



Cush Wind Farm

# Environmental Impact Assessment Report

## Annex 1.1: Scoping Report

Cush Wind Limited

Galetech Energy Services  
Clondargan, Stradone, Co. Cavan Ireland  
Telephone +353 49 555 5050  
[www.galetechenergy.com](http://www.galetechenergy.com)



## DOCUMENT CONTROL

	Function	Name
Content	Planning Team	Various
Approval	Planning Manager	Gavin Daly

## RECORD OF CHANGES

Revision Number	Issue Date	Summary of change	Approved
00	29/07/2022	Content	Planning Team
01	26/01/2023	Update	Planning Team
02	14/08/2023	Update	Planning Team

## DISTRIBUTION LIST

#	Function Title	Company	Name (optional)
1	For Client Information	Cush Wind Limited	
2			
3			
Notes:			



# Contents

<b>1.0</b>	<b>Introduction</b> .....	<b>1</b>
1.1	The Applicant.....	1
1.1	Purpose of this Report .....	2
<b>2.0</b>	<b>Environmental Impact Assessment</b> .....	<b>2</b>
2.1	What is EIA? .....	2
2.2	EIA Screening.....	2
2.3	What is an EIAR? .....	2
2.4	Purpose of the EIAR .....	3
2.5	EIAR Methodology.....	3
2.6	Content and Structure of the EIAR.....	4
2.7	Format of the EIAR.....	5
2.8	Contributors to the EIAR .....	7
<b>3.0</b>	<b>Consultation</b> .....	<b>7</b>
3.1	Stakeholder Consultation .....	7
3.2	Community Consultation .....	9
<b>4.0</b>	<b>Description of the Proposed Development</b> .....	<b>9</b>
3.1	Wind Turbines.....	10
3.2	Turbine Foundations .....	10
3.3	Hardstandings.....	11
3.4	On-Site Access Tracks .....	11
3.5	Internal Wind Farm Cabling.....	11
3.6	Meteorological Mast.....	11
3.7	Turbine Component Haul Route .....	11
3.8	Grid Connection Route Options .....	12
<b>4.0</b>	<b>Scope of the EIAR</b> .....	<b>12</b>
4.1	Project Alternatives .....	12
4.2	Population & Human Health.....	13
4.3	Biodiversity.....	15
4.4	Land & Soil.....	15
4.5	Water .....	16
4.6	Air & Climate.....	17
4.7	Landscape .....	17



4.8	Cultural Heritage .....	18
4.9	Noise & Vibration .....	18
4.10	Shadow Flicker .....	18
4.11	Material Assets .....	19
<b>5.0</b>	<b>Cumulative Assessment .....</b>	<b>23</b>
<b>6.0</b>	<b>Appropriate Assessment .....</b>	<b>23</b>





managing and coordinating EIAR projects for wind energy and associated electricity grid and substation developments.

## 1.1 Purpose of this Report

The purpose of the Environmental Impact Assessment (EIA) scoping process is to identify key environmental elements which are likely to be important during the EIA process and to eliminate those which are not from further assessment. The scoping process identifies sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the Environmental Impact Assessment Report (EIAR). In essence, the primary focus of scoping is to define the most appropriate assessment of likely significant effects related to the proposed development.

The aims of this document are to:-

- set out the overall approach to the preparation of the EIAR;
- describe the proposed content and structure of the EIAR;
- summarise key baseline information;
- describe the proposed assessment methodology;
- identify potential effects at all stages of the proposed development; and
- identify topics/factors which do not require further assessment and can be scoped out.

## 2.0 Environmental Impact Assessment

### 2.1 What is EIA?

EIA is a process required by the European Union (EU) Environmental Impact Assessment Directive 2011/92/EU, as amended by 2014/52/EU, and transposed into Irish law by way of Part X of the Planning & Development Act 2000 (as amended).

EIA is carried out by the relevant competent authority to ensure that projects, where the likelihood of significant effects on the environment cannot be excluded, are subject to a comprehensive and independent examination, analysis and evaluation of their likely significant effects on the environment; including the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects; of both their construction and operational phases, prior to being granted planning permission.

### 2.2 EIA Screening

In accordance with the provisions of the Planning & Development Act 2000 (as amended), EIA is mandatory when certain classes of projects exceed specific sizes and thresholds. Planning applications for such projects must be accompanied by an EIAR. Schedule 5 of the Planning and Development Regulations 2001 (as amended) provides that the following class of development proposal shall be subject to EIA:-

*“Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts”*

The proposed development consists of 7 no. wind turbines, and ancillary infrastructure, and is therefore of a scale which exceeds the mandatory threshold for EIA and, consequently, an EIAR will be prepared and submitted with the planning application.

### 2.3 What is an EIAR?

An EIAR is a written statement prepared by the developer (in this case, CWL) of the likely significant effects, if any, which the proposed development, if carried out, will

have on the environment. The EIAR consists of a systematic analysis of the proposed development, including its construction, operational and decommissioning phases, in relation to the existing environment. It is an iterative process carried out throughout the full lifecycle of the project design and consenting process so as to allow for preventative and ameliorative action, as necessary, at a point in time when changes can still be made to the project that anticipate, avoid and mitigate any likely significant effects foreseen.

The EIAR is the principal document that informs the EIA process and provides integral information which a consenting authority can use; amongst other considerations, including, where appropriate, its own supplementary assessments; in independently undertaking EIA and informing its decision to grant (including subject to conditions and/or modifications) or to refuse planning permission, and/or to seek further information from CWL.

The EIAR can also be used by third parties, including members of the public concerned, as part of the public participation process, to evaluate the proposed development and its likely significant environmental effects, and to inform any submissions made to the planning application process.

The EIAR will be prepared in accordance with the provisions contained within Schedule 6 of the Planning and Development Regulations 2001, as amended, which sets out the information to be contained in an EIAR. In addition, the EIAR will take account of the contents of Directive 2014/52/EU (the 2014 EIA Directive), which was adopted in the EU on 16th April 2014, amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The 2014 EIA Directive was transposed into Irish planning law from the 1 September 2018 via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

## 2.4 Purpose of the EIAR

The purpose of the EIAR is to inform decision making processes. The EIAR provides for a system of sharing information about the environment, within which a proposed development sits, and enables effects to be foreseen and prevented during the design and consent stages. The purpose of the EIAR is to:-

- Anticipate, avoid and reduce significant effects;
- Assess and mitigate effects;
- Maintain objectivity;
- Ensure clarity and quality;
- Provide relevant information to decision makers; and
- Facilitate better consultation.

It is a statutory requirement that the EIAR pays particular regard to the:-

- Key alternatives;
- Proposed project;
- Receiving environment;
- Likely significant effects;
- Mitigation and monitoring measures; and
- Residual effects.

A non-technical summary must also be provided.

## 2.5 EIAR Methodology

The EPA has published a set of revised '*Guidelines on the Information to be contained*

within an EIAR' and these guidelines have been updated to reflect the 2014 EIA Directive and the provisions contained therein. The guidelines have been published (May, 2022) and provide an update on the previous guidelines which were initially published in 2002 and in draft format (2017). The guidelines are a statutory document and provide guidance on the role of the EIAR in the EIA process, the key activities involved in the EIAR process, and guidance on the presentation of the information contained in the EIAR.

The EIAR team will have regard to these guidelines in the preparation of the EIAR documents; additionally the team will also have regard to best practice guidance for each individual environmental topic covered by the EIAR.

The EPA guidelines include a 7 no. stage approach (sequence) in the production of the EIAR. This includes:-

- Screening;
- Scoping;
- Consideration of Alternatives;
- Project Description;
- Baseline Description;
- Assessment of Likely Significant Impacts; and
- Mitigation/Monitoring.

The guidelines outline that adherence to this sequence ensures an objective and systematic approach is achieved. Using this sequence, the environment is described using a number of specific headings and this provides for a separate section for each topic. The description of the existing environment, the likely significant effects (positive, negative, & cumulative), mitigation and monitoring measures, and residual impacts are then grouped together in each section, covering each topic. This format allows for ease of investigation into each topic and for specialist studies/input to be integrated seamlessly.

## 2.6 Content and Structure of the EIAR

In order to be relevant, complete and legally compliant, the content of this EIAR includes all of the information required by the EIA Directive and national legislation, as appropriate and necessary to the specific characteristics of the proposed development, and includes:-

- (a) A description of the project comprising information on the site, design, size and other relevant features of the project;
- (b) A description of the likely significant effects of the project on the environment;
- (c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- (d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- (e) A non-technical summary of the information referred to in points (a) to (d); and
- (f) Any additional information specified in Annex IV of the EIA Directive relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.



In order to provide for a consistent approach and to communicate clear, concise, unambiguous information, each chapter of the EIAR will be systematically organised so as to follow a similar basic structure, as follows:-

- The existing environment: A description of the context, character, significance and sensitivity of the receiving (baseline) environment using standard descriptive methods, in order to predict the likely significant effects of the proposed development;
- The likely significant effects of the proposed development: The aspects of the construction, existence and operation of the proposed development that are likely to affect the existing environment including, as appropriate, predicted, potential, residual, 'do nothing' and 'worst case' effects. The likely significance of any effects is determined with reference to magnitude, intensity, integrity, duration and probability; and
- The measures to mitigate and monitor adverse effects: The range of methods which are proposed for mitigation by avoidance, reduction and remedy of any likely significant effects (including unplanned events) together with ongoing monitoring of the efficacy of mitigation measures.

This structure, which clearly separates data (descriptions of the receiving environment and of the project) from impact predictions (likely significant effects and mitigation measures), is designed to ensure that replicable impact assessments, based on rigorous scientific information and verifiable evidence, is carried out using recognised methods that are presented and documented in a fully legible, transparent and objective manner.

This methodological structure is designed to reduce any possible subjective information and bias in order to facilitate An Bord Pleanála in their independent EIA of the proposed development.

## 2.7 Format of the EIAR

The format of the EIAR is set out below:-

- Introduction;
- Assessment of Project Alternatives;
- Description of the Proposed Development;
- Population and Human Health;
- Biodiversity;
- Land & Soil;
- Water;
- Air Quality & Climate;
- Landscape;
- Cultural Heritage;
- Noise & Vibration;
- Shadow Flicker;
- Material Assets; and
- Interaction of the Foregoing.

Each chapter of the EIAR will be structured using the following general format:-

- Introduction;
- Methodology;
- Description of the Existing Environment;
- Description of Likely Significant Effects;
- Mitigation & Monitoring Measures;

- Residual Effects; and
- Summary.

### 2.7.1 Introduction

This section will introduce the environmental topic to be assessed and the elements to be examined within the assessment.

### 2.7.2 Methodology

Specific topic related methodologies will be outlined in this section. This will include the methodology used in describing the existing environment and undertaking the impact assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken.

### 2.7.3 Description of the Existing Environment

An accurate description of the existing environment is necessary to predict the likely significant effects of a new development. Existing baseline data will be used as a valuable reference for the assessment of actual effects from a development once it is in operation. To describe the existing environment, desktop reviews of existing data sources will be undertaken for each specialist area relying on published reference reports and datasets to ensure the objectivity of the assessment. Desktop studies will also be supplemented by specialised field walkovers or studies in order to verify the accuracy of the desktop study or to gather additional environmental information for incorporation into the EIAR.

The existing environment will be evaluated to highlight the character of the existing environment that is distinctive and what the significance of this is. The significance and sensitivity of a specific environment will be derived from legislation, national policies, local plans and policies, guidelines or professional judgements.

### 2.7.4 Description of the Likely Effects

In this section, assessments will be made as to how the receiving environment will interact with the proposed development. The full extent of the proposed development's effects prior to the implementation of proposed mitigation measures are introduced will be described. Effects from the construction, operation and decommissioning phases of the proposed development will be discussed; while interactions with other environmental topics and cumulative effects with other developments will also be assessed.

The evaluation of the significance of the effect will be undertaken. Where possible, pre-existing standardised criteria for the significance of effects will be used in accordance with the guidelines set out in the Environmental Protection Agency (EPA) *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft; August 2017). Additional assessment criteria can include Irish legislation, international standards, European Commission and EPA guidelines or good practice guidelines. Where appropriate criteria do not exist, the assessment methodology section will set out the criteria used to evaluate the significance.

### 2.7.5 Mitigation & Monitoring Measures

If significant effects are assessed as likely to arise, mitigation measures will be devised to minimise effects on the environment. Mitigation measures by avoidance, by reduction and by remedy may be implemented.

Proposals to undertake pre- or post-construction monitoring, or monitoring during construction activities, may also be proposed to obtain current information on the

proposed development site to inform construction methods, to ensure that activities are been completed in accordance with best practice guidelines and/or to ensure the efficacy of the proposed mitigation measures. These measures, and a clear justification for their implementation, will be described in this section.

#### 2.7.6 Residual Effects

This section will describe those environmental effects which will remain following the implementation of mitigation and monitoring measures. These effects will be described in detail and an assessment of their significance undertaken.

#### 2.7.7 Summary

A summary of the assessment undertaken will be provided in this section along with an overall assessment of the significance of the likely effects.

### 2.8 Contributors to the EIAR

The EIA Directive requires that an EIAR must be prepared by a team of competent, qualified experts with an appropriate combination of experience, expertise and knowledge related to the significance, complexity and range of effects that an EIAR needs to assess. Such competence includes an understanding of the legal context of the decision-making process and a variety of technical experts to address different environmental topics, and their interactions, in order to ensure that the information included in the EIAR is complete to a high level of objective quality. The preparation of an EIAR is also critically dependent on the technical expertise, experience, independence and objectivity of environmental specialists. They characterise the existing environment, evaluate its sensitivity and likely significant effects of the proposed development.

The preparation of this Scoping Report has been managed by GES with recognised experts carrying out specialist scoping assessments within their individual field. GES will also coordinate the preparation of the EIAR and, in addition to the appointed specialist experts, will prepare a number of specific chapters, as follows:-

- Population & Human Health: GES;
- Biodiversity: SLR Consulting;
- Land & Soil: Hydro Environmental Services;
- Water: Hydro Environmental Services;
- Air Quality & Climate: AWN Consulting;
- Landscape: Macro Works;
- Cultural Heritage: Dermot Nelis Archaeology;
- Noise & Vibration: AWN Consulting;
- Shadow Flicker: GES;
- Material Assets: GES; and
- Interaction of the Foregoing: GES.

### 3.0 Consultation

Consultation, to date, has predominately comprised engagement with organisations and authorities, key service providers (e.g. telecommunications) and other stakeholders to whom the proposed development may be of interest or may be affected by the proposed development; and consultation with the local community and general public.

#### 3.1 Stakeholder Consultation

A wide range of statutory and non-statutory organisations were contacted in writing at an early stage in the scoping process to gather their views on the EIAR scope and

the likely significant environmental effects of the proposed development. The process involved furnishing each organisation with a 'Preliminary Scoping Report' accompanied by a set of maps and drawings, and requesting written feedback. All responses received will be fully assessed and taken into consideration in the scope of the EIAR and, where necessary, the layout and design of the project will be revised in accordance with specific recommendations.

The following stakeholders were consulted with:-

- Airspeed Telecom;
- An Garda Síochana;
- An Taisce;
- Ajisko Limited;
- Bat Conservation Ireland;
- Birdwatch Ireland;
- Bord Gáis Energy
- Broadcasting Authority of Ireland;
- BT Communications Ireland;
- Commission for Communications Regulations;
- Commission for Regulation of Utilities;
- Department of Agriculture, Food and the Marine;
- Department of Defence;
- Department of Environment, Climate and Communications;
- Department of Housing, Local Government & Heritage;
- Department of Tourism, Culture, Arts, Gaeltacht, Sport & Media;
- Department of Transport;
- Eastern and Midlands Regional Assembly;
- Eir Mobile;
- EirGrid plc;
- Enet Telecommunications Networks Limited;
- Environmental Protection Agency;
- ESB Networks;
- Fáilte Ireland;
- Gas Networks Ireland;
- Geological Survey of Ireland;
- Health & Safety Authority;
- Health Service Executive – Environmental Health Department;
- Irish Aviation Authority;
- Iarnród Éireann;
- I-LOFAR
- Imagine Group;
- Inland Fisheries Ireland;
- Irish Peatland Conservation Council;
- Irish Raptor Study Group;
- Irish Water;
- Irish Wildlife Trust;
- JFK Communications Limited;
- National Ambulance Service;
- National Federation of Group Water Schemes;
- National Parks & Wildlife Service;
- Netshare Ireland;
- Offaly County Council;
- Office of Public Works;

- Open Eir;
- Oremande Flying Club;
- Ripplecom;
- Radio Services & Building Limited;
- 2m (RTE Transmission Network Limited);
- Sustainable Energy Authority of Ireland;
- Sport Ireland;
- Tetra Ireland Communications Limited;
- The Arts Council;
- The Heritage Council;
- Three (3) Ireland;
- Towercom;
- Transport Infrastructure Ireland;
- Údarás na Gaeltachta;
- Virgin Media Ireland;
- Viatel Ireland Limited;
- Vodafone Ireland Limited; and
- Waterways Ireland.

### 3.2 Community Consultation

Due to the restrictions imposed by Government in response to the COVID-19 pandemic, CWL has placed significant focus on remote consultation to ensure that local residents are fully aware of the proposed development, are aware of the layout and design of the proposed development, and that the local community has a suitable means of engagement with the project team.

Remote engagement has been predominately facilitated through the distribution of information leaflets to all residences within 2km of a proposed wind turbine offering information on the project and advising residents of the means of contacting the Community Liaison Officer (CLO). The CLO is contactable by email, phone, and via feedback forms (distributed with information leaflets).

A project website has been set up to inform the public of the project ([www.cushwindfarm.ie](http://www.cushwindfarm.ie)). The website is being used to notify the public of any changes in the design and layout of the proposed development arising as a consequence of the scoping exercise; while also being used to advise of public consultation events (clinics, workshops, etc.) arranged following the lifting of COVID-19 restrictions.

In addition, and following the easing of certain public health restrictions, CWL has carried out 'door-to-door' consultation and it is understood that all dwellings within 2km have been visited.

### 4.0 Description of the Proposed Development

The proposed development consists of the construction and operation of a wind farm, comprising infrastructure including 8 no. wind turbines, crane hardstandings, access tracks, site entrances, meteorological mast, internal wind farm underground cabling, borrow pits, spoil deposition areas and tree felling.

