653933 | Culvert  | Option 2    |
| WCC8 | 502514                 | 653286 | Culvert  | Option 2    |
| WCC9 | 502611                 | 652132 | Culvert  | Option 2    |



**Figure 7.1: Option 2 GCR water crossings**

The potential effects of any new watercourse crossings or upgrades of existing watercourse crossings are detailed in **Section 9.5.1** and **EIAR Chapter 9: Hydrology and Hydrogeology**.

## 7.2 BASELINE

### 7.2.1 Land use

Consultation with Corine (2018) Land Use maps (EPA) indicate the landcover along the alternate GCRs is primarily classified as 'Pastures' and 'Mixed Forest'.

### 7.2.2 Regional and Local Hydrology

Option 2 GCR to the Moneypoint 400kV substation are located within two WFD sub-catchments and four WFD River Subbasins. These are detailed as follows:

- Sub Catchment: Wood\_SC\_010, River Sub Basins: Moyasta\_10, Wood\_20, Wood\_10
- Sub Catchment: Cloon [Clare]\_SC\_010, River Sub Basin: Tonavoher\_010

The southern portion of the Development works involving the Grid Connection routes to the Moneypoint 400kV substation is primarily hydraulically characterised by the Wood River,

which discharges into the Kilrush Marina and flows into the Mouth of the Shannon Estuary as well as the Tonavoher River that flows into Ballymacrinan Bay and the Lower Shannon Estuary transitional waterbody. Watercourse crossing identified along the Grid Connection route options as part of the desk study analysis are presented in **Table 7.1**.

### 7.2.3 Water Framework Directive Groundwater Body Status

The Kilrush (EU\_Code: IE\_SH\_G\_123) groundwater body underlying Option 2 GCR and the wider region has been assigned “*Good Status*” under the Water Framework Directive (WFD) 2016-2021 cycle. This classification is based on an assessment of the chemical and quantitative status of the GWB. The Kilrush GWB has been categorised as “*Under Review*” for the WFD objectives of 2027, although no significant pressures have been identified.

### 7.2.4 Water Framework Directive Water Body Status & Objectives

The Water Framework Directive (WFD) surface water body status (2016 – 2021) and the associated objectives assigned for the surface water network both within and surrounding the Site have been reviewed with available data on the EPA Map Viewer online database (2022).

The Moyasta River, which drains the proposed Site and the Grid Connection Route has a WFD Status of “*Moderate*”. The Risk status for the Moyasta River is “*Under Review*”. Option 2 GCR crosses the river Wood\_010, this river has a WFD Status of “*Poor*” and is “*At Risk*”. It also crosses the Tonavoher\_010, this river has a WFD Status of “*Moderate*” and is “*Under Review*”.

### 7.2.5 Surface Water Hydrochemistry

The Environmental Protection Agency (EPA) conducts an ongoing monitoring programme as part of Ireland's requirements under the WFD. The monitoring programme includes an assessment of biotic indices (biological quality ratings ranging from 1-5) known as Q-Values.

**Table 7.2: EPA Monitoring Points and Latest Available Q-Values**

|                                                 |                             |
|-------------------------------------------------|-----------------------------|
| <b>Station ID</b>                               | <b>RS27W010100</b>          |
| <b>Station Name</b>                             | Bridge 1.5km u/s Kilrush    |
| <b>WFD Waterbody Code</b>                       | IEMRRS27W010100             |
| <b>Type</b>                                     | River                       |
| <b>Latest Monitoring Year</b>                   | 2022                        |
| <b>Latest Status</b>                            | Moderate                    |
| <b>Latest Q-Value</b>                           | 3-4                         |
| <b>Distance from the Proposed EIAR Boundary</b> | 0 metres (along GCR option) |

|                        |                      |
|------------------------|----------------------|
| <b>Station ID</b>      | <b>RS27W010100</b>   |
| <b>Easting</b>         | 101295               |
| <b>Northing</b>        | 155391               |
| <b>Local Authority</b> | Clare County Council |

Assessment for the Wood River, which drains the river subbasin where works will take place for Option 2 GCR, has been continually monitored since 1971. The most recent assessment of the Wood River by the EPA was carried out in 2022 which indicated that the river has a Q-Value of 3-4 "Moderate", "*Unpolluted*" water quality under the current cycle of the WFD, which is a decrease from "Good" in 2019. During the most recent assessment, it was noted that 'rubbish continues to be dumped at Station where ecological quality remained moderate'. This station is located closest to the proposed Grid Connection route works. According to the EPA's WFD database for Status 2016-2021, the Wood River currently holds a 'Moderate' to 'Poor' status, similar to the previous three assessment cycles. In consultation with the WFD Cycle 3 Sub catchment Assessment, the River Wood is 'At Risk' due to "poor biological status" where 'significant pressures from agriculture were identified'. Further downstream before entering the Kilrush Marina, the River Wood encounters additional pressures, including, urban run-off, forestry and other anthropogenic pressures along with agriculture.

#### 7.2.6 Wells

Mapping and searches of the EPA Water Framework Directive (WFD) and GSI well databases confirms that there are a number of mapped wells located within 20km of the Grid connection used for agriculture and domestic use and they are presented in **Table 7.3**.

**Table 7.3: Closest Wells, Springs, Boreholes to Option 2 GCR**

| Type     | Year | ID         | Townland           | Distance | Direction | Route    |
|----------|------|------------|--------------------|----------|-----------|----------|
| Dug well | 1962 | 0815NEW032 | Tullabrack         | c.065km  | East      | Option 2 |
| Dug well | 1962 | 0815SEW035 | Breaghva           | c.0.2km  | Northeast | Option 2 |
| Borehole | 1970 | 0815SEW047 | Ballykett          | c.0.00km | Through   | Option 2 |
| Borehole | 1962 | 0815SEW037 | Ballykett          | c.0.00km | Through   | Option 2 |
| Dug well | 1972 | 0815SEW036 | Ballykett          | c.0.00km | Through   | Option 2 |
| Borehole | 1973 | 0815SEW039 | Moyadda            | c.1.22km | East      | Option 2 |
| Borehole | 1964 | 0815SEW013 | Kilrush            | c.0.30km | East      | Option 2 |
| Borehole | 1964 | 0815SEW010 | Kilrush            | c.0.30km | East      | Option 2 |
| Borehole | 1962 | 0815SEW025 | Dysert             | c.0.05km | Through   | Option 2 |
| Dug well | 1962 | 0815SEW007 | Dysert             | c.0.05km | Through   | Option 2 |
| Dug well | 1962 | 0815SEW005 | Ballymacrinan      | c.0.05km | Through   | Option 2 |
| Borehole | 1982 | 0815SEW056 | Carrowdothia South | c.0.2km  | vicinity  | Option 2 |

In addition, all Water Framework Directive (WFD) groundwater bodies have been identified as Drinking Water Protected Areas (DWPA) due to the potential for qualifying abstractions of water for human consumption as defined under Article 7 of the WFD. The DWPA designation

applies to all groundwater bodies nationally, regardless of the productivity status of the underlying aquifer.