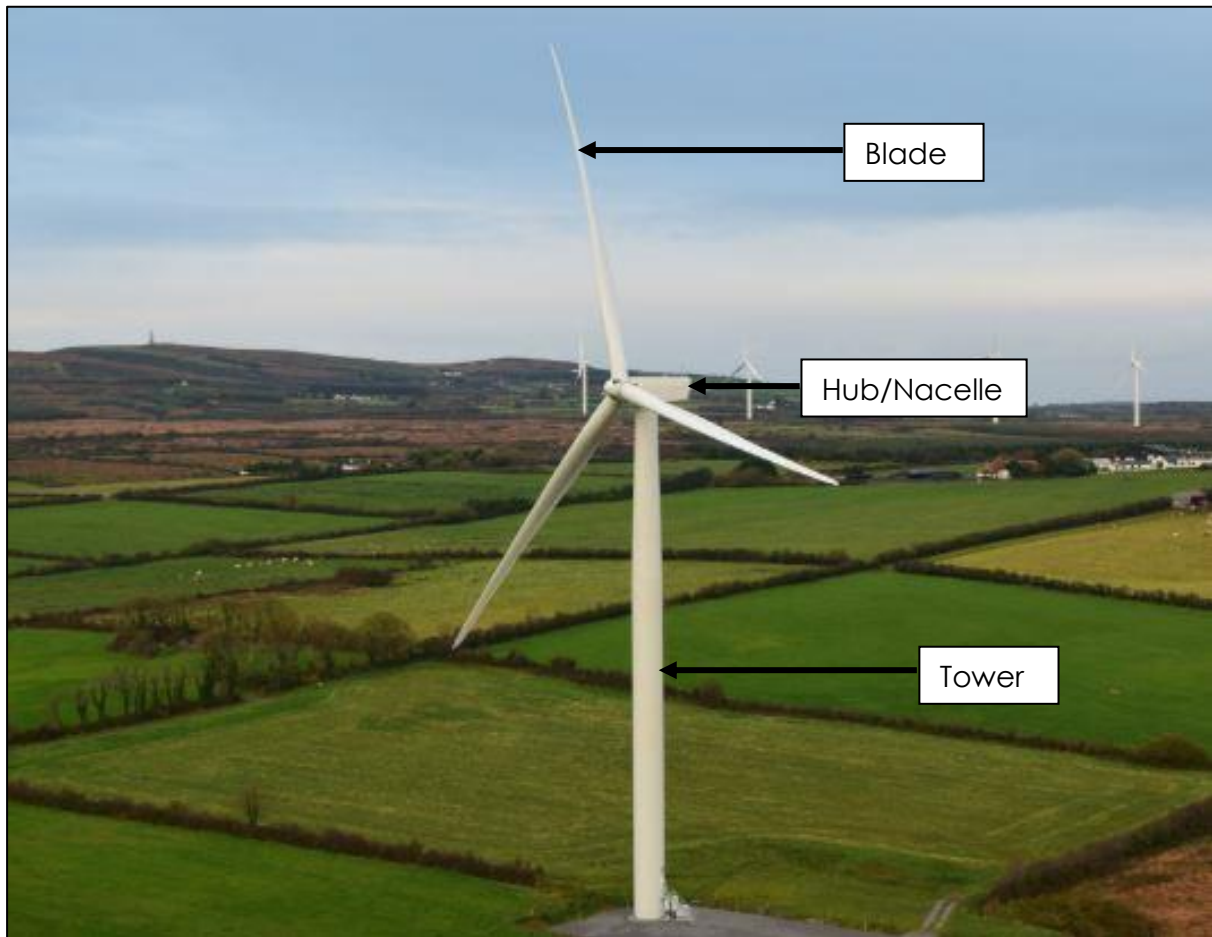
The project will also include a range of off-site or secondary developments including turbine component haul route, construction material haul routes and the importation of materials.

The project EIAR will include an assessment of a 110kV substation (Buildings, compound and Battery Energy Storage System) as well as an underground grid connection route to the existing 110kV Dallow substation at Clondallow.

### 3.1 Wind Turbines

The proposed turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms. The blades will be constructed of glass reinforced plastic and lightning protection conduits are integral to their construction. The nacelle is supported on a steel tower of tubular construction. The colour of the proposed turbines and blades will be white, off-white or light grey in accordance with the *Wind Energy Development Guidelines for Planning Authorities 2006* and as determined by the Planning Authority. The turbine has a cut-in wind speed of 3 m/s and a cut-out speed of 25 m/s. At the cut-out speed the turbines will automatically shut down.

Given the available wind resource at the proposed development site, a wind turbine with an overall height of up to 200 metres is presently considered to be the most suitable turbine size for the subject site. It is important to stress, however, that the exact model and manufacturer of the turbine has not yet been chosen and remains under consideration. A number of turbine models with various hub height/rotor diameter combinations could be suitable for the subject site.



**Figure 2: Typical Wind Turbine**

### 3.2 Turbine Foundations

Each turbine tower is secured to a steel ring foundation which can comprise either a reinforced concrete (gravity) foundation or a piled foundation. The precise type of foundation to be used for each turbine will depend upon the specific ground conditions at each location. This shall be established through detailed technical design and post-consent geotechnical investigations prior to construction, as is

standard best-practice in all construction projects.

The depth of excavation required for each wind turbine foundation will vary depending on precise ground conditions. The diameter of a standard gravity raft foundation will be c. 28.9m; whilst the diameter of a piled foundation would, if deemed to be required, be c. 22m. Foundation depths will range between 3m and 5m in depth, depending on ground conditions at each turbine location.

### 3.3 Hardstandings

Hardstanding areas shall be established adjacent to each turbine to facilitate crane operations for erection and occasionally for maintenance and decommissioning. Each hardstanding area shall typically be 96m x 45m for the construction phase and will consist of levelled and compacted (unsealed) hardcore. However, the precise size, arrangement and position of the hardstanding area will be determined by the chosen turbine supplier and, as such, cannot be confirmed until a turbine model has been chosen.

Temporary set-down areas will be located adjacent to each hardstanding area during the construction phase to accommodate turbine components following delivery to site. Following the erection of turbines, these set-down areas will be reinstated to their pre-construction condition.

### 3.4 On-Site Access Tracks

A total of c. 6.8km of on-site access tracks will be required for construction purposes and for site access during the operational phase. The access tracks proposed shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 5-metres.

A number of site entrances will also be constructed to facilitate ease of access through the site. These entrances will be appropriately designed to ensure all visibility splays (sightlines) are provided for. It is proposed to provide 2 no. construction phase site entrances during construction phase operations and 2 no. operational phase site entrances during the operational phase of the project. The construction phase site entrances are proposed from the N62 National Road, whilst both operational site entrances are to be accessed from the Local Road network.

### 3.5 Internal Wind Farm Cabling

Electrical cabling will be required to connect each turbine to the electrical substation. The cables will be located underground, installed in trenches of 1m in depth, and will generally follow the alignment of on-site access tracks.

### 3.6 Meteorological Mast

A permanent meteorological mast will remain on-site during the operational phase of the development (permanent as per the life span of the wind farm). The proposed permanent mast will be 30m in height and will consist of a steel lattice structure to which various measurement instruments will be attached. Some ground works, including the construction of concrete foundations and hardstanding area, will be required to erect the mast.

### 3.7 Turbine Component Haul Route

It is envisaged that the turbines will be transported from the Port of Galway using the N6, M6, N52, and N62. Temporary works; including the removal of street furniture (street lighting, signage, etc) and verge/roundabout island hardcore; will be required at various locations along the route; however, substantial and permanent

works are not currently assessed as being necessary.

At the junction of the N52 and N62, it is proposed to construct a temporary access track, to the south of the N52, to accommodate the provision of a reversing manoeuvre and to allow for onward delivery of abnormal-sized loads along the N62 to the construction phase site entrances. The current junction is not capable of accommodating such a manoeuvre and the construction of a temporary access track, which will be fully re-instated immediately following the delivery of turbine components, will facilitate same. CWL will engage with the relevant stakeholders, as part of the project design process, as part of ongoing consultation.

### 3.8 110kv Substation and underground grid connection

The 110kV substation, to be located in the townland of Boolinarig Big will comprise an electrical compound comprising 'tail fed' air-insulated switchgear. The footprint of the substation (overall compound area) will measure c. 8,235m<sup>2</sup> and will be surrounded by a palisade fence, with associated gates, of 2.6m in height for safety and security reasons. The proposed substation compound will contain 2 no. control buildings, a battery energy storage system and all necessary electrical equipment and apparatus to facilitate the export of electricity to the national grid. Ancillary infrastructure located within the footprint of the compound will include electrical apparatus, light posts, lightning mast and a battery energy storage system comprising of containerised energy storage modules, transformer and inverter units, heating, ventilation, air condition units and associated underground electricity cabling.

The point of connection of the project to the national grid will ultimately be decided by ESB Networks and/or EirGrid and is beyond the control of CWL. As such, it is not currently possible to definitively state the nature or routing of the grid connection infrastructure.

However, on the basis of detailed analysis by CWL including an assessment of the existing grid network and grid capacity in County Offaly it is anticipated that the project will be connected to the grid at the Dallow 110kV substation at Clondallow via underground electricity cabling, along private lands and the public road. At the initial stages of the scoping process a total of 5 no. grid connection 'options' were considered, however upon completion of project scoping and technical analysis, only one option was brought forward for assessment.

## 4.0 Scope of the EIAR

The EIAR will provide an assessment of effects during the construction, operation and decommissioning of the proposed development for each the environmental topics described in this section. The EPA *Advice Notes for Preparing Environmental Impact Statements* (Draft; September 2015) set out, at Project Type 33, considerations in the preparation of an EIAR (formerly termed an 'Environmental Impact Statement' (EIS). The EIAR for the proposed development will have regard to the guidance set out in respect of this project type.

This section provides a brief overview of the level of scoping which has taken place to date, as well as the potential effects which have been identified and the proposed methodology for further assessment in the EIAR.

### 4.1 Project Alternatives

Prior to the selection of the development under consideration, CWL undertook an extensive iterative process to assess a range of alternatives at both the macro-level and micro-level. The assessment of alternatives ranged from alternative site locations,



site layouts and designs, technologies, grid connection options and haul route options. This process has so far determined that the development as proposed represents the most environmentally sensitive project having regard to all reasonable available alternatives.

However, the proposed development in its current layout and design remains subject to further revision in line with continued project scoping and ongoing statutory and non-statutory consultation,

## 4.2 Population & Human Health

As part the scoping process, a desk based review of existing conditions in the area has been undertaken. It is anticipated that, during the construction phase, effects on community, recreation and tourism receptors will primarily be associated with traffic, noise, air quality and water impacts. Once the proposed development becomes operational, effects will be primarily associated with visual impact and noise impact.

In terms of human health, it is noted that impacts here will be closely linked with other environmental aspects associated with the proposed development which are relevant to human health, namely soils, water, air quality, noise, shadow flicker, and radiation (electrical infrastructure). Other effects may include employment effects and impacts on the local economy.

The potential effects identified above along with potential cumulative effects with other developments will be considered within the 'Population and Human Health' chapter of the EIAR. Effects which are not considered 'likely' or 'significant' have been scoped out from further assessment and include:-

- Safety issues connected with the operation of wind turbines;
- Health effects and wind turbine syndrome; and
- Effects of wind farms on property values as being a matter that is not relevant to the proper planning and sustainable development of the area.

The following sections set out the proposed approach to the preparation of the Population & Human Health chapter of the EIAR.

### 4.2.1 Methodology

The spatial focus of the study will be undertaken at two levels. Firstly, effects on specific community, recreation and tourism receptors will be assessed at a local level which will be defined as 5km from the boundary of the proposed development. This will be referred to as the 'Local Study Area'.

Economic effects will be considered with regard to a wider study area that takes account of a likely 'catchment' for provision of domestically sourced goods and services relating to the construction and operation of the wind farm. This study area will comprise the wider area around County Offaly and will be referred to as the 'Wider Study Area'. Given the scale of the proposed development, it is not intended to measure effects at a national or international level.

### 4.2.2 Description of the Existing Environment

A desk-based review of existing conditions in the area will be undertaken, including the following themes:-

- population demographics;
- labour market;
- economic diversity and investment including local business supply chain;
- education and skills;

- community receptors;
- visitor attractions (e.g. cultural heritage, fishing lakes, views);
- accommodation and other businesses/services serving the tourism economy;
- recreational assets (e.g. walking, cycling, views, equine use); and
- land use.

Data on sensitive receptors will be gathered within the Local Study Area and this will focus on community receptors, recreational assets and visitor assets. Baseline data on population demographics and employment will be gathered within the Wider Study Area. The sensitivity of each receptor or receptor group will be based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects.

Key literature sources, in evaluating the baseline environment, will include:-

- Central Statistics Office (CSO);
- The county development plan of Offaly (including draft county plans) where applicable;
- Pobal Profiling GIS Data;
- Fáilte Ireland;
- Offaly Tourism Statement of Strategy 2017-2022
- A Tourism Masterplan for the Shannon 2020-2030, Waterways Ireland.

#### 4.2.3 Description of the Likely Effects

The assessment will be primarily focussed on assessing the likely effects arising from the construction and operational phases. Decommissioning phase effects are considered, based on experience, to be similar to construction phase effects but of a reduced magnitude. Effects on the local economy (employment opportunities and economic output), local population, recreation and tourism assets and land use will each be assessed.

##### 4.2.3.1 Receptor Sensitivity

There are no published standards that define receptor sensitivity relating to Population and Human Health assessments. As a general rule the sensitivity of each receptor or receptor group will be based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects. In assigning receptor sensitivity, consideration will be given to the following:-

- importance of the receptor e.g. local, regional, national, international;
- availability of comparable alternatives;
- ease at which the resource could be replaced;
- capacity of the resource to recover or adapt to identified impacts over a period of time; and
- level of usage and nature of users (e.g. sensitive groups such as people with disabilities).

Based upon professional judgement, it is proposed that four levels of sensitivity are used: High; Medium, Low and Negligible.

##### 4.2.3.2 Magnitude Criteria

The magnitude of effect will be evaluated based on the change that occurs to the baseline conditions relating to supply chains, local labour market, tourism and visitor economy, land use, and tourism and recreation assets. It is proposed that four degrees of magnitude are used: high; medium; low and negligible.

#### 4.2.3.3 Significance of Effect

The level of effect will be assessed by combining the magnitude of the effect and the sensitivity of the receptor. It is proposed that four levels of effect are used: negligible, minor, moderate or major. Where an effect is classified as Major, this is considered to represent a 'significant effect' in EIA terms. Where an effect is classified as Moderate, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or magnitude levels are not clear or are borderline between categories or the effect is intermittent.

#### 4.2.4 Mitigation & Monitoring Measures

Mitigation measures, additional to those incorporated into the project design, will be considered in order to mitigate any significant adverse effects that are identified.

#### 4.2.5 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the project and the scope of environmental assessments. Fáilte Ireland has provided recommendations regarding the assessment of effects on tourism.

No other comments regarding the assessment of Population & Human Health effects have been received.

### 4.3 Biodiversity

A detailed Biodiversity Scoping Report has been prepared by SLR Consulting and is enclosed at **Annex 1**. The report has identified the effects which may occur as a result of the construction, operation and decommissioning of the proposed development and describes the proposed approach in the preparation of the Biodiversity chapter of the EIAR.

#### 4.3.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Bat Conservation Ireland (BCI) advised that they don't comment on individual planning applications but asked that all best practice guidelines are followed. Offaly County Council referred to potential connectivity to designated sites via Rapemills river and that the project EIAR should include an assessment of biodiversity. Department of Agriculture, Food and the Marine noted that a felling licence will need to be acquired, and the EIA and appropriate assessment procedures to be followed.

No other comments regarding the assessment of Biodiversity effects have been received.

### 4.4 Land & Soil

A Land, Soil and Water Scoping Report has been prepared by Hydro Environmental Services and is enclosed at **Annex 2**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been carried out. The report describes the characteristics of the existing environment (based on a desktop survey), identifies environmental effects which may arise as a result of the construction, operation and decommissioning of the proposed development, and describes the methodologies to be followed in the preparation of the Land & Soil chapter of the EIAR.

#### 4.4.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Geological Survey Ireland (GSI) noted that there may be potential impacts on the integrity of current County Geological Sites envisaged by the project, should these sites [i.e. Kilcormac Esker] not be assessed as constraints. GSI noted that the sites should not be damaged or integrity impacted or reduced in any manner due to the project. However they also noted that this is not always possible, and in this situation appropriate mitigation measures should be put in place to minimize or mitigate potential impacts. GSI has recommended that a suite of mapping databases and datasets available through its website are consulted to fully inform the proposed assessment; including in relation to geo-heritage sites, geological composition mapping, geotechnical databases, geohazards, presence of natural resources, geochemistry and geophysical data.

The Department of Agriculture, Food and the Marine (Forest Division) referred to the interaction of the proposed works with the environment locally and more widely, in addition to potential direct and indirect impacts on designated sites and water, and to ensure they were adequately assessed.

No other comments regarding the assessment of Land & Soil effects have been received.

#### 4.5 Water

A Land, Soil and Water Scoping Report has been prepared by Hydro Environmental Services (HES) and is enclosed at **Annex 2**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been carried out. The report describes the characteristics of the existing environment (based on a desktop survey), identifies environmental effects which may arise as a result of the construction, operation and decommissioning of the proposed development, and describes the methodologies to be followed in the preparation of the Water chapter of the EIAR.

##### 4.5.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Geological Survey Ireland has recommended that:-

- The proposed site is located in lands that benefit from the Boolinaraig Drainage District. There may be a risk of flooding at this location. The Local Authority and the developers should satisfy themselves that there is adequate level of protection against flooding at this location.
- Datasets prepared by the Office of Public Works identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land subject to flooding or poor drainage.
- The channel in question [at the Project Site] is not an OPW maintainable channel; however, it is good practise that a 10-metre wide strip be retained adjacent to the channel to permit access to the local authority for maintenance. Ideally, the strip should not be fenced, paved or landscaped in

a manner that would prevent access by maintenance plant.

- Further to this, please note that for the construction, replacement or alteration of any bridge or culvert over any channel which appears on a 6-inch to 1 mile map, Prior Section 50 consent must be sought under Section 50 of the Arterial Drainage Act, 1945.

A pro-forma response has been provided by Irish Water regarding an assessment of effects on water supplies, treatment of effluent and the protection of water quality.

The Office of Public Works (OPW) were consulted and identified that there may be a risk of flooding at this location. OPW identify that flooding should be considered during the early project design stage. It is noted that the Water Scoping Report received from HES includes details of early stage flood risk modelling which has been carried out on the site. The Department of Agriculture, Food and the Marine (Forest Division) referred to the interaction of these proposed works with the environment locally and more widely, in addition to potential direct and indirect impacts on designated sites and water – to be assessed.

#### 4.6 Air & Climate

An Air Quality and Climate scoping report has been prepared by AWN Consulting and is enclosed at **Annex 3**. The report describes the scope of work and methods to be applied in the identification and assessment of air quality effects associated with the proposed development.

##### 4.6.1 Stakeholder Engagement

No specific comments regarding the assessment of Air Quality & Climate effects have been received. The EIAR will assess the likelihood of significant levels of dust being generated during the construction, operation or decommissioning of the proposed development and whether the installation of dust monitoring stations is required.

#### 4.7 Landscape

A Landscape scoping report has been prepared by Macro Works and is provided at **Annex 4**. The report provides an initial evaluation of the baseline environment and discusses landscape and visual effects which are likely to arise and describes the findings of the scoping process to date. In addition the Scoping Report includes a Viewshed Reference Point (VRP) Report which identifies an initial broad set of potential views from a desk study using the Zone of Theoretical Visibility (ZTV) map. The VRP's include a mix of receptor types including:

- Key Views - from features of international or national importance;
- Amenity Views from important heritage or amenity locations;
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population; and
- Major Routes.

##### 4.7.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Offaly County Council also referred to Landscape and Visual Assessment in their response and a need to consider the cumulative impact given the existing/permitted development within the area.

No other comments regarding the assessment of Landscape effects have been received.

#### 4.8 Cultural Heritage

A Cultural Heritage scoping report has been prepared by Dermot Nelis Archaeology and is enclosed at **Annex 5**. The scoping report has been prepared to provide an initial evaluation of the baseline environment and to identify effects which the proposed development may have on the archaeological, architectural and cultural heritage resource of the surrounding area.

##### 4.8.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Offaly County Council referred to the need for a Cultural Heritage assessment which included an assessment of underwater archaeology.

#### 4.9 Noise & Vibration

A Noise & Vibration scoping report has been prepared by AWN Consulting and is enclosed at **Annex 6**. The scoping report has been prepared to identify the potential for noise and vibration effects at sensitive receptors surrounding the proposed development. The scoping report also describes the principal objectives, and the proposed methodologies, of the assessment.