The Kilrush GWB (IE\_SH\_G\_123) underlies the entire Option 2 GCR. The EPA notes that Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400m<sup>3</sup>/d). In the bedrock aquifers, groundwater predominantly flows through fractures, fissures, joints or conduits. Given that the existing GSI groundwater well database is an incomplete dataset, it is conservatively assumed that all dwellings located within 2km of the EIAR Site boundary have the potential to maintain a groundwater well for abstraction.

### 7.2.7 Hydrogeology – Bedrock Aquifer

The underlying bedrock within the EIAR Site boundary is that of Namurian Undifferentiated rock units with sandstone, siltstone and mudstone. Consultation with GSI Groundwater maps indicates that the entire Option 2 GCR is underlain by a bedrock formation underlying the Site and is classified as a 'Locally Important Aquifer – Bedrock' which is Moderately Productive only in Local Zones. There are no mapped karst features within 32km of the Development.

### 7.2.8 Groundwater Vulnerability & Recharge

Consultation with the GSI Groundwater Map Viewer (2023) indicates that both the Option 2 GCR to the existing Moneypoint Power substation are underlain by aquifer vulnerability ratings ranging from 'Moderate' to 'Extreme Vulnerability' including 'X' which is described as "Rock at or near Surface or Karst". There are no mapped karst features within 32km of the Development.

**Table 7.4: Groundwater Vulnerability Ratings**

| Vulnerability Rating        | Thickness of unsaturated zone (m) |
|-----------------------------|-----------------------------------|
| Rock at or Near Surface (X) | 0                                 |
| Extreme (E)                 | 0 to 3                            |
| High (H)                    | 3 to 5                            |
| Moderate (M)                | 5 to 10                           |
| Low (L)                     | >10                               |

### 7.2.9 Designated Sites & Habitats

Designated Site and habitats are detailed in Section 4.2.1.

### 7.2.10 Water Resources

There are no mapped drinking water lakes or rivers along Option 2 GCR. There are no National Federation of Group Water Schemes (NFGWS) or GSI Public Supply Source Protection Areas located along Options 2 GCR.

### 7.2.11 Receptor Sensitivity

- Water Framework Directive (WFD) status (2016-2021) generally ranging from “Moderate” to “Poor”. The principal objective of the WFD is to achieve good status or higher in all waters and to ensure that status does not deteriorate in any waters.
- The down-stream designations (sensitive protected areas e.g., SAC, SPA) associated with the catchment and the sensitive habitats and species associated with same.
- As outlined in Section 7.2.2 the Grid connection routes pass through Sub Catchment: Cloon [Clare]\_SC\_010 which is designated river for Freshwater pearl mussel species. the Grid Connection does not cross the Cloon River area designated for FPM. The Grid routes pass over the Tonavoher Stream. The Tonavoher stream is included in the Cloon River Catchment but has no hydrological connectivity to the Cloon River.
- Designated Shellfish areas exist in the Shannon Estuary catchment; downstream of the site in the Mouth of the Shannon (HAs 23;27) Code: IE\_SH\_060\_0000
  1. West Shannon Ballylongford; Code: IE\_SH\_060\_0000
  2. West Shannon Poulmasherry Bay; Code: IEPA2\_0021
  3. West Shannon Carrigaholt; Code: IEPA2\_0022
  4. West Shannon Rinevella; Code: IEPA2\_0023

## 7.3 ASSESSMENT OF POTENTIAL EFFECTS

### 7.3.1 Construction Phase Potential Effects

#### 7.3.1.1 Release of Suspended solids and increased run off

Minimal land take is associated with the Grid Connect route, considering all proposed works will traverse already existing public roadways (i.e., site access tracks to be constructed as part of the Development,) public and local road networks. However, the Option 2 GCR crossing points of existing culverts are considered the most vulnerable areas to surface water quality deterioration through the release of elevated suspended solids. The potential release of elevated suspended solids to surface waters is considered to be a **direct and indirect, adverse, large** in scale **moderate to significant**, effect of the Development. This potential impact is considered to be **unavoidable** and **conforms to baseline** conditions.

### 7.3.1.2 Watercourse crossings

Option 2 GCR would traverse a combined eight (no.8) existing bridge or watercourse culvert crossings (**Table 7.1**). These locations have previously been surveyed and no upgrading works are required with reference to BFA Consulting Technical Note (**Appendix 2.2**). The alternative option will be constructed via trenching adjacent to the public roadway, or in the verge, in its entirety. This is considered **a likely, adverse, significant, but temporary** effect of the Development which contrasts to baseline conditions.

### 7.3.1.3 Release of Nutrients

#### Release of Suspended Solids

- Excavation and construction activities, such as stockpiling material and vehicular movements of plant machinery introduce the risk of solids being entrained in runoff. Runoff contaminated with suspended solids will add turbidity to the receiving surface water body, can block fish gills and smother spawning grounds, reduce light penetration for flora growth, and promote bacteria and algae production. Nutrients that are associated with the solids (inorganic nutrients such as phosphorus and organic such as hydrocarbons, humic acid, sulphates, fugitive hydrocarbons and sewage if present) can lead to eutrophication of the water environment and eventually to fish-kills due to lowering of oxygen supply. Some ecological receptors such as Freshwater Pearl Mussels are particularly sensitive to perturbations in water quality, and in particular suspended solids.
- The degree to which inorganic solids are entrained in runoff is related to the particle sizing of the soil components. Smaller inorganic particles (e.g., clay) will be easily entrained and will remain in suspension for a longer period than larger particles (silt / sand) and will require lower flow rates and longer retention rates to settle out of the water column when given the opportunity. Peat, comprising mostly of organic matter, will behave in a similar manner to a fine-grained soil whereby much of the material will remain in suspension for a relatively long period of time, but will also dissolve and degrade within the water body, dramatically impacting on water quality.
- Release of suspended solids can be attributed to enhanced nutrient enrichment. This is highly dependent on the type of soil, for example peat released in water will disintegrate and most of the constituents of the peat material (carbon) will eventually dissolve into the water column and / or be consumed by micro-organisms. However, peat and other soils / subsoils will contribute varying degrees of loading of various compounds and nutrients, including Nitrogen (N) and Phosphorous (P) compounds, which are attributed to Nutrient Enrichment, or excessive loading of N and P in waters leading to

eutrophication and potentially profound adverse effects on ecological attributes downstream of the Site.

- Given the historical land use of the Site, i.e., agricultural forestry, there is likely to be trace amounts of fertiliser in the vicinity of the afforested site. Teagasc (2017) has stated routine fertiliser application is undertaken following chemical analysis of foliar (tree leaf) samples. If thresholds aren't met, fertiliser is applied manually between the months of April and August, avoiding drains and a 25m buffer zones to waterlogged and aquatic areas based on professional judgement. Ground Rock Phosphate (GRP) is used in two forms: Granulated Rock Phosphate (c. 11% P) and Ungranulated Rock Phosphate (c. 14% P), in application process, given there are no adverse environmental impacts, e.g., deterioration in water quality status.
- Peat soils behave differently to mineral soils, when it comes to some nutrients such as phosphorous. High organic matter soils (OM > 20%, i.e., peat) do not adsorb P in the same way that mineral soils do. Therefore, P does not bind to peat soil particles, however mineral soils associated with forestry do have the capacity to build up or increase the store of phosphorous they hold.

## 7.4 CUMULATIVE EFFECTS

The potential effects of the alternative Grid Connection Route in terms of hydrology and hydrogeology is localised and the potential release of suspended solids/nutrients and watercourse crossings are **Significant** and **temporary**. However with mitigation measures outlined in Section 7.5.1 and 7.5.2, there are **no significant cumulative effects** anticipated from other projects during the construction phase of the proposed Development.

## 7.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

### 7.5.1 Construction Phase

#### 7.5.1.1 Release of Suspended Solids and Increased Runoff Proposed Mitigation Measures – GCR

With reference to general excavation practices discussed above, excavation of cable trenches in close proximity to surface water features (Options 2 GCR), require special consideration in terms of managing movements, spoil arising from excavations, and entrainment of solids and contaminants in surface water runoff. Mitigation measures outlined above will ensure the effect arising from earthwork activities to the surrounding receptors are minimised to a **direct, adverse, neutral to slight** effect of the Project.

### 7.5.1.2 Watercourse Crossings Proposed Mitigation Measures

Option 2 GCR would traverse eight (no. 8) watercourse crossings, including an existing bridge or watercourse culvert crossings. However, these have previously been surveyed and no upgrading works are required with reference to BFA Consulting Technical Note (refer to **Appendix 2.2**). Trench in verge or carriageway will be employed. Mitigation measures outlined above will ensure the effect arising from the construction of any new watercourse crossing is minimised to a **direct, adverse, slight** effect of the Project.

### 7.5.1.3 Release of Nutrients

Inorganic nutrients such as nitrogen and phosphorus compounds (if present in excavated sediment and as discussed in **Section 7.3.1.3**) will be controlled by the attenuation of the suspended solids. The controlled attenuation of suspended solids in settlement ponds and check dams etc. will result in inorganic nutrients (if present in elevated concentrations) such as phosphorus and nitrogen being absorbed and retained by the solids in the water column. This will allow for a reduction of peak inorganic discharges in a controlled and stable run off rate. It is noted that the baseline surface water chemistry indicates elevated Ammoniacal Nitrogen and Phosphate.

It is considered that there is a low risk of mobilising trace metals that may naturally be present in low concentrations in the baseline environment. The potential for mobilising trace metals is most likely to result from enhanced water percolation associated with excavated bedrock substrate. To mitigate against this potential impact, water quality should be monitored for trace metal concentrations prior to, during and after the construction phase.

Mitigation by avoidance and the implementation of physical control measures will ensure that contaminant concentrations, particularly elevated suspended solids entrained in run-off are reduced to below the relevant legislative screening criteria. The overall impact is anticipated to be **direct, negative, imperceptible, and temporary**.

## 7.5.2 Development Decommissioning and Restoration Phase/s

### 7.5.2.1 Decommissioning of Infrastructure

In regard to cable ducting, for the Grid Connection route, cable joint bays will be left in-situ and cabling will be left in situ as they will be an ESNB asset.

This is considered a **direct, neutral** effect of the Development, which contrasts to the baseline conditions.

## 7.6 STATEMENT OF SIGNIFICANCE

This Appendix comprehensively assesses Grid connection route Option 2 GCR. The significant potential effects that could specifically arise from the Grid connection route Option 2 GCR during the construction of infrastructure elements including the excavation activities associated with cable trenches and works in close proximity to surface water or drainage network including watercourse crossings and culverts. Decommissioning and restoration phase effects and mitigation are similar to the construction phase and have been encompassed as such.

Elements of the construction and operation of the GCR that may potentially impact on the hydrogeological and water environment receptors have been identified and their pathways for impacts have been assessed.

Implementation of the control measures outlined in the EIAR will result in a robust environmental management plan which will target and mitigate likely sources and pathways of contaminant arising along the alternative GCR. The Option 2 GCR is not likely to significantly affect groundwater quantities, quality or availability.