##### 4.9.1 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Offaly County Council referred to the need for an assessment into noise.

No other comments regarding the assessment of Noise & Vibration effects have been received.

#### 4.10 Shadow Flicker

##### 4.10.1 Methodology

In order to determine the potential level of shadow flicker at the scoping stage, an assessment of the local environment has been carried out to identify potential receptors. All existing (occupied and unoccupied) dwellings and permitted dwellings (not yet constructed) within 2km of a proposed wind turbine, have been identified. The proposed development is located in an area which has a dispersed rural settlement pattern and, consequently, the number of dwellings identified is relatively low.

The EIAR will assess the effects on human health from shadow flicker, i.e. the moving shadows cast by the turbine blades in times of direct sunlight and the resultant effect that can have on nearby properties. The EIAR will comprise a detailed assessment of the likelihood of shadow flicker affecting local receptors during the operation of the proposed development. The assessment will be based on detailed shadow flicker prediction modelling for each dwelling within 2km of a proposed wind turbine. An assessment will be made to establish if the proposed development will comply with shadow flicker limits prescribed within the Wind Energy Development Guidelines for Planning Authorities (2006) or any superseding guidelines. Proven and recognised

technological mitigation will be introduced where necessary and appropriate.

#### 4.10.2 Description of the Existing Environment

A total of 106 no. properties (dwellings) have been identified as being located within 2km of a proposed wind turbine; however, further assessment and ground-truthing will be undertaken to confirm the status of a number of the identified properties. CWL will monitor future planning applications to ensure that a comprehensive assessment is undertaken and that the potential shadow flicker effects are fully assessed for all existing and permitted dwellings.

#### 4.10.3 Description of the Potential Effects

In times of direct sunshine, wind turbine blades may occasionally cast moving shadows on residences in close proximity to the proposed turbines. At certain times of the year, the moving shadows of the turbines blades can periodically reduce light to a room causing the light to appear to flicker. Shadow flicker would not generally have any effect on health or safety, but could on limited occasions present a nuisance effect.

#### 4.10.4 Mitigation & Monitoring Measures

Shadow flicker is an issue which has been considered at the early stages of scoping and has been used to inform the design and layout of the proposed development. A full shadow flicker projection will be provided within the EIAR which will determine the need for any further mitigation; while detailed mitigation measures and a preliminary Shadow Flicker Monitoring Programme will also be provided.

Technical solutions are available, and widely implemented, on wind farm developments to ensure that instances of shadow flicker do not result in significant effects. These mitigation measures effectively limit the operation of turbines during the infrequent periods when shadow flicker is predicted to occur. In summary, if a particular turbine is creating shadow flicker effects at a particular dwelling then that turbine may be temporarily shut down. This is usually addressed by turning off the turbines a predetermined times when shadow flicker is predicted to occur, if the sun is shining.

#### 4.10.5 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Offaly County Council referred to the need for an assessment into shadow flicker.

No other comments regarding the assessment of Shadow Flicker effects have been received.

### 4.11 Material Assets

#### 4.11.1 Transport & Access

##### 4.11.1.1 Methodology

A desktop review of the road network in the vicinity of the proposed development site has been conducted at the scoping stage together with a desktop review of proposed site entrance locations and the proposed grid connection route options. A route access survey has been carried out by a specialist transport consultant between the anticipated port of entry and proposed main site construction phase entrances. This survey has identified locations which will require off-site temporary alterations to

facilitate the safe delivery of turbine components to the proposed development site. Swept path analyses have also been conducted for all internal tracks to ensure that they are adequate to allow delivery of turbine components while also minimising the required land take where feasible.

#### 4.11.1.2 Description of the Existing Environment

The road network in the vicinity of the proposed development includes National Secondary classified roads (N62/N52), Regional roads, as well as locally-classified roads; however, the anticipated turbine component haul route will utilise motorways, national and regional roads; while the grid connection route will follow local and regional roads (short stretch), depending on the selected route. Road widths and carriageway surface-conditions are of a condition typical for their classification and are considered, initially, to be generally capable of accommodating construction traffic associated with the development of a wind farm.

It is noted, however, that the route access survey has identified locations along the anticipated haul route where temporary alteration works will be required; each of which will be fully assessed in the EIAR.

Based on anecdotal evidence and experience, the road network in the vicinity of the proposed development is unlikely to carry significant volumes of traffic; however, it is anticipated that these routes will be of local importance to residents, landowners and business owners.

#### 4.11.1.3 Description of the Likely Effects

The following effects have been identified as having the potential to arise as a consequence of the construction of the proposed development:-

- Increased traffic flows (construction phase);
- Changes to traffic/vehicular composition;
- Temporary traffic disruption/delays;
- Reduced road safety due to construction activities; and
- Degradation of road structures/surfaces.

Operational stage effects on traffic are likely to be much less than that associated with the construction stage; however, the level of impact will be examined in line with the operational life span of the proposed development.

#### 4.11.1.4 Mitigation & Monitoring Measures

A comprehensive suite of mitigation measures will be set out, as required, to reduce the likely effects of the proposed development on transport and access. The majority of such measures are likely to be techniques which will be inherent and intrinsic to the completion of works in accordance with accepted best practice construction methodologies (e.g. appropriate traffic management measures); however, specific measures are also likely to be proposed to minimise traffic disruption and maintain traffic flows, ensure public safety is not adversely affected and to maintain the structural integrity of roads and associated structures.

#### 4.11.1.5 Stakeholder Engagement

As described at **Section 3.1** above, a range of stakeholders have been consulted with and invited to provide comment on the proposed development and the scope of environmental assessments.

Offaly County Council made the following points in roads and traffic:



- The requirement for pre and post surveys.
- RSA at entrances especially at N62.
- CMP and TTA to be prepared.
- Haul routes – highlight bridges, junctions, and roundabout amendments.
- Sightlines – undulating levels – vertical assessment.
- High volume of traffic using national road.
- Quarry source to be used and to be detailed.

Transport Infrastructure Ireland (TII) has also offered recommendations regarding the scope of the EIAR which are generally reflective of the matters raised by the Planning Authority including, in addition:-

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes;
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development;
- Visual impacts from existing national roads should be assessed;
- In preparing the EIAR, regard should be had to TII Publications (*DMRB and Manual of Contract Documents for Road Works*);
- In preparing the EIAR, regard should be had to TII's *Environmental Assessment and Construction Guidelines*, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006);
- The EIAR should consider the *Environmental Noise Regulations 2006* (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority;
- TII Publications should be consulted to determine whether a Road Safety Audit is required;
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network;
- TII recommends that the EIAR should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal 'weight' loads are proposed, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route through all the relevant County Council administrative area should be checked to confirm their capacity to accommodate any abnormal 'weight' load proposed;
- The national road network is managed by a combination of PPP Concessions, Motorway Maintenance and Renewal Contracts (MMaRC) and local road authorities in association with TII. The Applicant should also consult with all PPP Companies, MMaRC Contractors and road authorities over which the haul route traverses to ascertain any operational requirements such as delivery timetabling, etc. and to ensure that the strategic function of the national road network is safeguarded.
- Any damage caused to the pavement on the existing national road at the temporary access due to the turning movement of abnormal 'length' loads (e.g. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development on site;

- Cable routing should avoid all impacts to existing TII infrastructure such as traffic counters, weather stations, etc. and works required to such infrastructure shall only be undertaken in consultation with and subject to the agreement of TII. Any costs attributable shall be borne by the applicant/developer. The developer should also be aware that separate approvals may be required for works traversing the national road network.

No other comments regarding the assessment of Transport & Access have been received.

#### 4.11.2 Telecommunications

##### 4.11.2.1 Methodology

The scoping process was commenced at an early stage of project design to identify the presence of telecommunication links in the area and, if present, their specific route. Consultation with a number of key service providers was undertaken and all feedback and recommendations have been incorporated into the project design.

The scoping methodology, which is ongoing and will continue throughout the EIA preparation process, will include:-

- Consultation with service providers, regulatory authorities and emergency services;
- Analyses of the effects of the proposed development on telecommunications operators' point-to-point microwave radio links and apply appropriate buffer distances around links and masts where required;
- Further specialist investigations will be carried out where significant effects are likely to occur;
- Where necessary, mitigation measures to be agreed with operators including:-
  - Turbine relocation;
  - Telecommunications link relocation;
  - Underground fibre optic cables to replace microwave link;
  - Submission of final detailed layout to telecoms operators; and
  - Agree any layout alterations following final detailed assessment by telecoms operators, or agree suitable mitigation measures if necessary.

##### 4.11.2.2 Description of the Existing Environment

While the proposed development site is not assessed to be a particularly important location for telecommunications links or infrastructure, no links were identified as being traversing the subject site and having the potential to be affected.

It is also noted that the project is located in relatively close proximity (just under 5km away) to Ireland's LOFAR station ('I-LOFAR'), located within the ground of Birr Castle to the south of the project. The Low Frequency Array (LOFAR) is an international network of state-of-the-art telescopes used to observe the Universe in unprecedented detail at low radio frequencies. The Irish LOFAR makes up part of a 12 station LOFAR project spread across Europe.

##### 4.11.2.3 Description of the Likely Effects

None of the electromagnetic and/or radio microwave link providers identified any concerns with the project during the consultation process.

In addition, the developer commissioned a specialist consultant to carry out a Radio Telescope Impact Assessment in order to ascertain the potential for likely significant effects on the I-LOFAR station at Birr Castle. The report concluded that any impact on I-LOFAR arising as a result of the project would be insignificant and that any emissions

from the turbines would be significantly smaller than emissions from closer sources, such as vehicles, mobile phones, buildings, machinery, home appliances, etc. in and around Birr.

The developer has sent the report to I-LOFAR for comment and to-date has not received any further comment.

#### 4.11.2.4 Mitigation & Monitoring Measures

A wide range of technological measures are available to avoid any disruption to telecommunication links and services. Such measures will be fully examined within the EIAR and will be proposed for implementation where necessary.

It is noted that 2rn have recommended that a protocol between be entered into to ensure that appropriate remediation of any interference experienced by residents.

### 5.0 Cumulative Assessment

The assessment of cumulative effects arising from the proposed development will take 2 no. forms, as follows:-

- The cumulative effects of the proposed wind farm, grid connection route options and haul route upgrade works will be assessed to evaluate the effects of the project as a whole; and
- The cumulative effects of the entire proposed development with other existing, permitted or proposed developments (for which there is publicly available information).

The cumulative assessment will be undertaken under each individual chapter heading. Where potentially significant cumulative effects are identified, mitigation and monitoring measures will be proposed to minimise this effect.

The interactions between effects on different environmental factors will also be addressed, as relevant, throughout the EIAR by ensuring that effects are cross-referenced between topics, thus reducing the need to duplicate coverage of such topics. Close co-ordination and management within the EIA Project Team, and careful read-across editing, will ensure that assessors are vigilant for complex interactions (direct, indirect, secondary and cumulative) and, where they are likely to arise, they are adequately identified and assessed. This includes interactions between effects, and possible cumulative effects, arising from the mitigation measures proposed that could magnify effects through the interaction or accumulation of effects.

### 6.0 Appropriate Assessment

As a separate, but interrelated, process, screening for the likelihood of any significant effects on European nature conservation sites (Natura 2000) designated under the EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) will be undertaken through the preparation of what is known as an Appropriate Assessment (AA) Screening Report (Stage 1). This is formally a separate assessment process, with discrete reporting requirements, but is obviously highly interrelated with EIA.

Article 6(3) of the Habitats Directive provides for a two-stage assessment process, which is implemented into Irish law (with some additional requirements) by the provisions of sections 177U and 177V of the Planning & Development Act 2000 (as amended). Screening for AA in accordance with section 177U is the first stage of the AA process in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or 'screened out', at this stage of the process.

The first step in the screening process is to develop a list of European-designated sites which may be affected by the construction, operation or decommissioning of the proposed development. Each relevant European site is evaluated to examine whether or not the proposed development is likely to have a significant effect on the European site.

The proposed development site is not located within any European site designated for nature conservation nor are there any direct interactions with designated sites. However, There are two Natura 2000 sites within 2km of the Site boundary, namely Dovegrove Callows SPA (004137) and Ridge Road, SW of Rapemills SAC (000919). There is a direct hydrological connection to seven Natura 2000 sites, namely Middle Shannon Callows SPA, River Little Brosna Callows SPA, All Saints Bog SPA, Lough Derg (Shannon) SPA, All Saints Bog and Esker SAC, River Shannon Callows SAC, and Lough Derg, North-east Shore SAC. Rapemills river flows through the Site westward where it drains to River Shannon via (IE\_SH\_25R010500). It is through River Shannon and its tributaries that the Site is then connected to these Natura 2000 sites.

There is a potential for a hydrological connection to several Natura 2000 sites via groundwater as these sites are situated within the same catchment as the proposed Site. These are Dovegrove Callows SPA, Ridge Road, SW of Rapemills SAC, Ballyduff/Clonfinane Bog SAC, Lisduff Fen SAC, Island Fen SAC, Sharavogue Bog SAC, Redwood Bog SAC, Slieve Bloom Mountains SPA, Moyclare Bog SAC, Slieve Bloom Mountains SAC, Ferbane Bog SAC, and Fin Lough (Offaly) SAC.

An Appropriate Assessment Screening Report, prepared by SLR Consulting, found that that it could not be confirmed, in the absence of avoidance or reduction (mitigation/protective) measures, that designated conservation sites would not be adversely affected by indirect effects arising from the construction, operation and decommissioning of the proposed development, either individually or in combination with other plans and projects, having regard to their conservation objectives.

As a result, and in accordance with the precautionary principle, it was concluded that the proposed development should proceed to be subject to a Stage 2 AA and that a NIS should be prepared and submitted with the planning application alongside this EIAR. In the NIS, the effect of the proposed development on the integrity of the European site(s), and its conservation objectives, will be assessed. Likely effects on species or habitats will be evaluated with respect to the scale, extent and nature; to make an overall assessment of the significance of the effect.

In the NIS, mitigation measures can be proposed to minimise effects on European sites to reduce the significance of any effects. Mitigation measures will follow the 'Avoidance – Reduction – Remedy' hierarchy. The mitigation measures will be described in detail, including in relation to their practical implementation, efficacy, timing and monitoring.

The NIS is presented and submitted as a separate standalone document. The NIS will include both the Stage 1 AA Screening Report and the Stage 2 Appropriate Assessment.

The Biodiversity chapter of the EIAR (**Chapter 5**) will not repeat the detailed assessment included in the NIS but will cross reference the findings of the separate assessment, as necessary. This is in accordance with the EPA *Guidelines on the Information to be contained within an EIAR (May 2022)* which states “a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”.

**Annex 1 –  
Biodiversity Scoping Report**



# CUSH WIND FARM

## Scoping Report - Ecology

Prepared for: Galetch Energy Services

Client Ref: 00581

SLR Ref: 501.00581.00005  
Version No: 1  
March 2022



Document Control	
Document Properties	
Organisation	SLR Consulting
Project Name	Cush Wind Farm
Report Title	Ecology Scoping Report
Author(s)	Sinéad Clifford
Draft version/final	Draft
Document reference	501.00581.00005 Cush Wind Farm Scoping Report_Draft RA_SC

DATE	Revision No	Prepared by	Reviewed by	Approved by	Status	Comments
28/03/2022	1	Sinéad Clifford	Richard Arnold	Richard Arnold	Draft	For client review

## BASIS OF REPORT

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with **Galetech Energy Services** (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

## CONTENTS

<b>1.0</b>	<b>BIODIVERSITY .....</b>	<b>3</b>
1.1	Relevant Legislation and Policy.....	3
1.1.1	Environmental Impact Assessment .....	3
1.1.2	Habitats and Species.....	3
1.1.3	Water.....	3
1.1.4	Environmental Liabilities.....	4
1.1.5	Relevant Policies .....	4
<b>2.0</b>	<b>METHODOLOGY.....</b>	<b>5</b>
2.1	Desk Study.....	5
2.2	Limitations.....	6
2.2.1	Desk Study.....	6
2.2.2	Field Survey(s) .....	6
<b>3.0</b>	<b>BASELINE ECOLOGICAL CONDITIONS.....</b>	<b>7</b>
3.1	Designated Sites .....	7
3.1.1	Natura 2000 Sites.....	7
3.1.2	Nationally Designated Sites .....	27
3.2	Habitats .....	56
3.3	Species .....	57
3.3.1	Plants .....	57
3.3.2	Invertebrates .....	58
3.3.3	Amphibians.....	59
3.3.4	Reptiles .....	59
3.3.5	Birds.....	59
3.3.6	Bats .....	63
3.3.7	Mammals (other than bats).....	67
3.3.8	Invasive Species.....	69
3.4	Summary of Important Ecological Features and Next Steps .....	73
3.4.1	Designated Sites.....	73
3.4.2	Habitats .....	73
3.4.3	Plants .....	73
3.4.4	Invertebrates .....	73
3.4.5	Amphibians.....	74
3.4.6	Reptiles .....	74
3.4.7	Birds.....	74



3.4.8	Bats .....	74
3.4.9	Mammals.....	74
3.4.10	Invasive Species.....	74
<b>4.0</b>	<b>CONCLUSIONS .....</b>	<b>74</b>
<b>5.0</b>	<b>REFERENCES .....</b>	<b>76</b>

## DOCUMENT REFERENCES

### TABLES

Table 3-1	Natura 2000 sites within 20km – Wind Farm Site.....	8
Table 3-2	Natura 2000 sites within 20km – Option 1 .....	14
Table 3-3	Natura 2000 sites within 20km – Option 2 .....	17
Table 3-4	Natura 2000 sites within 20km – Option 3 .....	21
Table 3-5	Nationally designated sites within 20km - Wind Farm Site.....	28
Table 3-6	Nationally Designated Sites within 20km – Option 1.....	37
Table 3-7	Nationally Designated Sites within 20km – Option 2.....	42
Table 3-8	Nationally Designated Sites within 20km – Option 3.....	48
Table 3-9	Records of rare and/or protected plant species (NPWS, 2022) .....	57
Table 3-10	Records of rare and/or protected invertebrate species (NPWS, 2022; NBDC, 2022) .....	58
Table 3-11	Records of Protected Amphibian species (NPWS, 2022) .....	59
Table 3-12	Records of Bird species (NBDC, 2022).....	60
Table 3-13	Bat Habitat Suitability Index – South-west.....	64
Table 3-14	Bat Habitat Suitability Index – South.....	65
Table 3-15	Bat Habitat Suitability Index – Rest of Site.....	65
Table 3-16	Records of Mammal species (NPWS, NBDC, 2022) .....	67
Table 3-17	Records of Invasive species (NBDC, 2022) .....	69

## 1.0 Biodiversity

This section outlines the likely ecological constraints present at the proposed Cush Wind Farm, and their impact on the feasibility of the proposed development(s).

This was prepared by Sinéad Clifford and reviewed by Richard Arnold. Sinéad is Senior Ecologist with SLR. Sinéad holds a BSc (Hons) Wildlife Biology from Institute of Technology Tralee, and a Certificate in Ecological Consultancy (Distinction) from Ecology Training UK (formerly Acorn Ecology). Sinéad has worked in ecological consultancy since 2018. Sinéad's specialist areas are in bat ecology, mammal survey, Geographical Information Systems (GIS), habitat survey, mapping and classification. She also has an excellent understanding and experience in invasive species survey. Sinéad has prepared ecological reports for a wide range of diverse projects during her career.

Richard Arnold BSc (Hons) MRes MCIEEM CEnv - Richard Arnold is a Technical Director with SLR. Richard has a BSc (Hons) in Ecology, an MRes in Environmental Science, is a full member of CIEEM and a Chartered Environmentalist. Richard has 23 years of experience as a consultant ecologist, including projects of all sizes and stages of development in the UK and Ireland.