Table 7.6: Summary of Potential Effects on Receiving Environment from the Development in the Absence of and with Mitigation Measures.

|                                       |              | Qualifying Criteria Pre-Mitigation |         |                   |                         |                                  |                                                               |             |                      |                      | Qualifying Criteria With Mitigation |                   |
|---------------------------------------|--------------|------------------------------------|---------|-------------------|-------------------------|----------------------------------|---------------------------------------------------------------|-------------|----------------------|----------------------|-------------------------------------|-------------------|
| Effect / Impact Description           | Phase        | Type                               | Quality | Scale             | Significance            | Extent                           | Context                                                       | Probability | Duration / Frequency | Mitigation Applied   | Quality                             | Significance      |
| Increased Runoff                      | Construction | Direct and Indirect *              | Adverse | Large             | Moderate to Significant | Development Footprint, Localised | Conforms to baseline e.g. forestry operations)                | Unavoidable | Temporary            | Yes; Section 9.4.1.1 | Adverse                             | Neutral to Slight |
| Release of Suspended Solids           | Construction | Direct and Indirect *              | Adverse | Small to Moderate | Moderate to Profound    | Localised (Potentially Regional) | Conforms to baseline e.g. forestry operations)                | Unavoidable | Temporary            | Yes; Section 9.4.1.1 | Adverse                             | Neutral to Slight |
| Watercourse Crossings - Mapped Rivers | Construction | Direct and Indirect *              | Adverse | Small to Moderate | Moderate to Profound    | Localised (Potentially Regional) | Conforms to Baseline e.g. existing bridges and roads in area. | Unavoidable | Permanent            | Yes; Section 9.4.1.2 | Adverse                             | Slight            |

## 8 NOISE

### 8.1 ASSESSMENT OF POTENTIAL EFFECTS

**Table 8.1** indicates typical construction related noise levels for this type of Development activity. Predictions are made for the nearest receptor to the Development and receptors at varying distances from the Option 2 GCR.

**Table 8.1: Typical Noise Levels from Construction Works**

| Activity                                                                                                  | L <sub>Aeq</sub> at 10m |
|-----------------------------------------------------------------------------------------------------------|-------------------------|
| Grid Connection: Trenching<br><br>Tracked excavator 14t, pneumatic breaker, vibratory roller 71t, tractor | 70-74dBA                |
| Horizontal directional drilling: Drill Rig (diesel), mud pump, diesel generator /tractor                  | 69-71dBA*               |

\*Recent measurements (2022) taken by author of HDD

The difference in noise levels between two locations can be calculated as:

$$L_{p2} - L_{p1} = 10 \log (R_2 / R_1)^2 - (A_{atm} + A_{gr} + A_{br} + A_{mis})$$

$$= 20 \log (R_2 / R_1) - (A_{atm} + A_{gr} + A_{br} + A_{mis})$$

where:

L<sub>p1</sub> = sound pressure level at location 1

L<sub>p2</sub> = sound pressure level at location 2

R<sub>1</sub> = distance from source to location 1

R<sub>2</sub> = distance from source to location 2

and where:

A<sub>atm</sub> = Attenuation due to air absorption

A<sub>gr</sub> = Attenuation due to ground absorption

A<sub>br</sub> = Attenuation provided by a barrier

A<sub>mis</sub> = Attenuation provided by miscellaneous other effects

In the calculations attenuation by A<sub>atm</sub>, A<sub>gr</sub> and A<sub>mis</sub> is taken as 3dBA where distances are more than 200m from a source and as zero within 200m -amelioration by barriers is not accounted for.

**Table 8.2** gives the noise levels predicted from construction activity at varying distances. The main noise sources are assumed to be the construction of the Turbine Foundations, Turbine

Hardstands, Grid Connection. The construction of the site access tracks, the new Electrical Substation, however the noise levels associated with this activity will be lower and of shorter duration than other works. The main road traffic noise will be associated with the delivery of ready-mix concrete for Turbine Foundations.

Road traffic is dealt with under a sub-heading within this section.

The maximum construction noise levels associated with the Development and Grid Connection are listed in **Table 8.2**. At receptor locations further away, noise levels will be less than that predicted. Works associated with Decommissioning will be no more than the levels predicted in **Table 8.2**.

**Table 8.2: Predicted Construction Noise Levels**

| Receptor                                                     | Activity taken as 100% per hour                                               | Distance of Activity (m) | LAeq dB 1hr range                                |
|--------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------|--------------------------------------------------|
| Grid Connection: Trenching<br>Receptors at varying distances | Tracked excavator 14t,<br>pneumatic breaker, vibratory<br>roller 71t, tractor | 15m<br>20m<br>40m<br>80m | 67.5-70.5dBA<br>65-68dBA<br>59-62dBA<br>53-56dBA |

Cable laying and trenching will move along the grid route from the Electrical Substation to the national grid at Moneypoint 400KV which means maximum levels will pertain no more than one day equivalent (8 hours) at any single receptor. The construction of the Option 2 GCR would be completed in approximately 24weeks. This work will generate a maximum of 12 HGV trips and 5 LGV on a daily basis for the duration of the UGC works. In terms of trenching and trucking the noise generated by this temporary activity is insignificant.

Construction noise levels are based on continuous operation. In practice, most plant will operate at a maximum level for short intervals. If required, an acoustic barrier can be provided which can be placed close to the source giving maximum attenuation (refer to BS 5228 for guidance on screening / barrier effects). When a noise source is completely obscured from a receptor by an acoustic barrier a minimum 10dBA reduction is obtained.

#### 8.1.1 Assessment of Construction Noise

The highest predicted noise levels are from the Grid Connection and delivery of concrete for Turbine Foundations. These maximum noise levels are expected to persist for no more than

3 days at any receptor. All predicted noise levels are well within NRA guidelines given as acceptable and are considered slight. Construction noise is a temporary activity.

All other identified activities will have lower noise levels.

Ground vibration from rock breaking will be below the threshold of sensitivity to humans of 0.2mm/s peak particle velocity at all receptors<sup>4</sup>. The effects of noise and vibration from onsite construction activities are therefore considered not significant.

### 8.1.2 Description of Effects

The criteria for description of effects for all construction noise activity and the potential worst-case effects, at the nearest receptors is given below.

| Quality  | Significance    | Duration  |
|----------|-----------------|-----------|
| Negative | Not Significant | Temporary |

## 8.2 MITIGATION MEASURES AND RESIDUAL EFFECTS

See **EIAR Chapter 10: Noise – Section 10.5 Mitigation Measures and Residual Effect.**

## 8.3 CUMULATIVE EFFECTS

The cumulative effects of the proposed Sceirde Rocks grid connection has been assessed and found to be not significant. There are no potential cumulative effects of the Option 2 GCR in terms of noise.

## 8.4 STATEMENT OF SIGNIFICANCE

The noise levels predicted from Option 2 GCR at the nearest receptors are orders of magnitude below the level at which risk of hearing damage, or indeed negative health effects are possible.

Noise during construction and Decommissioning of the Development will be managed to comply with current best practice, legislation and guidelines so that effects are not significant.

<sup>4</sup> Wiss, J. F., and Parmelee, R. A. (1974) Human Perception of Transient Vibrations, "Journal of Structural Division", ASCE, Vol 100, No. S74, PP. 773-787

## **9 LANDSCAPE & VISUAL AMENITY**

### **9.1 BASELINE**

The Wind Energy Development Guidelines (2006) provide guidance on wind farm siting and design criteria for a number of different landscape types. The site of the proposed Development is considered to be located within a relatively complex landscape setting that is more consistent with the 'Hilly and Flat Farmland' landscape type than other landscape types from the Wind Energy Development Guidelines.

### **9.2 ASSESSMENT OF POTENTIAL EFFECTS**

This assessment provides the likely and significant effects (positive and negative) of the Option 2 GCR.

The physical impact of this will equate to a modest, relatively narrow trench that will then be fully infilled to pre-existing surface levels.

As the construction stage of the Development is estimated to take approximately 24 weeks, construction-stage effects are considered short-term, by the EPA Guidance terms (i.e., effects lasting from one to seven years).

In respect of the Wind Energy Guidelines (2006), the Option 2 GCR layout of the proposed Development is in keeping with that recommended for "Hilly and Flat Farmland" landscape type.

In summary, the magnitude of construction-stage effects on the physical landscape of the Site are deemed to be High-medium, with a Negative quality of effect and short-term in duration.

### **9.3 CUMULATIVE EFFECTS**

### **9.4 MITIGATION MEASURES & RESIDUAL EFFECT**

Outside of those landscape and visual mitigation measures that formed part of the iterative design process for the proposed Moanmore Lower Wind Farm over a number of years, and which are embedded in the assessed Project, other specific landscape and visual mitigation measures are not considered necessary / likely to be effective.

### **9.5 STATEMENT OF SIGNIFICANCE**

Based on the landscape, visual and cumulative assessment contained herein, it is considered that there will not be any significant effects arising from the proposed Development.

## 10 AIR AND CLIMATE

### 10.1 BASELINE

#### 10.1.1 Existing Air Quality Conditions

Generally, Ireland is recognised as having some of the best air quality in Europe. However, from time to time, and under certain weather conditions, it is possible to experience some air pollution in the larger towns and cities. The most recent published report on air quality in Ireland is the 'Air Quality in Ireland 2022' report published by the EPA in 2023<sup>5</sup>. This report provides an overview of the ambient air quality in Ireland in 2022. The measured concentrations are compared with both EU legislative standards and WHO air quality guidelines<sup>6</sup> for a range of air pollutants. The closest monitoring site (National Network) to the Development within the same air quality zone is Askeaton, Co. Limerick. Askeaton monitoring site is located approx. 36.7km southeast of the Site. Results from the monitoring campaign during 2022 show:

- No levels above the EU limit value (in **EIAR Table 12.1**) were recorded at any of the ambient air quality network monitoring sites in Ireland in 2022.
- WHO guideline values were exceeded at a number of monitoring sites for fine particulate matter (PM<sub>2.5</sub>) and (PM<sub>10</sub>), ozone (O<sub>3</sub>), NO<sub>2</sub>. WHO guideline values for Sulphur dioxide (SO<sub>2</sub>) were exceeded at one monitoring station.
- Askeaton exceeded WHO 24-hour mean guideline (15µg/m<sup>3</sup> 24-hour mean) for (PM<sub>2.5</sub>) on 16 occasions in 2022 and exceeded the annual mean (5µg/m<sup>3</sup>) guideline with a mean of (5.5µg/m<sup>3</sup>) for 2022. Askeaton did not exceed any WHO guidelines for any other parameter in 2022.
- The annual mean PM<sub>10</sub> and PM<sub>2.5</sub> levels for Askeaton were (9.4 µg/m<sup>3</sup>) and (5.5 µg/m<sup>3</sup>) respectively. These values are below the limit values set out by Directive 2008/50/EC as per **EIAR Table 12.1**.

### 10.2 ASSESSMENT OF POTENTIAL EFFECTS

#### **Dust Emissions**

The main potential source of effects on air quality during construction is dust. There is potential for the generation of dust from excavations and from construction including construction of the trench for the cable ducting for the Grid Connection.

<sup>5</sup>chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.ie/publications/monitoring--assessment/air/Air\_Quality\_Report\_22\_v8v2.pdf [Accessed 19/09/2024]

<sup>6</sup> [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) [Accessed 19/09/2024]

The potential nuisance issues arising from this are dependent on the terrain, weather conditions, (i.e., dry and windy conditions), and the proximity of receptors. Potentially dust generating activities are as follows:

- Earth moving and excavation plant and equipment for handling and storage of soils and subsoils.
- Vehicle movements over dry surfaces such as Site access tracks and public roads.

The potential effect from dust becoming friable and a nuisance to workers and local road users, if unmitigated, is considered, a slight, negative, short-term, direct effect during the construction phase.

If unmitigated, there would also be dust deposition arising from mud on public roads, resulting from traffic leaving the construction Site. Effects from dust deposition at sensitive receptors would give rise to nuisance issues for residents of those properties. The effect would be short-term, temporary and slight negative impact on sensitive receptors.

### **Exhaust Emissions**

Emissions from plant and machinery, including trucks, during the construction of the Development are a potential effect. The engines of these machines produce emissions such as carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

Particulate matter ("PM") less than ten micrometres in size (PM<sub>10</sub>) can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders. PM<sub>10</sub> arises from direct emissions of primary particulate such as black smoke and formation of secondary particulate matter in the atmosphere by reactions of gases such as sulphur dioxide (SO<sub>2</sub>) and ammonia (NH<sub>3</sub>). The main sources of primary PM<sub>10</sub> are incomplete burning of fossil fuels such as coal, oil and peat and emissions from road traffic, in particular diesel engines. Other sources of particulates include re-suspended dust from roads. Natural particulate matter includes sea-salt and organic materials such as pollens.

Nitrogen oxides (NO<sub>x</sub>), include the two pollutants, nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). Anthropogenic (human) activities such as power-generation plants and motor vehicles are the principal sources of nitrogen oxides through high temperature combustion. Nitrogen oxides are an important air pollutant by themselves but can also react in the atmosphere to contribute to the formation of tropospheric ozone (ozone in the air we breathe) and acid rain. Short-term exposure to nitrogen dioxide is associated with reduced lung function and airway

responsiveness, and increased reactivity to natural allergens. Long-term exposure is associated with increased risk of respiratory infection in children.