### 1.1 Relevant Legislation and Policy

#### 1.1.1 Environmental Impact Assessment

- Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment 1985, as amended in 1997 (Council Directive 97/11/EC), 2003 (2003/35/EC) and 2009 (2009/31/EC), codified in 2011 (2011/92/EU) and amended again in 2014 (2014/52/EU) (the EIA directive)
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, as amended

#### 1.1.2 Habitats and Species

- European Union Habitats Directive, (1992). Council Directives 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
- European Union Birds Directive (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).
- European Communities (Birds and Natural Habitats) Regulations, 2011, as amended.
- Wildlife Act, 1976, as amended
- Wildlife (Amendment) Act, 2000, 2010, 2012
- Flora (Protection) Order 2015
- Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, as amended, together with Commission Implementing Regulation (EU) 2016/1141 and Implementing Regulation (EU) 2019/1262
- The Heritage Act 2018

#### 1.1.3 Water

- European Communities (Water policy) Regulations, 2003, as amended
- European Communities Environmental Objectives (Surface Waters) Regulations 2009

#### 1.1.4 Environmental Liabilities

- European Communities (Environmental Liability) Regulations 2008

#### 1.1.5 Relevant Policies

- Offaly County Development Plan 2021-2027, Wind Energy Strategy<sup>1</sup>
- Chapter 4 (Biodiversity and Landscape) of the Offaly County Development Plan 2021 – 2027<sup>2</sup>

---

<sup>1</sup> <https://www.offaly.ie/eng/Services/Planning/County-Development-Plan-2021-2027/Stage-4-Final-Plan/Wind%20Energy%20Strategy.pdf>

<sup>2</sup> <https://www.offaly.ie/eng/Services/Planning/County-Development-Plan-2021-2027/Stage-4-Final-Plan/Chapter%204%20-%20Biodiversity%20and%20Landscape.pdf>

## 2.0 Methodology

### 2.1 Desk Study

We have carried out a desk study to inform the biodiversity input to the scoping report for the proposed Cush Wind Farm. The desk study involved using online resources to collate information on areas designated for nature conservation and previous ecological studies undertaken for other projects in the wider local area.

The following online and other resources were accessed as part of the desk study, searching for all relevant records up to 20km radius of the site boundary:

- Satellite imagery<sup>3</sup>
- Environmental Protection Agency (EPA) Maps<sup>4</sup> were accessed for other environmental information relevant to preparation of this report.
- Design drawings and the project description of the proposed Cush Wind Farm prepared by Galetech Energy Services.
- National Parks and Wildlife Service<sup>5</sup> and the National Biodiversity Data Centre (NBDC)<sup>6</sup> online resources were accessed for information on sites designated for nature conservation and information on protected habitats and species. Only records of protected species for the past 10 years are considered within this report as older records are unlikely to still be relevant given their age and the changes in land management that is likely to have occurred in the intervening period. Environmental Protection Agency (EPA) Maps were accessed for other environmental information, such as surface water features, relevant to preparation of this report.
- Offaly County Council planning portal<sup>7</sup> and myplan.ie<sup>8</sup> were accessed for information on other permitted or proposed projects and plans within 15km, including associated environmental and ecological assessments.
- The BirdWatch Ireland website<sup>9</sup> was accessed for information on birds of conservation concern from the last 10 years. Birds of Conservation Concern in Ireland (BoCCI), published by BirdWatch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the island of Ireland. The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists; Red, Amber and Green; based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, Amber List are of medium conservation concern and Green List are not considered threatened. Whilst all bird species are protected under the Wildlife Acts 1976 – 2018, only records of species that are Red or Amber-listed on BoCCI or listed on Annex 1 of the Birds Directive were sought.
- Records of protected flora and fauna within 2km were sought from records held by the NBDC.

---

<sup>3</sup> <https://www.google.ie/maps> (last accessed 1st March 2022)

<sup>4</sup> <http://gis.epa.ie/> (last accessed 1st March 2022)

<sup>5</sup> <https://www.npws.ie/> (last accessed 1st March 2022)

<sup>6</sup> <https://maps.biodiversityireland.ie/> (last accessed 1st March 2022)

<sup>7</sup> <https://www.eplanning.ie/OffalyCC/searchtypes> (last accessed 1<sup>st</sup> March 2022)

<sup>8</sup> <https://myplan.ie/> (last accessed 1<sup>st</sup> March 2022)

<sup>9</sup> <https://birdwatchireland.ie/> (last accessed 1<sup>st</sup> March 2022)

## 2.2 Limitations

### 2.2.1 Desk Study

Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

### 2.2.2 Field Survey(s)

No surveys were undertaken to inform this report. The site visit was high-level in nature and did not assess habitats and species. As such, it should not be considered in lieu of targeted, detailed ecological surveys.

## 3.0 Baseline Ecological Conditions

This section sets out the baseline conditions for the ecological features considered within the proposed project site using the findings of the desk study.

### 3.1 Designated Sites

#### 3.1.1 Natura 2000 Sites

##### Wind Farm Site

There are 21 Natura 2000 sites within 20km of the proposed wind farm. The Site is not situated within any Natura 2000 site. There are two Natura 2000 sites within 2km of the Site boundary, namely Dovegrove Callows SPA (004137) and Ridge Road, SW of Rapemills SAC (000919).

There is a direct hydrological connection to seven Natura 2000 sites, namely Middle Shannon Callows SPA, River Little Brosna Callows SPA, All Saints Bog SPA, Lough Derg (Shannon) SPA, All Saints Bog and Esker SAC, River Shannon Callows SAC, and Lough Derg, North-east Shore SAC. Rapemills river flows through the Site westward where it drains to River Shannon via (IE\_SH\_25R010500). It is through River Shannon and its tributaries that the Site is then connected to these Natura 2000 sites.

There is a potential for a hydrological connection to several Natura 2000 sites via groundwater as these sites are situated within the same catchment as the proposed Site. These are Dovegrove Callows SPA, Ridge Road, SW of Rapemills SAC, Ballyduff/Clonfinane Bog SAC, Lisduff Fen SAC, Island Fen SAC, Sharavogue Bog SAC, Redwood Bog SAC, Slieve Bloom Mountains SPA, Moyclare Bog SAC, Slieve Bloom Mountains SAC, Ferbane Bog SAC, and Fin Lough (Offaly) SAC.

There are seven SPAs within 20km of the proposed Wind Farm. The Site is within the Core Foraging Range for a number of Species of Conservation Interest (SCI) for which these SPAs are designated (outlined in Table 3-1 below). Of the SCI for which these SPA's are designated, there is limited suitable habitat present within the Site for the following SCI:

- Black-headed gull
- Golden plover
- Greenland white-fronted goose
- Whooper swan

The habitats within the Site may be used by these species on a limited basis and during suitable conditions (e.g. following periods of heavy rainfall).

Hen Harrier is an SCI for Slieve Bloom Mountains SPA. Hen Harrier has been recorded within the proposed wind farm site during the 2020/2021 bird survey period.

There is a lack of hydrological or ecological connection between the proposed site and Arragh More (Derrybreen) Bog SAC, Kilcarren-Firville Bog SAC, Liskeenan Fen SAC, Clonaslee Eskers and Derry Bog SAC, and Scohaboy (Sopwell) Bog SAC.

Natura 2000 sites within 20km of the proposed site are presented in Table 3-1.

Table 3-1 Natura 2000 sites within 20km – Wind Farm Site

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Dovegrove Callows SPA	004137	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	1.48	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).  The Site is within the Core Foraging Range (CFR) for this Species of Conservation Interest (SCI), i.e. 5-8km.
Ridge Road, SW of Rapemills SAC	000919	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	1.80	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
River Little Brosna Callows SPA	004086	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Teal ( <i>Anas crecca</i> ) [A052] Pintail ( <i>Anas acuta</i> ) [A054] Shoveler ( <i>Anas clypeata</i> ) [A056] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395] Wetland and Waterbirds [A999]	3.15	Yes, there is a hydrological connection via Incherky river (IE_SH_251020930) which is a tributary of River Shannon.  The Site is within the CFR for whooper swan, golden plover, black-headed gull, black-tailed godwit, and Greenland white-fronted goose. A CFR has not been established for the other SCI, so the maximum of 20km (as per Nature Scot, 2018) has been assumed.
All Saints Bog and Esker SAC	000566	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	3.16	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300).
All Saints Bog SPA	004103	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	3.16	Yes. There is a hydrological connection between this SAC and the proposed site via

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
				River Rapemills (EU Code: IE_SH_25R010300). The Site is within the CFR for this SCI, i.e. 5-8km.
River Shannon Callows SAC	000216	Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410] Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) [6510] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Lutra lutra</i> (Otter) [1355]	6.62	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300).
Middle Shannon Callows SPA	004096	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Corncrake ( <i>Crex crex</i> ) [A122] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Wetland and Waterbirds [A999]	6.62	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300). The Site is within the CFR for whooper swan, black-tailed godwit black-headed gull, and golden plover. A CFR has not been established for the other SCI, so the maximum of 20km (as per Nature Scot, 2018) has been assumed.
Ballyduff/Clonfinane Bog SAC	000641	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	7.14	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Lisduff Fen SAC	002147	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	8.24	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Island Fen SAC	002236	<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	8.54	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).



Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Sharavogue Bog SAC	000585	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.22	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Redwood Bog SAC	002353	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.34	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Arragh More (Derrybreen) Bog SAC	002207	Degraded raised bogs still capable of natural regeneration [7120]	10.60	No.
Kilcarren-Firville Bog SAC	000647	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	11.31	No.
Slieve Bloom Mountains SPA	004160	Hen Harrier ( <i>Circus cyaneus</i> ) [A082]	11.65	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).  The Site is within the CFR Hen Harrier (i.e. 2-10km).
Moyclare Bog SAC	000581	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	12.08	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Slieve Bloom Mountains SAC	000412	Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs (* if active bog) [7130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0]	13.59	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Liskeenan Fen SAC	001683	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210]	13.96	No.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ferbane Bog SAC	000575	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	14.02	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Clonaslee Eskers And Derry Bog SAC	000859	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	15.02	No.
River Suck Callows SPA	004097	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395] Wetland and Waterbirds [A999]	17.29	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300).  The Site is within the CFR for whooper swan, golden plover, and Greenland white-fronted goose. A CFR has not been established for the other SCI, so the maximum of 20km (as per Nature Scot, 2018) has been assumed.
Lough Derg, North-east Shore SAC	002241	<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0]	17.32	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300) which drains to the River Shannon, which drains to Lough Derg.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Lough Derg (Shannon) SPA	004058	Cormorant ( <i>Phalacrocorax carbo</i> ) [A017] Tufted Duck ( <i>Aythya fuligula</i> ) [A061] Goldeneye ( <i>Bucephala clangula</i> ) [A067] Common Tern ( <i>Sterna hirundo</i> ) [A193] Wetland and Waterbirds [A999]	17.49	Yes. There is a hydrological connection between this SAC and the proposed site via River Rapemills (EU Code: IE_SH_25R010300) which drains to the River Shannon, which drains to Lough Derg.  The Site is within the CFR for cormorant. A CFR has not been established for the other SCI so the maximum of 20km (as per Nature Scot, 2018) has been assumed.
Fin Lough (Offaly) SAC	000576	Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	18.03	There is a potential groundwater connection to this SAC as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Schoaboy (Sopwell) Bog SAC	002206	Degraded raised bogs still capable of natural regeneration [7120]	18.75	No.

### Grid Connection Route – Option 1

There are 17 Natura 2000 sites within 20km of Option 1 (Table 3-2). The route does not traverse any Natura 2000 site. However, it is situated within 15m of Dovegrove Callows SPA which is designated for Greenland white-fronted goose. The route is primarily situated along existing roads and some agricultural grassland. This is sub-optimal habitat, and of limited to negligible ecological value to the species.

There is a hydrological connection to Dovegrove Callows SPA, River Little Brosna Callows SPA, River Shannon Callows SAC, and Middle Shannon Callows SPA via Little Brosna river (IE\_SH\_25L021000). As such, there is potential for habitat-quality impacts on this SPA in the absence of avoidance/mitigation measures.

### Grid Connection Route – Option 2

There are 19 Natura 2000 sites within 20km of Option 2 (Table 3-3). The route runs adjacent to Ridge Riad, SW of Rapemills SAC.

This route lies within 58m of Rapemills river (IE\_SH\_25R010300) which flows westward to All Saints Bog and Esker SAC, River Shannon Callows SAC, Middle Shannon Callows SPA, Lough Derg, North-east Shore SAC, and Lough Derg (Shannon) SPA. As such, there is potential for habitat-quality impacts on this SPA in the absence of avoidance/mitigation measures.

There are six SPAs within 20km of Option 2. However, the habitats along the route are primarily artificial in nature and of no ecological value to these species.

### **Grid Connection Route – Option 3**

There are 19 Natura 2000 sites within 20km of Option 3 (Table 3-4). The route runs through River Shannon Callows SAC, and Middle Shannon Callows SPA.

Option 3 crosses Rapemills river (IE\_SH\_25R010300) which flows westward to All Saints Bog and Esker SAC, River Suck Callows SPA, All Saints Bog SPA, and River Little Brosna Callows SPA. As such, there is potential for habitat-quality impacts on this SPA in the absence of avoidance/mitigation measures.

There are seven SPAs within 20km of Option 3. However, the habitats along the route are primarily artificial in nature and of no ecological value to these species.

Table 3-2 Natura 2000 sites within 20km – Option 1

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Dovegrove Callows SPA	004137	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	0.15	Yes. There is a hydrological connection to this SPA via Little Brosna river (IE_SH_25L021000).
Ridge Road, SW of Rapemills SAC	000919	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	1.52	No.
River Little Brosna Callows SPA	004086	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Teal ( <i>Anas crecca</i> ) [A052] Pintail ( <i>Anas acuta</i> ) [A054] Shoveler ( <i>Anas clypeata</i> ) [A056] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395] Wetland and Waterbirds [A999]	2.84	Yes. There is a hydrological connection to this SPA via Little Brosna river (IE_SH_25L021000).
All Saints Bog and Esker SAC	000566	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	3.34	No.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
		Bog woodland [91D0]		
All Saints Bog SPA	004103	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	3.34	No. Option 2 is outside the core foraging range for this SCI.
Ballyduff/Clonfinane Bog SAC	000641	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	5.81	No.
River Shannon Callows SAC	000216	Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinia caerulea</i> ) [6410] Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) [6510] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Lutra lutra</i> (Otter) [1355]	7.00	Yes. There is a hydrological connection to this SAC via Little Brosna river (IE_SH_25L021000).
Middle Shannon Callows SPA	004096	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Corncrake ( <i>Crex crex</i> ) [A122] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Wetland and Waterbirds [A999]	7.00	Yes. There is a hydrological connection to this SPA via Little Brosna river (IE_SH_25L021000).
Lisduff Fen SAC	002147	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	7.69	No.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Sharavogue Bog SAC	000585	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	8.18	No.
Redwood Bog SAC	002353	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.03	No.
Island Fen SAC	002236	<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	9.13	No.
Arragh More (Derrybreen) Bog SAC	002207	Degraded raised bogs still capable of natural regeneration [7120]	9.39	No.
Kilcarren-Firville Bog SAC	000647	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	10.11	No.
Liskeenan Fen SAC	001683	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	12.63	No.
Moyclare Bog SAC	000581	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	13.65	No.
Slieve Bloom Mountains SPA	004160	Hen Harrier ( <i>Circus cyaneus</i> ) [A082]	13.74	No. Option 2 is outside the core foraging range for this SCI.

**Table 3-3 Natura 2000 sites within 20km – Option 2**

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ridge Road, SW of Rapemills SAC	000919	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	0.00	No, Option 2 adjacent through this SAC, but shall be confined to the existing roadway.
All Saints Bog SPA	004103	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	0.09	No. While Option 2 is within the core foraging range for this SCI, the habitats are artificial in nature and of no ecological value to this species.
All Saints Bog and Esker SAC	000566	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	0.13	Option 2 is within 58m of Rapemills river (IE_SH_25R010300) which flows westward to this SAC.
River Little Brosna Callows SPA	004086	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Teal ( <i>Anas crecca</i> ) [A052] Pintail ( <i>Anas acuta</i> ) [A054] Shoveler ( <i>Anas clypeata</i> ) [A056] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	0.24	No. While Option 2 is within the core foraging range for these SCI, the habitats are artificial in nature and of no ecological value to these species.



Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
		Wetland and Waterbirds [A999]		
Dovegrove Callows SPA	004137	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	0.61	No. While Option 2 is within the core foraging range for these SCI, the habitats are artificial in nature and of no ecological value to these species.
River Shannon Callows SAC	000216	Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410] Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) [6510] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Lutra lutra</i> (Otter) [1355]	4.44	Option 2 is within 58m of Rapemills river (IE_SH_25R010300) which flows westward to this SAC.
Middle Shannon Callows SPA	004096	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Corncrake ( <i>Crex crex</i> ) [A122] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Wetland and Waterbirds [A999]	4.44	Option 2 is within 58m of Rapemills river (IE_SH_25R010300) which flows westward to this SPA. While Option 2 is within the core foraging range for these SCI, the habitats are artificial in nature and of no ecological value to these species.
Redwood Bog SAC	002353	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	5.59	No.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ballyduff/Clonfinane Bog SAC	000641	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	5.78	No.
Arragh More (Derrybreen) Bog SAC	002207	Degraded raised bogs still capable of natural regeneration [7120]	8.34	No.
Lisduff Fen SAC	002147	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	8.79	No.
Kilcarren-Firville Bog SAC	000647	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.00	No.
Sharavogue Bog SAC	000585	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.07	No.
Island Fen SAC	002236	<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	9.99	No.
Liskeenan Fen SAC	001683	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	12.36	No.
Moyclare Bog SAC	000581	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	13.65	No.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Lough Derg, North-east Shore SAC	002241	<p>Juniperus communis formations on heaths or calcareous grasslands [5130]                      Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]                      Alkaline fens [7230]                      Limestone pavements [8240]                      Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]  <i>Taxus baccata</i> woods of the British Isles [91J0]</p>	13.81	Option 2 is within 58m of Rapemills river (IE_SH_25R010300) which flows westward to this SAC.
Slieve Bloom Mountains SPA	004160	<p>Hen Harrier (<i>Circus cyaneus</i>) [A082]</p>	13.86	Option 2 is outside of the core foraging range for this SCI. Also, the habitats are artificial in nature and of no ecological value to this species.
Lough Derg (Shannon) SPA	004058	<p>Cormorant (<i>Phalacrocorax carbo</i>) [A017]                      Tufted Duck (<i>Aythya fuligula</i>) [A061]                      Goldeneye (<i>Bucephala clangula</i>) [A067]                      Common Tern (<i>Sterna hirundo</i>) [A193]                      Wetland and Waterbirds [A999]</p>	13.96	<p>Option 2 is within 58m of Rapemills river (IE_SH_25R010300) which flows westward to this SPA.                      While Option 2 is within the core foraging range for these SCI, the habitats are artificial in nature and of no ecological value to these species.</p>

**Table 3-4 Natura 2000 sites within 20km – Option 3**

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
River Shannon Callows SAC	000216	Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410] Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) [6510] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0] <i>Lutra lutra</i> (Otter) [1355]	0.00	Option 3 runs directly through this SAC.
Middle Shannon Callows SPA	004096	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Corncrake ( <i>Crex crex</i> ) [A122] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Wetland and Waterbirds [A999]	0.00	Option 3 runs directly through this SAC.  While Option 3 is within the core foraging range for these SCI, the habitats are primarily artificial in nature and of no ecological value to these species. The route also crosses some agricultural grassland, but the land take would be minimal and not of significant value to these species.
Dovegrove Callows SPA	004137	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	0.97	No. While Option 3 is within the core

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
				foraging range for this SCI, the habitats are primarily artificial in nature and of no significant ecological value to these species.
All Saints Bog and Esker SAC	000566	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	1.15	Option 3 crosses Rapemills river (IE_SH_25R010300) which flows westward to this SAC.
River Suck Callows SPA	004097	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395] Wetland and Waterbirds [A999]	1.45	Option 3 crosses Rapemills river (IE_SH_25R010300) which flows westward to this SPA.  While Option 3 is within the core foraging range for these SCI, the habitats are primarily artificial in nature and of no ecological value to these species.