The construction phase is likely to result in an increase in exhaust emission from construction vehicles and transport vehicles associated with the site works. The impact on air quality from an increase in exhaust emissions will be a short-term, slight negative effect.

### 10.3 CUMULATIVE EFFECTS

Potential cumulative effects on the climate between the Project and other developments in the vicinity were also considered as part of this assessment. The other developments considered as part of the cumulative effects assessment are described in **Moanmore Lower Wind Farm EIAR - Appendix 1.2.** and in **Moanmore Lower Wind Farm EIAR - Chapter 2, Table 2.2 in Section 2.3.4.**

During the construction phase of the Project and other consented developments within 20 kilometres that are yet to be constructed, there will be minor exhaust emissions from construction plant and machinery and dust emissions from construction activities. In a worst-case scenario if any of these developments were constructed at the same time as the Project in Moanmore, there would be short-term slight negative cumulative impact on climate due to exhaust and dust emissions.

### 10.4 MITIGATION MEASURES & RESIDUAL EFFECT

See **EIAR Chapter 12: Air and Climate – Section 12.2.8 and 12.3.7.**

### 10.5 STATEMENT OF SIGNIFICANCE

The Development has been assessed as having no significant direct or indirect effects on air quality or the climate during the construction or operation phases of the Option 2 GCR.

## 11 CULTURAL HERITAGE

### 11.1 BASELINE

A review of a 100m wide corridor centred on the Option 2 GCR revealed that this corridor contains four recorded archaeological sites and each of these have been classified as 'redundant records' by the Archaeological Survey of Ireland see Table 11.1 and Figure 11.1). Three of these 'redundant records' relate to quern stones (CL057-072----, CL067-074---- and CL067-075----) that have incorporated into modern structures within private residences set back from the roadside. The other entry relates to a modern golf course feature that does not comprise an archaeological site (CL057-061----). There are no Protected Structures or other structures listed in the National Inventory of Architectural Heritage located within the 100m wide corridor centred on the route. Details and mapping for each of the identified constraints within the environs of the Grid Connection route, including available published inventory entries, are presented below.

A review of the Database of Irish Excavation Reports revealed that it does not contain any entries for archaeological investigations carried out within the environs of the Option 2 GCR.

A review of the first edition 6-inch Ordnance Survey (OS) map of 1842 revealed that the existing road network that the Grid Connection route option follows was present by the middle of the 19<sup>th</sup> century. This cartographic source shows a dispersed settlement pattern along the roadsides which generally appear to comprise small farm buildings. There are bridge crossings over two watercourses along the Grid Connection route option depicted on the 6-inch OS map and the existing masonry bridges at these locations are not listed as Protected Structures or included in the National Inventory of Architectural Heritage. The bridges have also not been included in a Clare County Council survey of bridges of architectural, social or technical merit within the county (available at [www.heritagemaps.ie](http://www.heritagemaps.ie)). The proposed Grid Connection methodology at these two locations will comprise cable ducts laid within the road carriageway and will not require works within the watercourses or any interventions to the fabric of the bridge structures.

**Table 11.1: Archaeological sites within 100m corridor centred on Options 2 GCR**

| Designation   | Name/Class       | Townland       | Archaeological Survey of Ireland Description                                                                                                                                                                                                                                                                                                                                                           | Observations                                                                                                                              |
|---------------|------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| CL057-072---- | Redundant Record | BREAGHVA       | A quernstone, inscribed with the date 1810, found in the yard of a farmhouse, near a rath (CL057-038----) c. 120m to the NNW. This is an archaeological object.                                                                                                                                                                                                                                        | Located within farmyard set back from the roadside.                                                                                       |
| CL057-061---- | Redundant Record | PARKNAMONEY    | Listed as 'Potential site – aerial photo' in the SMR (1992) and the RMP (1996). Although not indicated on any OS map a small oval feature (c. 15m E-W; c. 10 N-S) was visible on an aerial photograph (OS 4/2674). On inspection in 2002 this was found to be a golf green. Several other identical features are visible in the same field on the OS ortho photography (2005), accessed 11 March 2015. | This comprises a modern golf course feature                                                                                               |
| CL067-074---- | Redundant Record | CLOONEYLISSAUN | Not listed in the SMR (1992) or in the RMP (1996). This record was created for 5 quern stones noted in the newly built boundary wall of a house. These are archaeological objects.                                                                                                                                                                                                                     | The quern stones are located within a boundary wall adjacent to the west side of the roadside that does not extend into the road corridor |
| CL067-075---- | Redundant Record | DYSERT         | Not listed in the SMR (1992) or in the RMP (1996). This record was created for 2 quern stones noted in the boundary wall of a house. These are archaeological objects.                                                                                                                                                                                                                                 | The quern stones are located within a boundary wall adjacent to the west side of the roadside that does not extend into the road corridor |



**Figure 11.1:** Archaeological sites within environs of Moneypoint grid connection route options

## 11.2 IMPACT ASSESSMENT

There are four recorded archaeological sites within a 100m wide corridor centred on the Grid Connection route options to Moneypoint 400kV Substation and each of these have been designated as redundant records by the Archaeological Survey of Ireland. Three of these 'redundant records' relate to quern stones located within private properties adjacent to the road while the other comprises a modern golf course feature (Table 11.1). The excavation of the cable trench within the road network will have no predicted direct or indirect effects on these 'redundant record' sites. There are two undesignated historic masonry bridge located within the public road network that the route follows. The proposed Option 2 GCR methodology at both bridges will comprise the cable duct being laid within the road carriageway and this will not require any works to the bridge structures. In addition, the Option 2 GCR will not require any works within any other watercourses and will not have the potential to impact on any potential underwater archaeological remains that may exist within their channels. The construction of this Option 2 GCR would, therefore, not result in any predicted effects on any known cultural heritage constraints.

## 11.3 STATEMENT OF SIGNIFICANCE

The Development has been assessed as having no significant direct effects on any known cultural heritage constraints during the construction or operation phases of the Option 2 GCR.

## 12 MATERIAL ASSETS INCL. ROADS

Grid Option to Moneypoint:

- **Option 2 GCR:** The on-site substation will connect via 2 no. 20kV underground cables to the existing Moneypoint 400kV substation. The approximate length of this grid connection route is 10.2km. The connection method for this option would be an MV connection to Moneypoint via a new 110/MV transformer. The new transformer can likely be connected within the existing Moneypoint facility.

The Grid Connection option will be located entirely along public roads/verges, and constructed and installed according to the requirements and specifications of EirGrid and ESB Networks.

BFA Consulting undertook a grid study in July 2024. This found that the most likely connection method for the proposed Moanmore Lower wind farm appears to be an underground cable connection to the Tullabrack 110kV substation. The report also identified that an alternative connection point could be a MV connection to Moneypoint 400kV substation. EirGrid confirmed in a customer clinic that there is a spare 110kV bay in Moneypoint for the connection of new generation.

### 12.1 ASSESSMENT OF POTENTIAL EFFECTS

#### 12.1.1 Landuse – Agriculture

The construction of the Option 2 GCR will require relatively localised excavation and enabling works within the curtilage of the public road network, with no excavation or enabling works envisaged in private lands. Full reinstatement will occur where such excavation or enabling works are undertaken.

#### 12.1.2 Landuse – Forestry

The construction of the Option 2 GCR will require relatively localised excavation and enabling works within the curtilage of the public road network. There is no loss of forestry associated with the grid route works.

#### 12.1.3 Telecommunications

The construction of the Option 2 GCR will require relatively localised excavation and enabling works within the curtilage of the public road network. There will be no impact to telecommunication links.

#### 12.1.4 Electricity Networks

This section describes the transmission network and the anticipated connection option. It is not proposed to utilise any elements of the distribution network.

The nationwide electricity transmission system allows for the transport of large volumes of electricity from generation stations, including wind farms, to bulk supply points near the main population centres where it interconnects with the distribution system.

Option 2 GCR will be located entirely along public roads/verges, and constructed and installed according to the requirements and specifications of EirGrid and ESB Networks.

Due to the fact that all on-site internal cabling will be underground as will the Grid Connection from the onsite substation to the Moneypoint 400kV substation, there will be no impact on the existing overhead electricity network.

The Development will contribute directly and in the long term to the electricity network by strengthening it through additional renewable energy generation.

If connected to the Moneypoint 400kV substation, the underground cable is likely to connect via a new transformer within the confines of the Moneypoint facility and thus will have a slight, positive short-term effect in terms of upgrading of critical infrastructure.

#### 12.1.5 Air Navigation

The construction of the Option 2 GCR will require relatively localised excavation and enabling works within the curtilage of the public road network. There will be no impact to air navigation from Options 2 GCR.

#### 12.1.6 Quarries

The crushed stone for construction of the Option 2 GCR will come from licenced quarries in the locality such as:

- Whelans Limestone Quarries Ltd, Tullagower
- Derrynalecka Quarry, Derrynalecka
- Glenmore Quarry, Glenmore
- Hehir Quarry, Bollyneaska
- Letterkelly Quarry, Letterkelly
- Liscormick Quarry, Liscormick
- Nagle Stone Quarry, Liscannor
- Luogh and Lisacannor Stone Company Ltd. Luogh Quarry, Doolin

- Ryans Quarry (Roadstone Ltd), Ennis
- Bunratty Quarry (Roadstone Ltd), Bunratty
- Bobby O'Connell and Sons Ltd Ballycar Quarry, Ardnacrusha
- Esker Readymix, Athenry

The use of imported material will have a slight, permanent negative effect on non-renewable resources of the area as a result of denudation of existing natural resource reserves for other economic activities. This effect is considered to be imperceptible in the long-term.

### 12.1.7 Utilities

Gas Networks Ireland have responded to a consultation request illustrating there are no existing services along the Option 2 GCR.

BFA Consulting survey of the Option 2 GCR, reviewed the locations of existing services and separation distances were identified see **Moanmore Lower Wind Farm – Appendix 2.2.**

### 12.1.8 Waste

#### ***Excavated Materials***

An estimated 7,466m<sup>3</sup> of material will be excavated along the Option 2 GCR and will be transported by an authorised waste permit holder to a local licensed waste disposal facility. The effects of this are not likely to be significant however there will be a slight to moderate effect in terms of waste material volume generated and the need to send this material for suitable disposal at a waste reception facility licenced for disposal of hazardous bituminous materials.

## 12.2 CUMULATIVE EFFECTS

### 12.2.1 Landuse – Agriculture

Due to the localised nature of the proposed construction works, there is no potential for significant cumulative effects in-combination with other local developments on the agricultural land use as all effects are directly within the public road.

There will be no cumulative effects relating to the proposed Option 2 GCR and surrounding projects in relation to Landuse - Agriculture during the construction, or operation phases.

### 12.2.2 Landuse – Forestry

Due to the localised nature of the proposed construction works which will be kept within the proposed grid route options (public roads) there is no potential for significant cumulative effects in-combination with other local developments on commercial forestry.

There will be no cumulative effects relating to the proposed Option 2 GCR and surrounding projects in relation to Landuse-Forestry during the construction, operation or decommissioning phase.

#### **12.2.3 Telecommunications**

There will be no cumulative effects relating to the Option 2 GCR and surrounding projects in relation to telecommunications during the construction, or operational phases.

#### **12.2.4 Electricity Networks**

There will be no cumulative effects relating to the proposed Option 2 GCR and surrounding projects in relation to existing electricity transmission networks during the construction or operational phases.

#### **12.2.5 Air Navigation**

There will be no cumulative effects relating to the proposed Option 2 GCR and surrounding projects in relation to air navigation during the construction or, operational phases.

#### **12.2.6 Quarries**

The very nature of a quarry is that it will be subjected to cumulative effects as it is the source of stone for almost all developments in the area.

Therefore, there will be cumulative effects relating to the Development and surrounding projects in relation to quarries during the construction phase. This will primarily be in the form of depletion of existing natural resource reserves in the locality.

Potential negative cumulative effects on quarries are none / imperceptible during the operational and Decommissioning phases and a potential positive economic effect on local quarries during the construction stage.

#### **12.2.7 Waste**

There will be no cumulative effects relating to the proposed grid route options and surrounding projects in relation to waste during the construction, operation or decommissioning phase.

### **12.3 MITIGATION MEASURES & RESIDUAL EFFECT**

See **EIAR Chapter 15 Material Assets** – Section 15.9.4 and 15.10.6.