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ridge Road, SW of Rapemills SAC	000919	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	1.46	No.
All Saints Bog SPA	004103	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	1.53	Option 3 crosses Rapemills river (IE_SH_25R010300) which flows westward to this SPA.  While Option 3 is within the core foraging range for this SCI, the habitats are primarily artificial in nature and of no ecological value to this species.
River Little Brosna Callows SPA	004086	Whooper Swan ( <i>Cygnus cygnus</i> ) [A038] Wigeon ( <i>Anas penelope</i> ) [A050] Teal ( <i>Anas crecca</i> ) [A052] Pintail ( <i>Anas acuta</i> ) [A054] Shoveler ( <i>Anas clypeata</i> ) [A056] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Lapwing ( <i>Vanellus vanellus</i> ) [A142] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395] Wetland and Waterbirds [A999]	2.99	Option 3 crosses Rapemills river (IE_SH_25R010300) which flows westward to this SPA.  While Option 3 is within the core foraging range for these SCI, the habitats are primarily artificial in nature and of no

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
				ecological value to these species.
Moyclare Bog SAC	000581	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	3.58	No
Fin Lough (Offaly) SAC	000576	Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	5.56	No
Ballyduff/Clonfinane Bog SAC	000641	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	6.63	No
Mongan Bog SPA	004017	Greenland White-fronted Goose ( <i>Anser albifrons flavirostris</i> ) [A395]	6.86	No. While Option 3 is within the core foraging range for these SCI, the habitats are primarily artificial in nature and of no ecological value to these species.
Mongan Bog SAC	000580	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	6.87	No
Ferbane Bog SAC	000575	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	7.10	No

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
Redwood Bog SAC	002353	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	7.16	No.
Pilgrim's Road Esker SAC	001776	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	7.40	No.
Lisduff Fen SAC	002147	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	8.80	No.
Sharavogue Bog SAC	000585	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	9.23	No.
Island Fen SAC	002236	<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	10.00	No.
Arragh More (Derrybreen) Bog SAC	002207	Degraded raised bogs still capable of natural regeneration [7120]	10.12	No.
Kilcarren-Firville Bog SAC	000647	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	10.84	No.
Liskeenan Fen SAC	001683	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	13.44	No.
Slieve Bloom Mountains SPA	004160	Hen Harrier ( <i>Circus cyaneus</i> ) [A082]	13.86	No. Option 3 is outside of the core foraging range for this SCI. Also, the habitats are primarily artificial in



---

Site	Site Code	Qualifying Interest(s)	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connection (Yes/No)
				nature and of no ecological value to this species.

---

### 3.1.2 Nationally Designated Sites

#### Wind Farm Site

There are 27 nationally designated sites within 20km of the proposed wind farm. The Site is not situated within any designated site.

Woodville Woods pNHA is situated within 35m of the Site. The site synopsis for this site notes mobile species, such as snipe, fallow deer, pine marten, red squirrel and badger. There is suitable habitat for these species within the proposed wind farm site and, thus, a potential ecological link to Woodville Woods pNHA.

There are 13 pNHAs within the same catchment area as the site, namely Ross And Glens Eskers pNHA, Lough Coura pNHA, Ridge Road, SW Of Rapemills pNHA, Dovegrove Callows pNHA, All Saints Bog And Esker pNHA, Ballyduff/Clonfinane Bog pNHA, Cloghanbeg pNHA, Derrykeel Meadows pNHA, Sharavogue Bog pNHA, River Shannon Callows pNHA, Camcor Wood pNHA, Ferbane Bog pNHA, and Slieve Bloom Mountains pNHA. As such, there is potential for a hydrological link between the Site and these pNHAs. Further investigation is required to establish if there is a connection.

There is a direct hydrological connection to River Shannon Callows pNHA via Rapemills river (IE\_SH\_25R010300) which flows westward to this pNHA. As such, there is potential for water quality impacts on these designated sites in the absence of avoidance/mitigation measures.

There is a lack of hydrological or ecological connection between the proposed site and Grand Canal pNHA, Redwood Bog pNHA, Lough Boora pNHA, Kilcarren-Firville Bog pNHA, Moyclare Bog pNHA, Liskeenan Fen pNHA, Kinnitty (Domestic Dwelling, Occupied) pNHA, and Clonfert Cathedral pNHA.

Nationally designated sites within 20km are presented in Table 3-5.

**Table 3-5 Nationally designated sites within 20km - Wind Farm Site**

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
Woodville Woods pNHA	000927	Large stand of woodland comprised of oak, hazel, beech, with bramble, ivy, primrose, bluebell, and dog's mercury. An accreted lake colonised by common reed, common club-rush, water horsetail, bulrush. Snipe, fallow deer, pine marten, red squirrel and badger present.	0.35	There is likely to be an ecological connection with species moving between the pNHA and the Site.
Ross And Glens Eskers pNHA	000920	Gravel esker ridge grading into a cutaway bog of good peat depth. The esker ridge supports a good example of a substantially undisturbed Hazel scrub and forms an important ecological example of landscape formation. The adjoining cutaway bog and fine birch woodland add habitat diversity to this site.	0.46	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Lough Coura pNHA	000909	A small in-filled lake with very few damp areas found. Purple moor grass, common reed, black bog-rush, great fen sedge, broad-leaved pondweed, mare's-tail, lesser tussock sedge, fly orchid and narrow-leaved marsh orchid have been recorded here.	0.73	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Ridge Road, SW Of Rapemills pNHA	000919	No site synopsis available. However, it overlaps with Ridge Road, SW of Rapemills SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.81	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
Dovegrove Callows pNHA	000010	No site synopsis available. However, it overlaps with Dovegrove Callows SPA. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.83	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
All Saints Bog And Esker pNHA	000566	No site synopsis available. However, it overlaps with All Saints Bog And Esker SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	3.16	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Birr (Domestic Dwelling No.1, Occupied) pNHA	000569	A nursery roost for the Leisler's Bat (ca. 100 bats).	4.17	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Birr (Domestic Dwelling No.2, Occupied) pNHA	000568	A nursery roost for over 200 Leisler's Bats (ca. 200 bats).	4.28	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Bracken's Dwelling, Near Whiteford pNHA	002058	A nursery roost for the Leisler's Bat (ca. 80 bats).	5.48	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Banagher (Domestic Dwelling, Occupied) pNHA	000567	A summer and possibly winter roost of the Brown Long-eared Bat (ca. 60 bats).	5.84	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
River Shannon Callows pNHA	000216	No site synopsis available. However, it overlaps with River Shannon Callows SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	6.62	There is a hydrological connection via Rapemills river (IE_SH_25R010300) which flows westward to this pNHA.
Ballyduff/Clonfinane Bog pNHA	000641	No site synopsis available. However, it overlaps with Ballyduff/Clonfinane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	7.14	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Cloghanbeg pNHA	002059	A nursery roost for the Leisler's Bat (ca. 50 bats).	7.93	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Derrykeel Meadows pNHA	000897	The calcium-rich substratum of the meadows gives rise to an interesting ecological habitat. Black Bog-rush, Common Reed, Purple Moor-grass, Purple-loosestrife, Soft Rush, Hard Rush, Selfheal, and Common Butterwort are abundant. Wandering Snail ( <i>Lymnaea peregra</i> ) also flourishes in this habitat. Blunt flowered Rush ( <i>Juncus subnodulosus</i> ) is also common in certain areas.	8.16	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Grand Canal pNHA	002104	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.	8.66	No.

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
Sharavogue Bog pNHA	000585	No site synopsis available. However, it overlaps Sharavogue Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	9.22	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Redwood Bog pNHA	000654	No site synopsis available. However, it overlaps Redwood Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	9.34	No.
Lough Boora pNHA	001365	The drained lake-bed consists of shallow fen peat overlying calcareous shell-marsh. The surface of the western portion has been left undisturbed allowing plant colonisation and regeneration.	9.62	No.
Kinnitty (Domestic Dwelling, Occupied) pNHA	000579	A summer roost for the Leisler's Bat (ca. 100 bats).	10.05	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
River Shannon Callows pNHA	000216	No site synopsis available. However, it overlaps Moyclare Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	10.65	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Kilcarren-Firville Bog pNHA	000647	No site synopsis available. However, it overlaps Kilcarren-Firville Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	11.31	No.

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
Moyclare Bog pNHA	000581	No site synopsis available. However, it overlaps Moyclare Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	12.08	No.
Camcor Wood pNHA	000889	This is a particularly fine example of woodland in a fairly natural condition, although unfortunately the Glinsk gully has suffered to a serious degree from conifer plantation. The native woodland has an impressive age structure with much regeneration, and an equally impressive ground layer, notably species-rich, with 42 mosses, 12 ferns, 15 grasses, and 90 other higher plant species recorded.	13.59	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Liskeenan Fen pNHA	001683	No site synopsis available. However, it overlaps Liskeenan Fen SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	13.96	No.
Ferbane Bog pNHA	000575	No site synopsis available. However, it overlaps Ferbane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	14.01	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).
Slieve Bloom Mountains pNHA	000412	No site synopsis available. However, it overlaps Slieve Bloom Mountains SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	14.03	There is a potential groundwater connection to this pNHA as it is within the same catchment as the proposed wind farm (i.e. Lower Shannon).

Site	Site Code	Qualifying Interests	Distance from Proposed Project Site (km)	Potential Hydrological or Ecological Connectivity (Yes/No)
Clonfert Cathedral pNHA	000244	A large colony of Brown Long-eared Bats. There may be over 100 bats roosting in the church roof, and they may be present all year round.	14.59	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).



### Grid Connection Route – Option 1

There are 33 nationally designated sites within 20km of Option 1 (Table 3-6). The route is not located within any nationally designated site.

There is a direct hydrological connection between the site and Dovegrove Callows pNHA, River Little Brosna Callows NHA, and River Shannon Callows pNHA via Little Brosna river (IE\_SH\_25L021000). As such, there is a potential for water-quality impacts in the absence of avoidance/mitigation measures.

There is a lack of hydrological or ecological connection between the proposed site and 29 nationally designated sites, namely:

- Ross And Glens Eskers pNHA, Woodville Woods pNHA
- Ridge Road, SW Of Rapemills pNHA
- Lough Coura pNHA
- Birr (Domestic Dwelling No.1, Occupied) pNHA
- All Saints Bog And Esker pNHA
- Birr (Domestic Dwelling No. 2, Occupied) pNHA
- Killeen Bog NHA
- Bracken's Dwelling, Near Whiteford pNHA
- Ballyduff/Clonfinane Bog pNHA
- Banagher (Domestic Dwelling, Occupied) pNHA
- Cloghanbeg pNHA
- Sharavogue Bog pNHA
- Arragh More Bog NHA
- Redwood Bog pNHA
- Grand Canal pNHA
- Kilcarren-Firville Bog pNHA
- Derrykeel Meadows pNHA
- Kilnaborris Bog NHA
- Lorrha Bog NHA
- Lough Boora pNHA
- Ballymacegan Bog NHA
- Kinnitty (Domestic Dwelling, Occupied) pNHA
- Liskeenan Fen pNHA
- Moyclare Bog pNHA
- Cangort Bog NHA
- Lough Nahinch (Tipperary) pNHA
- Fiagh Bog pNHA
- Friar's Lough pNHA
- Meeneen Bog NHA

Nationally designated sites within 20km are presented in

Table 3-5.

### Grid Connection Route – Option 2

There are 34 nationally designated sites within 20km of Option 2 (Table 3-7). The route crosses Ross And Glens Eskers pNHA, and Ridge Road, SW Of Rapemills pNHA. As such, there is potential for a direct impact on these two sites.

Woodville Woods pNHA is situated within 11m of Option 2. The site synopsis for this site notes mobile species, such as snipe, fallow deer, pine marten, red squirrel and badger. There is suitable habitat for these species within the limited semi-natural habitats along the route. Thus, there is a potential ecological link to Woodville Woods pNHA.

There is a lack of hydrological or ecological connection between the proposed site and 29 nationally designated sites, namely:

- All Saints Bog And Esker pNHA
- River Little Brosna Callows NHA
- Dovegrove Callows pNHA
- Lough Coura pNHA
- Birr (Domestic Dwelling No.1, Occupied) pNHA
- River Shannon Callows pNHA
- Birr (Domestic Dwelling No. 2, Occupied) pNHA
- Cloghanbeg pNHA
- Killeen Bog NHA
- Redwood Bog pNHA
- Ballyduff/Clonfinane Bog pNHA
- Bracken's Dwelling, Near Whiteford pNHA
- Banagher (Domestic Dwelling, Occupied) pNHA
- Arragh More Bog NHA
- Kilnaborris Bog NHA
- Lorrha Bog NHA
- Ballymacegan Bog NHA
- Grand Canal pNHA
- Sharavogue Bog pNHA
- Derrykeel Meadows pNHA
- Meeneen Bog NHA
- Friar's Lough pNHA
- Lough Boora pNHA
- Liskeenan Fen pNHA
- Clonfert Cathedral pNHA
- Kinnitty (Domestic Dwelling, Occupied) pNHA
- Moyclare Bog pNHA
- Fiagh Bog pNHA
- Lough Derg pNHA
- Cangort Bog NHA
- Lough Nahinch (Tipperary) pNHA

### Grid Connection Route – Option 3

There are 47 nationally designated sites within 20km of Option 3 (Table 3-8). The route crosses River Shannon Callows pNHA, and Grand Canal pNHA. As such, there is potential for a direct impact on these two sites.

Woodville Woods pNHA is situated within 11m of Option 3. The site synopsis for this site notes mobile species, such as snipe, fallow deer, pine marten, red squirrel and badger. There is suitable habitat for these species within the limited semi-natural habitats along the route. Thus, there is a potential ecological link to Woodville Woods pNHA.

There is a hydrological connection between Option 3 and All Saints Bog And Esker pNHA, Suck River Callows NHA, River Little Brosna Callows NHA, Cloghanbeg pNHA, and Killeen Bog NHA via Brosna river (IE\_SH\_25B091200) and Rapemills river (IE\_SH\_25R010500). As such, there is potential for impacts on these designated sites in the absence of avoidance/mitigation measures.

There is a lack of hydrological or ecological connection between the proposed site and 29 nationally designated sites, namely:

- All Saints Bog And Esker pNHA
- River Little Brosna Callows NHA
- Dovegrove Callows pNHA
- Lough Coura pNHA
- Birr (Domestic Dwelling No.1, Occupied) pNHA
- River Shannon Callows pNHA
- Birr (Domestic Dwelling No. 2, Occupied) pNHA
- Cloghanbeg pNHA
- Killeen Bog NHA
- Redwood Bog pNHA
- Ballyduff/Clonfinane Bog pNHA
- Bracken's Dwelling, Near Whiteford pNHA
- Banagher (Domestic Dwelling, Occupied) pNHA
- Arragh More Bog NHA
- Kilnaborris Bog NHA
- Lorrha Bog NHA
- Ballymacegan Bog NHA
- Grand Canal pNHA
- Sharavogue Bog pNHA
- Derrykeel Meadows pNHA
- Meeneen Bog NHA
- Friar's Lough pNHA
- Lough Boora pNHA
- Liskeenan Fen pNHA
- Clonfert Cathedral pNHA
- Kinnitty (Domestic Dwelling, Occupied) pNHA
- Moyclare Bog pNHA
- Fiagh Bog pNHA
- Lough Derg pNHA
- Cangort Bog NHA
- Lough Nahinch (Tipperary) pNHA

**Table 3-6 Nationally Designated Sites within 20km – Option 1**

Site	Site Code	Qualifying Interest(s)	Distance from Option 1 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ross And Glens Eskers pNHA	000920	Gravel esker ridge grading into a cutaway bog of good peat depth. The esker ridge supports a good example of a substantially undisturbed Hazel scrub and forms an important ecological example of landscape formation. The adjoining cutaway bog and fine birch woodland add habitat diversity to this site.	0.01	No. The route will be restricted to the existing roadway and will not encroach on this pNHA.
Woodville Woods pNHA	000927	Large stand of woodland comprised of oak, hazel, beech, with bramble, ivy, primrose, bluebell, and dog's mercury. An accreted lake colonised by common reed, common club-rush, water horsetail, bulrush. Snipe, fallow deer, pine marten, red squirrel and badger present.	0.10	No. The route will be restricted to the existing roadway and will not encroach on this pNHA.
Dovegrove Callows pNHA	000010	No site synopsis available. However, it overlaps with Dovegrove Callows SPA. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	0.57	Yes. There is a hydrological connection to this pNHA via Little Brosna river (IE_SH_25L021000).
Ridge Road, SW Of Rapemills pNHA	000919	No site synopsis available. However, it overlaps with Ridge Road, SW of Rapemills SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.53	No.
Lough Coura pNHA	000909	A small in-filled lake with very few damp areas found. Purple moor grass, common reed, black bog-rush, great fen sedge, broad-leaved pondweed, mare's-tail, lesser tussock sedge, fly orchid and narrow-leaved marsh orchid have been recorded here.	2.70	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 1 (km)	Potential Hydrological or Ecological Connection (Yes/No)
River Little Brosna Callows NHA	000564	Peatlands [4] Birds [12]	2.84	Yes. There is a hydrological connection to this pNHA via Little Brosna river (IE_SH_25L021000).
Birr (Domestic Dwelling No.1, Occupied) pNHA	000569	A nursery roost for the Leisler's Bat (ca. 100 bats).	3.21	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
All Saints Bog And Esker pNHA	000566	No site synopsis available. However, it overlaps with All Saints Bog And Esker SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	3.34	No.
Birr (Domestic Dwelling No. 2, Occupied) pNHA	000568	A nursery roost for over 200 Leisler's Bats (ca. 200 bats).	3.39	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Killeen Bog NHA	000648	Peatlands [4]	4.37	No.
Bracken's Dwelling, Near Whiteford pNHA	002058	A nursery roost for the Leisler's Bat (ca. 80 bats).	4.96	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Ballyduff/Clonfinane Bog pNHA	000641	No site synopsis available. However, it overlaps with Ballyduff/Clonfinane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	5.81	No.
Banagher (Domestic Dwelling, Occupied) pNHA	000567	A summer and possibly winter roost of the Brown Long-eared Bat (ca. 60 bats).	6.69	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).