#### 12.4 STATEMENT OF SIGNIFICANCE

The Development of Option 2 GCR, if considered has been assessed as having no significant direct effects on any known material assets during the construction and operation phase of the Development.

## 13 TRAFFIC AND TRANSPORT

### 13.1 BASELINE DESCRIPTION

#### 13.1.1 Sensitive Receptors

The construction of the underground Option 2 GCR will require works to be carried out on the public road network which may impact on sensitive receptors listed in **Table 13.2**. The works on the public road network and their potential impact on sensitive receptors are listed in **Table 13.1**. Daily volumes of HGV and LGV traffic generated by the construction of Option 2 GCR are outlined in **Table 13.3**. The construction of the UGC will generate a maximum of 12 HGV trips and 5 LGV on a daily basis for the duration of the UGC works. Traffic volumes associated UGC works will be distributed throughout the day corresponding with the removal of excavated material from trenches during the morning period, deliveries of materials throughout the day and trench reinstatement during the afternoon.

**Table 13.1: Works Location and Potential Impact on Sensitive Receptors**

| Construction Activity                                                                          | Potential impact on Sensitive Receptors | Impact of works on Sensitive Receptors and Public Road Users                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction of alternative 20kV Grid Connection between Site and Moneypoint 400kV Substation. | Medium Impact / Medium Term             | Increased journey times due to traffic management and traffic diversions over a 24 week period during which traffic management measures will be in place. Local access to be maintained for local residents and farmers in area.<br>Increased Noise and vibration due to construction works involving saw cutting, excavation, trench reinstatement and surfacing. |

**Table 13.2: Sensitive Receptors**

| Receptor                                                                                                          | Sensitivity | Reason for Inclusion                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hospitals, Medical Centres                                                                                        | High        | Medical centres are likely to be highly sensitive to changes in traffic density, noise and vibration from HGVs and construction activities.<br>Access will be required at all times for general and emergency access                                                                                                                                                      |
| Private dwellings located along the Turbine Delivery Route the construction haul route and Grid Connection route. | High        | There are numerous residential properties which front directly on to the Option GCR 2. Residents of these properties are likely to require unrestricted access to the roads in order to access their place of employment and/or local services. These properties are also likely to be highly sensitive to changes in traffic density, noise and vibration from HGVs etc. |
| Care Homes                                                                                                        | High        | Care Homes are likely to be highly sensitive to changes in traffic density, noise and vibration from HGVs and construction activities.<br>Access will be required at all times for general and emergency access                                                                                                                                                           |

| Receptor             | Sensitivity | Reason for Inclusion                                                                                                                                                                            |
|----------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Schools              | High        | Schools are likely to be highly sensitive to changes in traffic density, noise and vibration from HGVs and construction activities during school hours.<br>Access will be required at all times |
| Churches             | Moderate    | Churches are likely to be sensitive to noise and vibration from HGVs and construction activities during church services.<br>Access will be required at all times.                               |
| Hotels and B&B's     | Moderate    | Hotels and B&Bs are likely to be sensitive to noise and vibration from HGVs and construction activities.<br>Access will be required at all times.                                               |
| Businesses and Shops | Moderate    | Businesses and Shops are likely to be sensitive to noise and vibration from HGVs and disruption from construction activities during business hours.<br>Access will be required at all times.    |
| Farms                | Low         | Farm operations may be sensitive to noise and disruption from construction activities                                                                                                           |
| Public Amenities     | Low         | Entrance to public amenities may be sensitive to disruption from construction activities                                                                                                        |

It is estimated that during the construction of Option 2 GCR approximately 1,224 loads of material (concrete, stone, tarmac, cables, spoil) will be delivered and removed from the Site respectively. The movements and timelines associated with the grid connection works are outlined in **Table 13.3**.

**Table 13.3: Grid Connection Traffic Volumes - HGV Trips**

| Materials                      | Quantity | No. Of Deliveries | Timeframe (Week) | Maximum Loads / Day | Vehicle Type |
|--------------------------------|----------|-------------------|------------------|---------------------|--------------|
| Grid Connection works Option 2 | 10.2km   | 1,224             | 12-24            | 12                  | OGV1 / OGV2  |

## 13.2 ASSESSMENT OF POTENTIAL EFFECTS

### 13.2.1 Works on the Grid Connection

The construction of the grid connection will be carried out under a number of phased operations which will involve traffic management. The first phase of the works will involve the excavation of a 0.6m wide cable trench, construction of 1.6m wide x 2.9m long joint bays, installation of cable ducting, backfilling of trench and temporary reinstatement of road surfacing. The second phase of the works will involve installing the electrical cable in the ducting. During the cable installation traffic management will be required at the joint bays to allow cable pulling and jointing. The final phase of the works will involve permanent reinstatement of the road surfacing and surface dressing. The phased works will require traffic management to be removed and reinstalled a number of times over the course of the project. The works will be carried out under a road opening licence and under a Traffic Management Plan (TMP) approved by Clare County Council. A TMP has been prepared for

the Moanmore Lower wind farm development and is submitted with this application (see **EIAR Appendix 16.2**). These works have the potential for a slight, negative, temporary effect on residents, businesses and road users due to increased noise and vibration resulting from construction activities and increased journey times and delays due to temporary traffic management.

However, these effects will be confined to a relatively short 24week period during the construction phase of the Option 2 GCR and hence are not predicted to have a significant effect. The trenches and joint bays will be reinstated in accordance with the “Guidelines for Managing Openings in Public Roads”, 2017 and to requirements of Clare County Council, as may be set out in the road opening license.

### **13.3 MITIGATION MEASURES & RESIDUAL EFFECT**

See **EIAR Chapter 16: Traffic and Transport – Section 16.4**.

### **13.4 CUMALATIVE EFFECTS**

The cumulative effects of the traffic associated with the construction of the Option 2 GCR when combined with unrelated planned and proposed developments in the area (including Sceirde Rocks grid connection) will be similar to the cumulative effects of traffic generated by the construction of Option 1 GCR between Tullabrack Substation to Moanmore Lower Wind Farm. The cumulative effects of Option 1 GCR have been assessed in **EIAR Chapter 16: Traffic and Transport – Section 16.5**.

### **13.5 STATEMENT OF SIGNIFICANCE**

This assessment has identified no potentially significant effects, given the mitigation measures embedded in the design and recommended for the implementation of the Development.