Site	Site Code	Qualifying Interest(s)	Distance from Option 1 (km)	Potential Hydrological or Ecological Connection (Yes/No)
River Shannon Callows pNHA	000216	No site synopsis available. However, it overlaps with River Shannon Callows SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	7.00	Yes. There is a hydrological connection to this pNHA via Little Brosna river (IE_SH_25L021000).
Cloghanbeg pNHA	002059	A nursery roost for the Leisler's Bat (ca. 50 bats).	8.15	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Sharavogue Bog pNHA	000585	No site synopsis available. However, it overlaps with Sharavogue Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	8.17	No.
Arragh More Bog NHA	000640	Peatlands [4]	9.00	No.
Redwood Bog pNHA	000654	No site synopsis available. However, it overlaps with Redwood Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	9.03	No.
Grand Canal pNHA	002104	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.	9.30	No.
Kilcarren-Firville Bog pNHA	000647	No site synopsis available. However, it overlaps Kilcarren-Firville Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	10.11	No.
Derrykeel Meadows pNHA	000897	The calcium-rich substratum of the meadows gives rise to an interesting ecological habitat.	10.35	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 1 (km)	Potential Hydrological or Ecological Connection (Yes/No)
		Black Bog-rush, Common Reed, Purple Moor-grass, Purple-loosestrife, Soft Rush, Hard Rush, Selfheal, and Common Butterwort are abundant. Wandering Snail ( <i>Lymnaea peregra</i> ) also flourishes in this habitat. Blunt flowered Rush ( <i>Juncus subnodulosus</i> ) is also common in certain areas.		
Kilnaborris Bog NHA	000284	Peatlands [4]	11.19	No.
Lorrha Bog NHA	001684	Peatlands [4]	11.28	No.
Lough Boora pNHA	001365	The drained lake-bed consists of shallow fen peat overlying calcareous shell-marsh. The surface of the western portion has been left undisturbed allowing plant colonisation and regeneration.	12.03	No.
Ballymacegan Bog NHA	000642	Peatlands [4]	12.42	No.
Kinnitty (Domestic Dwelling, Occupied) pNHA	000579	A summer roost for the Leisler's Bat (ca. 100 bats).	12.46	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Liskeenan Fen pNHA	001683	No site synopsis available. However, it overlaps Liskeenan Fen SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	12.63	No.
Moyclare Bog pNHA	000581	No site synopsis available. However, it overlaps Moyclare Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	13.64	No.
Cangort Bog NHA	000890	Peatlands [4]	13.73	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 1 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Lough Nahinch (Tipperary) pNHA	000936	<p>The lake is fringed by sparse Common Club-rush swamp. The lower wet areas of adjacent peat support interesting plant communities, including the peatland species Round-leaved Sundew, Bog Asphodel, and other species such as butterfly-orchid, Early-purple Orchid, Common Twayblade and Slender Sedge. Gorse and Downy Birch are colonising some areas, and Buckthorn is also recorded as profuse. An area of mature planted woodland extends to the north and adds diversity to the site. The site is important for a range of breeding water birds such as Redshank, Snipe and Water Rail, and the bird interest is increased in the winter when migratory species use the site.</p> <p>Water Germander which is restricted to the Shannon, and loughs in East Clare and Tipperary, is another notable occurrence.</p>	14.11	No.
Fiagh Bog pNHA	000932	<p>It is not a bog in the true sense but a calcium-rich fen formed over Lower Limestone. It supports dried out areas of coarse grassland and Gorse scrub, around the wet fen area. The vegetation here is characterised by Black Bog-rush and <i>Campylium stellatum</i>. There is also some Common Reed present. The rare Round-mouthed Whorl Snail (<i>Vertigo geyeri</i>).</p>	14.23	No.
Friar's Lough pNHA	000933	<p>A small lake with adjacent woodland. The lough itself is fringed with dense reed-beds. Scrubby and boggy species such as Bracken and Bilberry occur under the woodland canopy. Alder Buckthorn is also present here.</p>	14.42	No.
Meeneen Bog NHA	000310	Peatlands [4]	14.53	No.



**Table 3-7 Nationally Designated Sites within 20km – Option 2**

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Ross And Glenns Eskers pNHA	000920	Gravel esker ridge grading into a cutaway bog of good peat depth. The esker ridge supports a good example of a substantially undisturbed Hazel scrub and forms an important ecological example of landscape formation. The adjoining cutaway bog and fine birch woodland add habitat diversity to this site.	0.00	Yes. Option 2 crosses this pNHA.
Ridge Road, SW Of Rapemills pNHA	000919	No site synopsis available. However, it overlaps Ridge Road, SW Of Rapemills SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	0.00	Yes. Option 2 crosses this pNHA.
All Saints Bog And Esker pNHA	000566	No site synopsis available. However, it overlaps All Saints Bog And Esker SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	0.09	No.
Woodville Woods pNHA	000927	Large stand of woodland comprised of oak, hazel, beech, with bramble, ivy, primrose, bluebell, and dog's mercury. An accreted lake colonised by common reed, common club-rush, water horsetail, bulrush. Snipe, fallow deer, pine marten, red squirrel and badger present.	0.11	There is likely to be an ecological connection with species moving between the pNHA and the Site.
River Little Brosna Callows NHA	000564	Peatlands [4] Birds [12]	0.24	No.
Dovegrove Callows pNHA	000010	No site synopsis available. However, it overlaps with Dovegrove Callows SPA. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.15	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Lough Coura pNHA	000909	A small in-filled lake with very few damp areas found. Purple moor grass, common reed, black bog-rush, great fen sedge, broad-leaved pondweed, mare's-tail, lesser tussock sedge, fly orchid and narrow-leaved marsh orchid have been recorded here.	2.70	No.
Birr (Domestic Dwelling No.1, Occupied) pNHA	000569	A nursery roost for the Leisler's Bat (ca. 100 bats).	4.30	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
River Shannon Callows pNHA	000216	No site synopsis available. However, it overlaps with River Shannon Callows SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	4.44	No.
Birr (Domestic Dwelling No. 2, Occupied) pNHA	000568	A nursery roost for over 200 Leisler's Bats (ca. 200 bats).	4.50	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Cloghanbeg pNHA	002059	A nursery roost for the Leisler's Bat (ca. 50 bats).	4.70	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Killeen Bog NHA	000648	Peatlands [4]	4.76	No.
Redwood Bog pNHA	000654	No site synopsis available. However, it overlaps with Redwood Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	5.59	No.
Ballyduff/Clonfinane Bog pNHA	000641	No site synopsis available. However, it overlaps with Ballyduff/Clonfinane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	5.79	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Bracken's Dwelling, Near Whiteford pNHA	002058	A nursery roost for the Leisler's Bat (ca. 80 bats).	6.06	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Banagher (Domestic Dwelling, Occupied) pNHA	000567	A summer and possibly winter roost of the Brown Long-eared Bat (ca. 60 bats).	6.69	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).
Arragh More Bog NHA	000640	Peatlands [4]	8.13	No.
Kilnaborris Bog NHA	000284	Peatlands [4]	8.27	No.
Lorrha Bog NHA	001684	Peatlands [4]	8.92	No.
Ballymacegan Bog NHA	000642	Peatlands [4]	8.96	No.
Grand Canal pNHA	002104	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.	9.00	No.
Sharavogue Bog pNHA	000585	No site synopsis available. However, it overlaps with Sharavogue Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	9.07	No.
Derrykeel Meadows pNHA	000897	The calcium-rich substratum of the meadows gives rise to an interesting ecological habitat. Black Bog-rush, Common Reed, Purple Moor-grass, Purple-loosestrife, Soft Rush, Hard Rush, Selfheal, and Common Butterwort are abundant. Wandering Snail ( <i>Lymnaea peregra</i> ) also flourishes in this habitat. Blunt flowered Rush ( <i>Juncus subnodulosus</i> ) is also common in certain areas.	10.36	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Meeneen Bog NHA	000310	Peatlands [4]	11.07	No.
Friar's Lough pNHA	000933	A small lake with adjacent woodland. The lough itself is fringed with dense reed-beds. Scrubby and boggy species such as Bracken and Bilberry occur under the woodland canopy. Alder Buckthorn is also present here.	11.95	No.
Lough Boora pNHA	001365	The drained lake-bed consists of shallow fen peat overlying calcareous shell-marsh. The surface of the western portion has been left undisturbed allowing plant colonisation and regeneration.	12.03	No.
Liskeenan Fen pNHA	001683	No site synopsis available. However, it overlaps with Liskeenan Fen SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	12.37	No.
Clonfert Cathedral pNHA	000244	A large colony of Brown Long-eared Bats. There may be over 100 bats roosting in the church roof, and they may be present all year round.	12.43	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).
Kinnitty (Domestic Dwelling, Occupied) pNHA	000579	A summer roost for the Leisler's Bat (ca. 100 bats).	12.48	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Moyclare Bog pNHA	000581	No site synopsis available. However, it overlaps with Moyclare Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	13.65	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Fiagh Bog pNHA	000932	It is not a bog in the true sense but a calcium-rich fen formed over Lower Limestone. It supports dried out areas of coarse grassland and Gorse scrub, around the wet fen area. The vegetation here is characterised by Black Bog-rush and <i>Campylium stellatum</i> . There is also some Common Reed present. The rare Round-mouthed Whorl Snail ( <i>Vertigo geyeri</i> ).	13.83	No.
Lough Derg pNHA	000011	No site synopsis available. However, it overlaps with Lough Derg, North-east Shore SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	13.92	No.
Cangort Bog NHA	000890	Peatlands [4]	14.17	No.
Lough Nahinch (Tipperary) pNHA	000936	The lake is fringed by sparse Common Club-rush swamp. The lower wet areas of adjacent peat support interesting plant communities, including	14.55	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 2 (km)	Potential Hydrological or Ecological Connection (Yes/No)
		<p>the peatland species Round-leaved Sundew, Bog Asphodel, and other species such as butterfly-orchid, Early-purple Orchid, Common Twayblade and Slender Sedge. Gorse and Downy Birch are colonising some areas, and Buckthorn is also recorded as profuse. An area of mature planted woodland extends to the north and adds diversity to the site. The site is important for a range of breeding water birds such as Redshank, Snipe and Water Rail, and the bird interest is increased in the winter when migratory species use the site. Water Germander which is restricted to the Shannon, and loughs in East Clare and Tipperary, is another notable occurrence.</p>		

**Table 3-8 Nationally Designated Sites within 20km – Option 3**

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
River Shannon Callows pNHA	000216	No site synopsis available. However, it overlaps with River Shannon Callows SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	0.00	Yes. There is a hydrological connection to this pNHA via Brosna river (IE_SH_25B091200) and Rapemills river (IE_SH_25R010500).
Grand Canal pNHA	002104	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland.	0.00	Yes. Option 3 traverses this pNHA.
Ross And Glens Eskers pNHA	000920	Gravel esker ridge grading into a cutaway bog of good peat depth. The esker ridge supports a good example of a substantially undisturbed Hazel scrub and forms an important ecological example of landscape formation. The adjoining cutaway bog and fine birch woodland add habitat diversity to this site.	0.01	No.
Woodville Woods pNHA	000927	Large stand of woodland comprised of oak, hazel, beech, with bramble, ivy, primrose, bluebell, and dog's mercury. An accreted lake colonised by common reed, common club-rush, water horsetail, bulrush. Snipe, fallow deer, pine marten, red squirrel and badger present.	0.11	There is likely to be an ecological connection with species moving between the pNHA and the Site.

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
All Saints Bog And Esker pNHA	000566	No site synopsis available. However, it overlaps with All Saints Bog And Esker SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.15	Yes. There is a hydrological connection to this pNHA via Rapemills river (IE_SH_25R010500).
Suck River Callows NHA	000222	Peatlands [4] Birds [12]	1.45	Yes. There is a hydrological connection to this pNHA via Brosna river (IE_SH_25B091200) and Rapemills river (IE_SH_25R010500).
Ridge Road, SW Of Rapemills pNHA	000919	No site synopsis available. However, it overlaps with Ridge Road, SW Of Rapemills SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.47	No.
Dovegrove Callows pNHA	000010	No site synopsis available. However, it overlaps with Dovegrove Callows SPA. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	1.52	No.
Banagher (Domestic Dwelling, Occupied) pNHA	000567	A summer and possibly winter roost of the Brown Long-eared Bat (ca. 60 bats).	1.94	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).
Lough Coura pNHA	000909	A small in-filled lake with very few damp areas found. Purple moor grass, common reed, black bog-rush, great fen sedge, broad-leaved pondweed, mare's-tail, lesser tussock sedge, fly orchid and narrow-leaved marsh orchid have been recorded here.	2.69	No.



Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
River Little Brosna Callows NHA	000564	Peatlands [4] Birds [12]	2.99	Yes. There is a hydrological connection to this pNHA via Rapemills river (IE_SH_25R010500).
Clorhane Wood pNHA	000894	No site synopsis available. However, it overlaps with River Shannon Callows SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	3.05	No.
Moyclare Bog pNHA	000581	No site synopsis available. However, it overlaps with Moyclare Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	3.54	No.
Clonfert Cathedral pNHA	000244	A large colony of Brown Long-eared Bats. There may be over 100 bats roosting in the church roof, and they may be present all year round.	3.54	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3.45km (Bat Conservation Trust, 2016)).
Lough Nanag Esker pNHA	000910	An esker ridge composed of glacial gravels. A small lake occurs in the south-eastern section of the site. Support small populations of the rare and legally protected green-winged Orchid ( <i>Orchis morio</i> ).	4.12	No.
Birr (Domestic Dwelling No.1, Occupied) pNHA	000569	A nursery roost for the Leisler's Bat (ca. 100 bats).	4.30	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Birr (Domestic Dwelling No. 2, Occupied) pNHA	000568	A nursery roost for the Leisler's Bat (ca. 200 bats).	4.50	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Cloghanbeg pNHA	002059	A nursery roost for the Leisler's Bat (ca. 50 bats).	5.00	Yes. There is a hydrological connection to this pNHA via Rapemills river (IE_SH_25R010500).
Killeen Bog NHA	000648	Peatlands [4]	5.24	Yes. There is a hydrological connection to this pNHA via Rapemills river (IE_SH_25R010500).
Kilnaborris Bog NHA	000284	Peatlands [4]	5.47	No.
Fin Lough (Offaly) pNHA	000576	No site synopsis available. However, it overlaps with Fin Lough (Offaly) SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	5.55	No.
Bracken's Dwelling, Near Whiteford pNHA	002058	A nursery roost for the Leisler's Bat (ca. 80 bats).	6.06	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Mongan Bog pNHA	000580	No site synopsis available. However, it overlaps with Mongan Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	6.35	No.
Ballyduff/Clonfinane Bog pNHA	000641	No site synopsis available. However, it overlaps with Ballyduff/Clonfinane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	6.63	No.
Ferbane Bog pNHA	000575	No site synopsis available. However, it overlaps with Ferbane Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	6.87	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Clonfinlough Esker pNHA	000892	Well drained, calcium rich soils of eskers often support interesting and species-rich vegetation. The mosaic of scrub and grassland is attractive to common birds and mammals.	7.08	No.
Pilgrim's Road Esker pNHA	001776	No site synopsis available. However, it overlaps with Pilgrim's Road Esker SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	7.13	No.
Redwood Bog pNHA	000654	No site synopsis available. However, it overlaps with Redwood Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	7.16	No.
Cloonascragh Fen And Black Wood pNHA	001247	The fen is one of the main sites for the very scarce and declining snail. Woodland on eskers is a rare and fragmented habitat in Ireland. There has probably always been woodland at Black Wood. Although coppicing has occurred, the ground flora is extremely diverse and intact. In this situation it gives rare clues as to the character of the original post-glacial woodland development. The transition to peat gives the wood extra interest.	7.40	No.
Sharavogue Bog pNHA	000585	No site synopsis available. However, it overlaps with Sharavogue Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	9.22	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Arragh More Bog NHA	000640	Peatlands [4]	9.75	No.
Cranberry Lough pNHA	001630	A very natural, undisturbed location and is quite attractive to wildlife in the area. Nesting bird species recorded include Sedge Warbler, Reed Bunting, Snipe, Curlew, Little Grebe and Moorhen. Whooper Swans have also been observed here in the winter	10.17	No.
Derrykeel Meadows pNHA	000897	The calcium-rich substratum of the meadows gives rise to an interesting ecological habitat. Black Bog-rush, Common Reed, Purple Moor-grass, Purple-loosestrife, Soft Rush, Hard Rush, Selfheal, and Common Butterwort are abundant. Wandering Snail ( <i>Lymnaea peregra</i> ) also flourishes in this habitat. Blunt flowered Rush ( <i>Juncus subnodulosus</i> ) is also common in certain areas.	10.36	No.
Ballymacegan Bog NHA	000642	Peatlands [4]	10.41	No.
Kilcarren-Firville Bog pNHA	000647	No site synopsis available. However, it overlaps with Kilcarren-Firville Bog SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	10.84	No.
Lough Boora pNHA	001365	The drained lake-bed consists of shallow fen peat overlying calcareous shell-marsh. The surface of the western portion has been left undisturbed allowing plant colonisation and regeneration.	10.88	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Doon Esker Wood pNHA	001830	A long narrow strip of semi-natural woodland along the crest of a steep-sided esker. The ground flora contains many features of the original ancient woodland. This ridge gains even more importance because it is part of the 'Eiscir Riada', the ancient routeway across Ireland to Clonmacnoise and beyond.	11.10	No.
Ballinasloe Esker pNHA	001779	The main habitats are mixed wood and dry broadleaved semi-natural woodland. A freshwater marsh, wet woodland and a small fen also occur on this site.	11.12	No.
Lorrha Bog NHA	001684	Peatlands [4]	11.59	No.
Carrickynaghtan Bog NHA	001623	Peatlands [4]	12.29	
Kinnitty (Domestic Dwelling, Occupied) pNHA	000579	A summer roost for the Leisler's Bat (ca. 100 bats).	12.48	No. This is outside the core sustenance zone (CSZ) for this species (i.e. 3km (Bat Conservation Trust, 2016)).
Meeneen Bog NHA	000310	Peatlands [4]	12.52	No.
Moorfield Bog NHA	000221	Peatlands [4]	13.21	No.
Liskeenan Fen pNHA	001683	No site synopsis available. However, it overlaps with Liskeenan Fen SAC. In the absence of a site synopsis, its Natura 2000 designation takes precedence.	13.44	No.
Clonydonnin Bog NHA	000565	Peatlands [4]	13.94	No.
Cangort Bog NHA	000890	Peatlands [4]	14.42	No.

Site	Site Code	Qualifying Interest(s)	Distance from Option 3 (km)	Potential Hydrological or Ecological Connection (Yes/No)
Friar's Lough pNHA	000933	A small lake with adjacent woodland. The lough itself is fringed with dense reed-beds. Scrubby and boggy species such as Bracken and Bilberry occur under the woodland canopy. Alder Buckthorn is also present here.	14.52	No.

## 3.2 Habitats

### Wind Farm Site

Based on a review of aerial imagery, the Site is predominantly comprised of agricultural grassland, and conifer plantation. The agricultural fields are delineated by hedgerows and treelines throughout. A second-order watercourse (Rapemills river) runs through the north and south of the site, and flows west where it drains to the River Shannon (IE\_SH\_25S012060). Artificial habitats are also present with a road (N62) and access tracks throughout the site.

The Site is within the distribution of eight Annex I habitats, namely:

- Active raised bog (EU Code: 7110)
- Degraded raised bogs still capable of regeneration (EU Code: 7120)
- Transition mires and quaking bogs (EU Code: 7140)
- Depressions on peat substrates of the Rhynchosporion (EU Code 7150)
- Petrifying springs with tufa formation (Cratoneurion) (EU Code: 7220)
- Alkaline fens (EU Code: 7230)
- Alluvial forests with *Alun glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion*) (EU Code: 91E0)
- Bog woodland (EU Code: 91DO)

As such, there is potential for Annex I habitats to be present within the Site.

### Grid Connection Route – Option 1

Option 1 crosses through agricultural grassland, conifer plantation, and hedgerows where it begins within the proposed wind farm site. Following this, it is confined to the existing road which is artificial in nature.

Based on a review of satellite imagery, the route crosses Little Brosna river (IE\_SH\_25L021000) at two points. This river flows west before draining to the River Shannon.

### Grid Connection Route – Option 2

Option 2 crosses through agricultural grassland, conifer plantation, and hedgerows where it begins within the proposed wind farm site. Following this, it is confined to the existing road which is artificial in nature.

Based on a review of satellite imagery, this route option does not traverse any watercourses. However, the eastern end lies within 58m of Rapemills river, which drains to River Shannon.

### Grid Connection Route – Option 3

Option 3 crosses through agricultural grassland, conifer plantation, and hedgerows where it begins within the proposed wind farm site. Following this, it is confined to the existing road which is artificial in nature.

Based on a review of satellite imagery, this route crosses ten watercourses, all of which drain to River Shannon.

## 3.3 Species

### 3.3.1 Plants

#### Wind Farm Site

Records of seven species of rare and/or protected flora were yielded from the data search. As such, there is potential for these species to be present within the wind farm site. The results of this data search are presented below in Table 3-9.

**Table 3-9 Records of rare and/or protected plant species (NPWS, 2022)**

Species		Date of Most Recent Record	Status/Designation	Grid Square
Autumn Lady's-tresses	<i>Spiranthes spiralis</i>	2008	Near threatened	N00
Fly Orchid	<i>Ophrys insectifera</i>	2008	Near threatened	N01
Green-winged Orchid	<i>Orchis morio</i>	2021	Vulnerable and Near Threatened	N00, N01
Lustrous Bog-moss	<i>Sphagnum subnitens</i>	2005	Least Concern.  Protected by Habitats Directive [92/42/EEC] Annex V	N00
Magellanic Bog-moss	<i>Sphagnum magellanicum</i>	2005	Genus is protected under Habitats Directive [92/42/EEC] Annex V	N00
Red Hemp-nettle	<i>Galeopsis angustifolia</i>	2007	Endangered.	N01
Meadow Barley	<i>Hordeum secalinum</i>	1998	Vulnerable.  Flora (Protection) Order, 2015	N01

#### Grid Connection Route Options

The grid connection routes proposed are primarily confined to existing roads which are artificial in nature. There is some semi-natural habitat present at the beginning of these routes, but this overlaps with the wind farm boundary which is discussed above. As such, no other protected/rare plant species are envisaged as being present along the route options.



### 3.3.2 Invertebrates

#### Wind Farm Site

Records of four protected invertebrate species were yielded from the data search. As such, there may be potential for these species to be present within the proposed site. These are presented below in Table 3-10.

**Table 3-10 Records of rare and/or protected invertebrate species (NPWS, 2022; NBDC, 2022)**

Species		Date of Record	Designation	Grid Square
Desmoulin's Whorl Snail	Vertigo moulinsiana	2005	Habitats Directive [92/42/EEC] Annex II	N00
Geyer's Whorl Snail	Vertigo geyeri	2005	Habitats Directive [92/42/EEC] Annex II	N00
White-clawed Crayfish	Austropotamobius pallipes	2008	Habitats Directive (92/43/EEC), Annex II, Annex V.  Wildlife Act (1976), as amended.	N0164709141  Little Brosna river  Blackwater (Shannon Bridge)
Marsh Fritillary	Eurodryas aurinia	2010	Habitats Directive [92/42/EEC] Annex II	N01
Brook Lamprey	Lampetra planeri	1988	Habitats Directive [92/42/EEC] Annex II  Fisheries Acts 1959 to 2006	N00  Little Brosna / Riverstown Bridge

#### Grid Connection Route Option 1

The grid connection routes proposed are primarily confined to existing roads which are artificial in nature. There is some semi-natural habitat present at the beginning of these routes, but this overlaps with the wind farm boundary which is discussed above.

Option 1 has two watercrossings. As outlined in Table 3-10, records of two protected aquatic invertebrate species (i.e. white-clawed crayfish, and brook lamprey) have been recorded. As such, there is potential for impact on these and other protected aquatic species.

#### Grid Connection Route Option 2

The grid connection routes proposed are primarily confined to existing roads which are artificial in nature. There is some semi-natural habitat present at the beginning of these routes, but this overlaps with the wind farm boundary which is discussed above. As such, no other protected/rare invertebrate species are envisaged as being present along the route option.

#### Grid Connection Route Option 3

The grid connection routes proposed are primarily confined to existing roads which are artificial in nature. There is some semi-natural habitat present at the beginning of these routes, but this overlaps with the wind farm boundary which is discussed above. Option 3 has ten watercrossings. As outlined in Table 3-10, records of two protected aquatic invertebrate species (i.e. white-clawed crayfish, and

brook lamprey) have been recorded. As such, there is potential for impact on these and other protected aquatic species.

### 3.3.3 Amphibians

#### Wind Farm Site

Records of two protected species of amphibian were yielded from the data search, namely smooth newt and common frog. As such, they are likely to be present within the site. These are presented in Table 3-11 below.

**Table 3-11 Records of Protected Amphibian species (NPWS, 2022)**

Species		Date of Most Recent Record	Designation	Grid Square
Smooth Newt	<i>Lissotriton vulgaris</i>	2011	Wildlife Act, 1976 (as amended)	N01
Common Frog	<i>Rana temporaria</i>	2011	Wildlife Act, 1976 (as amended)	N00, N01

#### Grid Connection Route Options

The grid connection routes proposed are primarily confined to existing roads which are artificial in nature. There is some semi-natural habitat present at the beginning of these routes, but this overlaps with the wind farm boundary which is discussed above. As such, no other protected/rare amphibian species are envisaged as being present along the route options.

### 3.3.4 Reptiles

No records of common lizard *Zootoca vivipara* were yielded from the data search. However, there may be suitable habitats present within the wind farm site which would support common lizard.

### 3.3.5 Birds

Records of protected bird species yielded from the data search are presented in Table 3-12.

The species presented are those which are amber or red listed, those known to be susceptible to collision, and/or Annex I species.

**Table 3-12 Records of Bird species (NBDC, 2022)**

Species		Date of Record	Designation	Conservation Status	Recorded on-site
Barn Owl	<i>Tyto alba</i>	08/11/2019	Wildlife Act, 1976 (as amended)	Red Listed	None recorded as no species-specific survey undertaken to-date. However, suitable structures will be noted during the winter roost bat survey.
Black-headed Gull	<i>Larus ridibundus</i>	02/02/2015	Wildlife Act, 1976 (as amended) Annex II of EU Birds Directive	Amber Listed	Recorded on site.
Common Kestrel	<i>Falco tinnunculus</i>	07/06/2020	Wildlife Act, 1976 (as amended)	Amber Listed	Recorded on site.
Common Kingfisher	<i>Alcedo atthis</i>	24/05/2020	Wildlife Act, 1976 (as amended) Annex I Birds Directive	Amber Listed	None recorded to-date. However, there are watercourses on site. As such, there is potential for this species to be present.
Common Snipe	<i>Gallinago gallinago</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Red Listed	Yes. There is also suitable habitat on site.
Eurasian Curlew	<i>Numenius arquata</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Red Listed	None recorded to-date. However, there is suitable habitat on site. As such, there is potential for this species to be present.

Species		Date of Record	Designation	Conservation Status	Recorded on-site
Eurasian Teal	<i>Anas crecca</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Amber Listed	None recorded to-date. However, there are watercourses on site. As such, there is potential for this species to be present.
Eurasian Wigeon	<i>Anas penelope</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Amber Listed	None recorded to-date. However, River Little Brosna Callows SPA lies within 24m of the site, and is designated for wigeon. As such, there is potential for this species to forage in or fly through the Site.
European Golden Plover	<i>Pluvialis apricaria</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex I Birds Directive	Red Listed	Recorded to-date. There are also SPAs designated for this species within their core foraging range.
Greater White-fronted Goose	<i>Anser albifrons</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex I Birds Directive	Amber Listed	None recorded to-date. However, there are SPAs designated for this species within their core foraging range (closest is 9m). As such, they may forage or fly through the site.
Little Egret	<i>Egretta garzetta</i>	10/03/2020	Wildlife Act, 1976 (as amended) Annex I of EU Birds Directive	Green Listed	None recorded to-date. However, there is suitable foraging habitat on site, and potential for them to be foraging in or flying through the site.

Species		Date of Record	Designation	Conservation Status	Recorded on-site
Mallard	<i>Anas platyrhynchos</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Green Listed	Recorded on-site.
Mute Swan	<i>Cygnus olor</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Amber Listed	None recorded to-date. However, there is suitable habitat within and around the site. As such, there is potential for this species to be foraging in or flying over the site.
Northern Lapwing	<i>Vanellus vanellus</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Red Listed	Recorded on site.
Peregrine Falcon	<i>Falco peregrinus</i>	26/02/2019	Wildlife Act, 1976 (as amended) Annex I of EU Birds Directive	Green Listed	Recorded on site.
Short-eared Owl	<i>Asio flammeus</i>	03/05/2016	Wildlife Act, 1976 (as amended) Annex II Birds Directive	Amber Listed	None recorded to-date. However, there is suitable habitat on site. As such, there is potential for this species to be present.
Whooper Swan	<i>Cygnus cygnus</i>	27/12/2019	Wildlife Act, 1976 (as amended) Annex I of EU Birds Directive	Amber Listed	Recorded on site.

Key observations during bird surveys on-site to-date include the following:

- Winter 2020/21:
  - 3 flights of whooper swan (20 birds overall)
  - 1 lapwing flight (13 birds)
  - 1 hen harrier flight
  - Kestrel also recorded a handful of times
  
- Breeding season 2021:
  - handful of black-headed gull observations, 2 lapwing adults and 2 chicks c. 250 m from proposed turbine location to SE, one K. and one L. flight line
  
- Winter 2021/22:
  - A handful of hen harrier observations
  - Small numbers of Kestrel flight lines each month
  - Lapwing flight lines
  - Black-headed gull flight lines
  - Very large golden plover flock (>2000 birds). Appears to be a one-off passing through area.
  - Male merlin
  - Peregrine falcon flight lines
  - Two whooper swan flight lines

No swans or geese have been recorded feeding or roosting within 2 km of site. No Greenland white-fronted geese ever recorded in any survey. However, the proximity of SPAs designated for these species groups mean there is potential for them to be passing through the site.

### 3.3.6 Bats

Eight records of bats were yielded from the data search. There is ample suitable roosting, commuting and foraging habitat within the proposed wind farm site. As such, bats are likely to be using the site. Bat species are protected under Wildlife Act, 1976 (as amended), and Annex IV of the Habitats Directive. It is an offence to intentionally disturb, injure or kill a bat or disturb its resting place and any work on a roost must be carried out with the advice of NPWS.

Species		Date of Record	Designation
Brown long-eared bat	<i>Plecotus auritus</i>	26/08/2010	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive

Species		Date of Record	Designation
Daubenton's bat	<i>Myotis daubentonii</i>	25/08/2014	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Lesser Noctule	<i>Nyctalus leisleri</i>	06/08/2014	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	21/07/2009	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Pipistrelle species	<i>Pipistrellus pipistrellus sensu lato</i>	06/08/2014	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	25/07/2012	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Natterer's bat	<i>Myotis nattereri</i>	26/08/2010	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive
Whiskered bat	<i>Myotis mystacinus</i>	18/06/2008	Wildlife Act, 1976 (as amended) Annex IV of the Habitats Directive

The bat landscape suitability (Lundy et al., 2011) index spans from 0 to 100, with 0 indicating landscapes considered least favourable for bats and 100 indicating landscapes considered most favourable for bats, in terms of habitats present.

The suitability index for the proposed project site is presented below (Table 3-13 to Table 3-15) for all bat species, as well as individual species. Overall, the proposed project site is of high suitability for bat species. This is primarily based on the abundance of hedgerows and treelines, and connectivity to the wider landscape.

**Table 3-13 Bat Habitat Suitability Index – South-west**

Common Name	Scientific Name	Suitability Index
Whiskered bat	<i>Myotis mystacinus</i>	60
Natterer's bat	<i>Myotis nattereri</i>	53
Brown long-eared	<i>Plecotus auritus</i>	51

Common Name	Scientific Name	Suitability Index
Common pipistrelle	Pipistrellus pipistrellus	50
Leisler's bat	Nyctalus leisleri	49
Soprano pipistrelle	Pipistrellus pygmaeus	46
	All Bats	39.22
Daubenton's bat	Myotis daubentonii	38
Lesser horseshoe bat	Rhinolophus hipposideros	3
Nathusius' pipistrelle	Pipistrellus nathusii	3

**Table 3-14**

Common Name	Scientific Name	Suitability Index
Common pipistrelle	Pipistrellus pipistrellus	44
Brown long-eared	Plecotus auritus	43
Natterer's bat	Myotis nattereri	43
Leisler's bat	Nyctalus leisleri	42
Soprano pipistrelle	Pipistrellus pygmaeus	40
Whiskered bat	Myotis mystacinus	37
Daubenton's bat	Myotis daubentonii	33
	All Bats	31.67
Lesser horseshoe bat	Rhinolophus hipposideros	2
Nathusius' pipistrelle	Pipistrellus nathusii	1

**Table 3-15 Bat Habitat Suitability Index – Rest of Site**

Common Name	Scientific Name	Suitability Index
Common pipistrelle	Pipistrellus pipistrellus	39
Soprano pipistrelle	Pipistrellus pygmaeus	36
Brown long-eared	Plecotus auritus	36
Leisler's bat	Nyctalus leisleri	36
Natterer's bat	Myotis nattereri	35
Whiskered bat	Myotis mystacinus	29
	All Bats	26.56
Daubenton's bat	Myotis daubentonii	26
Lesser horseshoe bat	Rhinolophus hipposideros	1



---

Common Name	Scientific Name	Suitability Index
Nathusius' pipistrelle	Pipistrellus nathusii	1

### 3.3.7 Mammals (other than bats)

Records of nine protected mammal species were yielded from the data search. These are presented in Table 3-16 below.

**Table 3-16 Records of Mammal species (NPWS, NBDC, 2022)**

Species		Date of Record	Designation	Grid Square	Potential on-site?
Eurasian Badger	<i>Meles meles</i>	2018	Wildlife Act, 1976 (as amended)	M92 N02 N00 N01	Yes, there is suitable habitat for this species on-site.
Eurasian Otter	<i>Lutra lutra</i>	2013	Wildlife Act, 1976 (as amended) Annex II of the Habitats Directive	M92 N02 N01 N00	Yes, there is suitable habitat for this species on-site, including watercourses and connectivity to SACs which are designated for otter.
Eurasian Pygmy Shrew	<i>Sorex minutus</i>	2013	Wildlife Act, 1976 (as amended)	N00	Yes, there is suitable habitat for this species on-site.
Eurasian Red Squirrel	<i>Sciurus vulgaris</i>	2018	Wildlife Act, 1976 (as amended)	M92 N00	Yes, there is suitable habitat for this species on-site.
Fallow Deer	<i>Dama dama</i>	2006	Wildlife Act, 1976 (as amended)	N01 N00	Yes, there is suitable habitat for this species on-site.
Irish Hare	<i>Lepus timidus subsp. hibernicus</i>	2010	Wildlife Act, 1976 (as amended)	M92 N02 N01 N00	Yes, there is suitable habitat for this species on-site.

Species		Date of Record	Designation	Grid Square	Potential on-site?
Irish Stoat	<i>Mustela erminea subsp. hibernica</i>	2005	Wildlife Act, 1976 (as amended)	N01 N00	Yes, there is suitable habitat for this species on-site.
Pine Marten	<i>Martes martes</i>	2021	Wildlife Act, 1976 (as amended)	M92 N01 N00	Yes, there is suitable habitat for this species on-site.
West European Hedgehog	<i>Erinaceus europaeus</i>	1988	Wildlife Act, 1976 (as amended)	M92 N02 N01 N00	Yes, there is suitable habitat for this species on-site.

### 3.3.8 Invasive Species

Records of 34 invasive species were yielded from the data search.

Records of 19 medium-impact invasive species, and 14 high-impact species was yielded from the data search. The invasiveness of one species (Spanish bluebell) has not yet been established.

Ten Third-Schedule: Part 1 plant species, and four Third-Schedule: Part 2a species was yielded.

**Table 3-17 Records of Invasive species (NBDC, 2022)**

Species		Date of Record	Invasiveness	Grid Square
American Mink	<i>Mustela vison</i>	08/10/2018	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
American Skunk-cabbage	<i>Lysichiton americanus</i>	28/03/2019	Medium Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Bank Vole	<i>Myodes glareolus</i>	23/06/2013	Medium Impact Invasive Species	N00, N01
Black Currant	<i>Ribes nigrum</i>	08/09/2003	Medium Impact Invasive Species	N00, N01
Brown Rat	<i>Rattus norvegicus</i>	31/12/1981	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Budapest Slug	<i>Tandonia budapestensis</i>	29/10/1997	Medium Impact Invasive Species	N00, N01
Butterfly-bush	<i>Buddleja davidii</i>	13/04/2018	Medium Impact Invasive Species	N00, N01
Cherry Laurel	<i>Prunus laurocerasus</i>	28/01/2021	High Impact Invasive Species	N00, N01

Species		Date of Record	Invasiveness	Grid Square
Common Garden Snail	<i>Cornu aspersum</i>	28/10/1978	Medium Impact Invasive Species	N00, N01
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	31/12/1982	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
European Rabbit	<i>Oryctolagus cuniculus</i>	18/04/2018	Medium Impact Invasive Species	N00, N01
Evergreen Oak	<i>Quercus ilex</i>	11/02/2021	Medium Impact Invasive Species	N00, N01
Fallow Deer	<i>Dama dama</i>	11/07/2018	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
False-acacia	<i>Robinia pseudoacacia</i>	13/08/2009	Medium Impact Invasive Species	N00, N01
Fringed Water-lily	<i>Nymphaoides peltata</i>	31/12/2010	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Giant Hogweed	<i>Heracleum mantegazzianum</i>	29/05/2003	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Giant Knotweed	<i>Fallopia sachalinensis</i>	26/07/2018	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Giant-rhubarb	<i>Gunnera tinctoria</i>	23/04/2020	High Impact Invasive Species	N00, N01

Species		Date of Record	Invasiveness	Grid Square
			Restricted under Regulation S.I. 477 (Ireland)	
Greater White-toothed Shrew	<i>Crocidura russula</i>	09/04/2020	Medium Impact Invasive Species	N00, N01
Himalayan Honeysuckle	<i>Leycesteria formosa</i>	06/07/2018	Medium Impact Invasive Species	N00, N01
Himalayan Balsam	<i>Impatiens glandulifera</i>	27/07/2019	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Japanese Knotweed	<i>Fallopia japonica</i>	06/07/2018	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>	17/08/2017	Medium Impact Invasive Species	N00, N01
Keeled Slug	<i>Tandonia sowerbyi</i>	30/11/1934	Medium Impact Invasive Species	N00, N01
Pampas-grass	<i>Cortaderia selloana</i>	05/01/2019	Medium Impact Invasive Species	N00, N01
Parrot's-feather	<i>Myriophyllum aquaticum</i>	15/08/2018	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Pitcherplant	<i>Sarracenia purpurea</i>	30/04/1984	Medium Impact Invasive Species	N00, N01
<i>Rhododendron ponticum</i>	<i>Rhododendron ponticum</i>	28/08/2003	High Impact Invasive Species Restricted under Regulation S.I. 477 (Ireland)	N00, N01

Species		Date of Record	Invasiveness	Grid Square
Spanish Bluebell	<i>Hyacinthoides hispanica</i>	23/05/2013	Invasiveness not established  Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Sycamore	<i>Acer pseudoplatanus</i>	11/02/2021	Medium Impact Invasive Species	N00, N01
Three-cornered Garlic	<i>Allium triquetrum</i>	04/04/2021	Medium Impact Invasive Species  Restricted under Regulation S.I. 477 (Ireland)	N00, N01
Traveller's-joy	<i>Clematis vitalba</i>	18/04/2018	Medium Impact Invasive Species	N00, N01
Wrinkled Snail	<i>Candidula intersecta</i>	31/12/1999	Medium Impact Invasive Species	N00, N01

## 3.4 Summary of Important Ecological Features and Next Steps

### 3.4.1 Designated Sites

#### Wind Farm Site

The proposed wind farm site is connected to Natura 2000 sites and nationally designated sites. As such, an assessment must be made of the potential for significant impacts to these sites and their qualifying interests. This may necessitate surveys for the qualifying interest features on and around the proposed site.

#### Grid Connection Route Options

Of the three grid connection route options, Option 1 and Option 3 present the most connectivity to designated sites, while Option 2 presents the least risks as, based on satellite imagery, it lacks hydrological connectivity, does not traverse protected habitats, and does not encroach on any designated sites.

### 3.4.2 Habitats

#### Wind Farm Site

There is potential for Annex I habitats to be present within the proposed wind farm site. It is strongly recommended that habitat surveys be carried out to classify habitats and determine if they are Annex I habitats.

#### Grid Connection Route Options

Due to the artificial nature of the habitats along the grid connection route, is it not envisaged that any of the three options are likely to encroach on Annex I habitats.

Options 1 and Option 3 traverse watercourses. As such, water-quality impacts and impacts to aquatic fauna may occur as a result of the installation of the grid connections here.

### 3.4.3 Plants

The data search yielded records of protected and rare flora. The habitat survey (April- September) will identify if there are any rare or protected flora present, or determine the need for further surveys for scarce/ rare plants, or important plant communities within the wind farm site and along the grid connection route.

### 3.4.4 Invertebrates

The extended habitat survey will help inform if there is potential for the aforementioned protected invertebrate species to be present. Both Marsh Fritillary, Desmoulins's Snail, and Geyer's Whorl Snail are dependent on particular habitat types. As such, if these habitats are absent, it is unlikely these species would be present.

There are records of white-clawed crayfish, and brook lamprey downstream of the site. As such, there is potential for impacts on these and other protected aquatic invertebrate species. An aquatic survey should be carried out to provide detailed information at survey points within the catchment area to establish the protected species and habitats that may be present. Without such detail, the EIAR believe would be deficient. This is now a standardised approach that has been developed and carried out in wind farm developments nationally. A general walkover survey would not provide the level of detail required (i.e. no electro-fishing, crayfish, macrophyte surveys etc.) to inform the presence or absence of protected habitats and species. It is important to consider the downstream catchment that could



be impacted by the project. This would include source populations contributing to downstream designated sites.

### **3.4.5 Amphibians**

Any works should consider the potential for smooth newt and common frog to be present. A survey and appropriate avoidance/mitigation measures to avoid negative impacts on these species will need to be included.

### **3.4.6 Reptiles**

The extended habitat survey will identify if there are potential suitable habitats present to support common lizard.

### **3.4.7 Birds**

An ornithology chapter will be prepared to present the baseline conditions at the proposed Site, as established during bird surveys to-date. This information will contribute to the Biodiversity chapter of the EIAR to determine potential impacts on the species, and to inform suitable avoidance/mitigation measures.

Collision-risk modelling will be completed to inform the collision-risk of the project design, and to inform required changes if necessary.

Lapwing are a key constraint. As such, a pre-construction survey will be required to make sure nest locations have not changed, and to determine an appropriate buffer.

### **3.4.8 Bats**

A full suite of bat surveys will be carried out in 2022 to determine the Site's suitability for roosting bats, the species present, the potential impacts, and necessary avoidance/mitigation measures required.

The results of these surveys will be presented in a bat report which will outline the baseline conditions at the proposed Site. This information will contribute to the Biodiversity chapter of the EIAR to determine potential impacts on the species, and to inform suitable avoidance/mitigation measures.

### **3.4.9 Mammals**

The extended habitat survey will inform the presence and/or potential for protected mammal species within the Site.

### **3.4.10 Invasive Species**

The extended habitat survey (April-September) will identify the presence of any invasive flora and fauna.

## **4.0 Conclusions**

### **Wind Farm Site**

Based on the desk study, no high-risk constraint which would threaten the feasibility of the project.

However, as outlined, there are protected species and habitats, as well as connectivity to designated sites. These shall be addressed through the Biodiversity chapter of the EIAR, AA Screening and Natura Impact Statement.

Mitigation measures to prevent water pollution and avoid negative impacts on protected habitats and fauna are almost certain to be required.

### **Grid Route Options**

Grid route option 2 presents the least risks as, based on satellite imagery, it lacks hydrological connectivity, does not traverse protected habitats, and does not encroach on any designated sites.

## 5.0 References

Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Brussels, 28.9.2021 C(2021) 6913 final.

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – NonMarine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

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.

Cooper, L. M. (2004). *Guidelines for Cumulative Effects Assessment in SEA of Plans*, EPMG Occasional Paper 04/LMC/CEA, Imperial College London.

DoEHLG (2009). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin.

EC. (2020). *Guidance document on wind energy developments and EU nature legislation*. Brussels: European Commission.

OPR. (2021). *OPR Practice Note PN01: Appropriate Assessment Screening for Development Management*. Office of the Planning Regulator.

European Commission (2001). Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2018). Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC.

European Union Birds Directive (2009) *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version)*.

European Union Habitats Directive, (1992). *Council Directives 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*. Fossitt, J.A. (2000) [A Guide to Habitats in Ireland](#). The Heritage Council, Kilkenny.

IAQM (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning*. Institute of Air Quality Management.

Kettunen, M, Terry, A., Tucker, G. & Jones A. (2007) *Guidance on the maintenance of landscape features of major importance for wild flora and fauna - Guidance on the implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC)*. Institute for European Environmental Policy (IEEP), Brussels, 114 pp. & Annexes.

Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

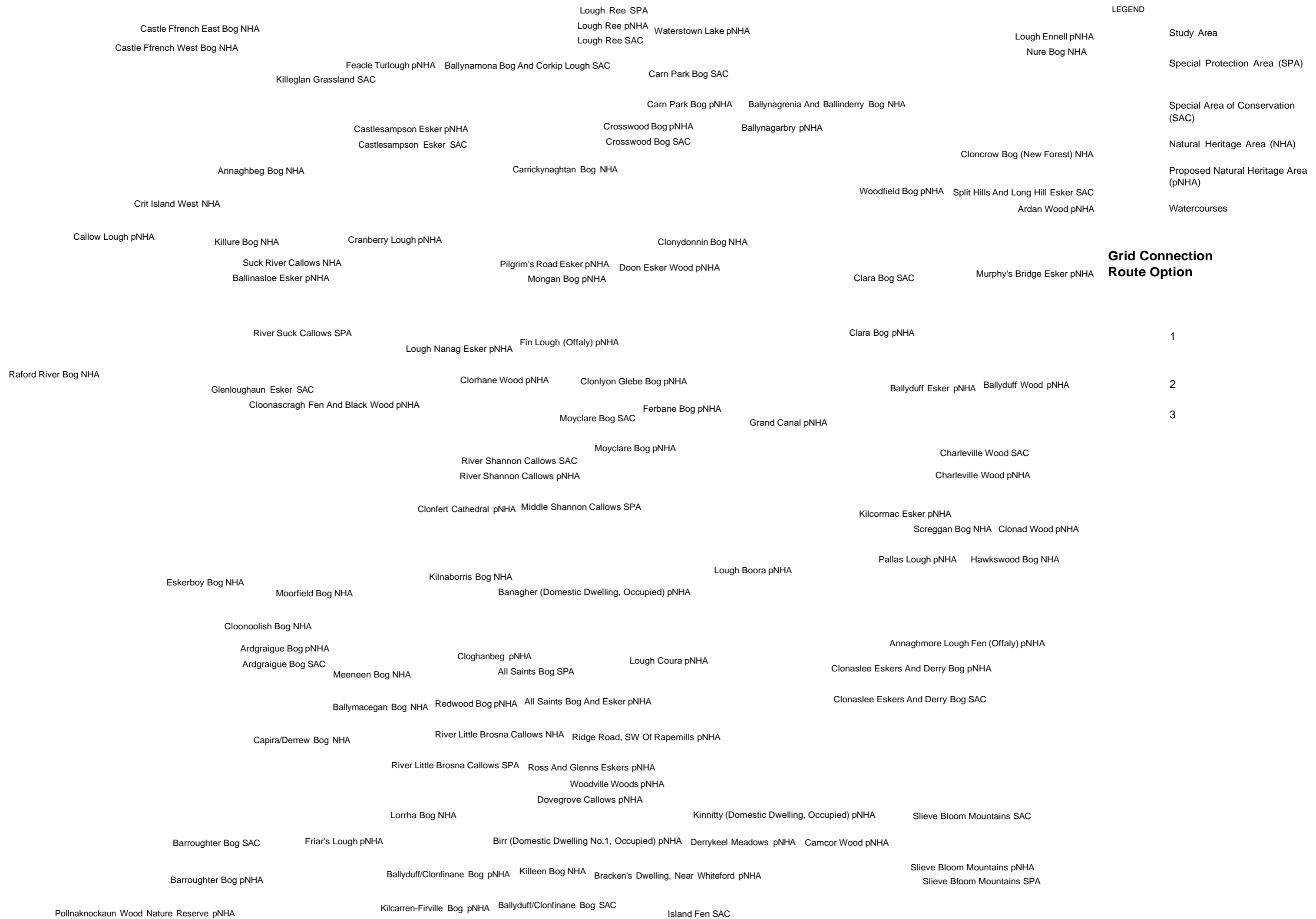
Scott Wilson and Levett-Therivel, (2006). *Appropriate Assessment of Plans*. Scott Wilson, Levett-Therivel Sustainability Consultants, Treweek Environmental Consultants and Land Use Consultants.

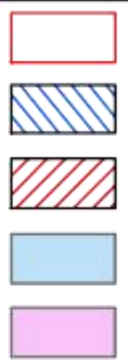
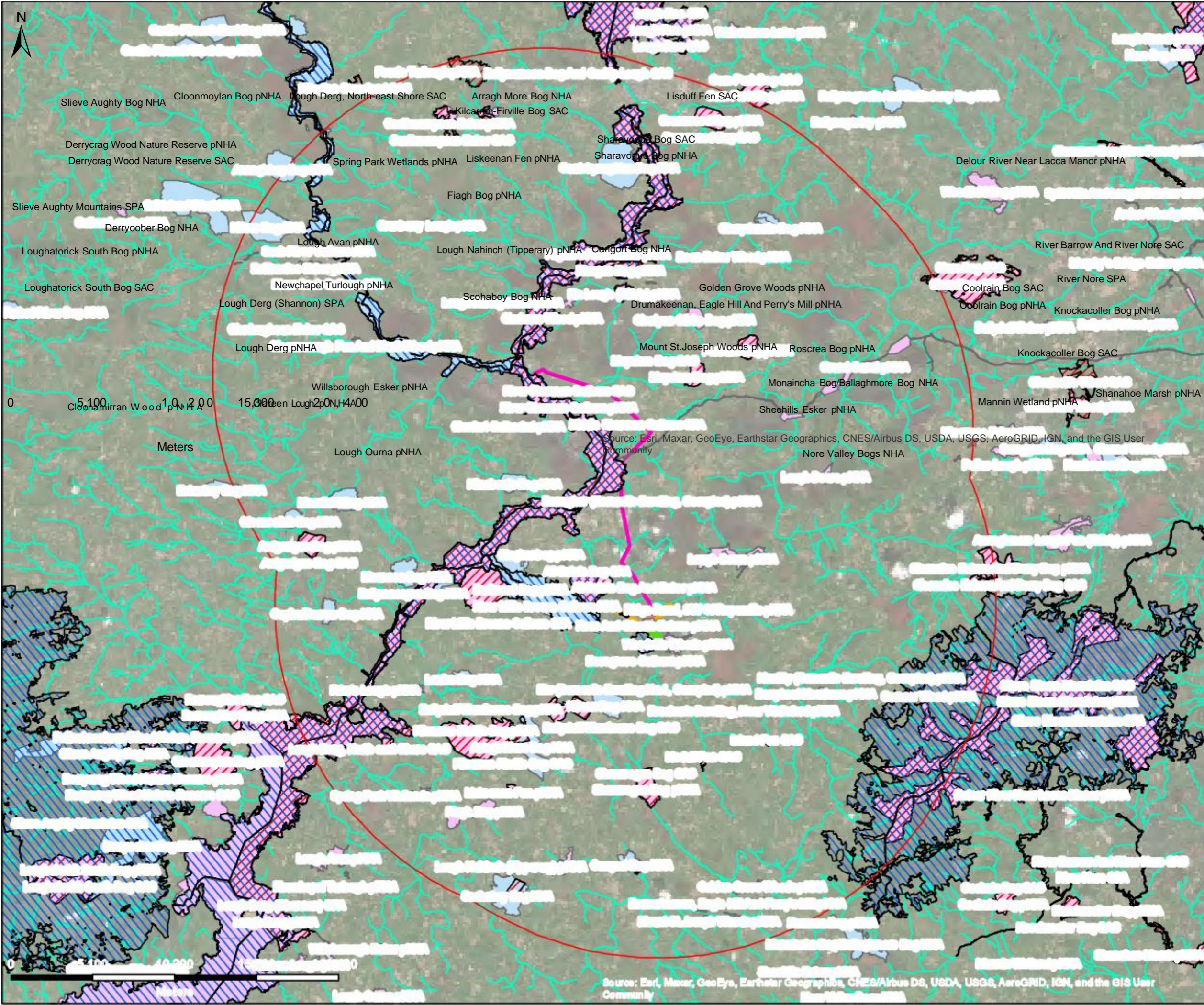
# Appendix 1

FIGURE 1 NATURA 2000 SITES

FIGURE 2 FIELD SURVEY RESULTS







7 DUNDRUM BUSINESS PARK  
WINDY ARBOUR  
DUBLIN  
IRELAND  
T: +353 (0)1 296 4667  
www.slrconsulting.com

GALETECH ENERGY SERVICES  
CUSH WIND FARM SCOPING REPORT  
CONSTRAINTS - GRID CONNECTION ROUTE OPTIONS

FIGURE 2

Scale 1:225,081 @ A3 Date MARCH 2022



## EUROPEAN OFFICES

### United Kingdom

#### AYLESBURY

T: +44 (0)1844 337380

#### BELFAST

belfast@slrconsulting.com

#### BRADFORD-ON-AVON

T: +44 (0)1225 309400

#### BRISTOL

T: +44 (0)117 906 4280

#### CARDIFF

T: +44 (0)29 2049 1010

#### CHELMSFORD

T: +44 (0)1245 392170

#### EDINBURGH

T: +44 (0)131 335 6830

#### EXETER

T: +44 (0)1392 490152

#### GLASGOW

glasgow@slrconsulting.com

#### GUILDFORD

guildford@slrconsulting.com

#### LONDON

T: +44 (0)203 805 6418

#### MAIDSTONE

T: +44 (0)1622 609242

#### MANCHESTER (Denton)

T: +44 (0)161 549 8410

#### MANCHESTER (Media City)

T: +44 (0)161 872 7564

#### NEWCASTLE UPON TYNE

T: +44 (0)191 261 1966

#### NOTTINGHAM

T: +44 (0)115 964 7280

#### SHEFFIELD

T: +44 (0)114 245 5153

#### SHREWSBURY

T: +44 (0)1743 23 9250

#### STIRLING

T: +44 (0)1786 239900

#### WORCESTER

T: +44 (0)1905 751310

### Ireland

#### DUBLIN

T: +353 (0)1 296 4667

### France

#### GRENOBLE

T: +33 (0)6 23 37 14 14



**Annex 2 –  
Land, Soil & Water Scoping Report**



## **PROPOSED CUSH WIND FARM DEVELOPMENT, COUNTY OFFALY**


Land, Soils and Water Scoping Assessment

**DRAFT REPORT**

Prepared for:  
**GALETECH ENERGY SERVICES**

Prepared by:  
**HYDRO-ENVIRONMENTAL SERVICES**

**DOCUMENT INFORMATION**

<b>DOCUMENT TITLE:</b>	<b>PROPOSED CUSH WIND FARM DEVELOPMENT, COUNTY OFFALY – LAND, SOILS AND WATER SCOPING ASSESSMENT</b>
<b>ISSUE DATE:</b>	<b>5<sup>TH</sup> SEPTEMBER 2022</b>
<b>PROJECT NUMBER:</b>	<b>P1537-2</b>
<b>PROJECT REPORTING HISTORY:</b>	<b>P1537-0 P1537-1</b>
<b>CURRENT REVISION NO:</b>	<b>DRAFT REPORT REV02</b>
<b>AUTHORS:</b>	<b>DAVID BRODERICK CONOR MCGETTIGAN MICHAEL GILL</b>
<b>SIGNED:</b>	 <hr/> <b>MICHAEL GILL B.A., B.A.I., M.SC. DIP. GEOL, MIEI, MCIWEM MANAGING DIRECTOR – HYDRO-ENVIRONMENTAL SERVICES</b>
<p><b>Disclaimer:</b>  <i>This report has been prepared by HES with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our terms and conditions and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client, and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.</i></p>	

## TABLE OF CONTENTS

<b>1. INTRODUCTION</b> .....	<b>1</b>
1.1 OVERVIEW .....	1
1.2 DEVELOPMENT DESCRIPTION.....	1
1.3 GUIDANCE.....	3
1.4 METHODOLOGY.....	4
1.4.1 Desk Study.....	4
1.4.2 Receptor Importance/ Sensitivity Criteria .....	4
<b>2. EXISTING ENVIRONMENT</b> .....	<b>8</b>
2.1 SITE DESCRIPTION & TOPOGRAPHY.....	8
2.2 SUPERFICIAL GEOLOGY.....	8
2.3 BEDROCK GEOLOGY.....	11
2.4 GEOLOGICAL HERITAGE SITES .....	13
2.5 HYDROLOGY & DRAINAGE.....	13
2.6 WATERBODY QUALITY & WFD STATUS .....	14
2.7 PUBLISHED FLOOD RISK MAPPING .....	15
2.8 SITE SPECIFIC FLOOD RISK ASSESSMENT .....	17
2.9 HYDROGEOLOGY .....	18
2.10 DESIGNATED SITES .....	19
2.11 DRINKING WATER SUPPLIES .....	19
<b>3. IDENTIFICATION OF POTENTIAL EFFECTS</b> .....	<b>21</b>
3.1 POTENTIAL EFFECTS AND CONSTRAINTS .....	21
<b>4. EIAR ASSESSMENT METHODOLOGY</b> .....	<b>23</b>
4.1 SITE SURVEYS AND INVESTIGATIONS .....	23
4.2 IMPACT ASSESSMENT PROCESS .....	23
<b>5. REPORT CONCLUSIONS</b> .....	<b>25</b>

## FIGURES (IN TEXT)

Figure A: Site Location Map .....	2
Figure B: Site Layout Map .....	3
Figure C: Local Subsoils Map (Wind Farm Site).....	10
Figure D: Local Subsoils Map (Grid Connection Options).....	10
Figure E: Local Bedrock Geology Map .....	12
Figure F: Local Hydrology Map .....	14
Figure G: OPW's Past Flood Event Mapping .....	16
Figure H: OPW National Indicative Fluvial Mapping.....	17
Figure I: Site Specific Modelled Flood Zones .....	18
Figure I: Local Designated Site Map.....	19

## TABLES

Table A: Estimation of Importance of Soil and Geology Criteria (NRA, 2008).....	5
Table B: Estimation of Importance of Hydrology Criteria (NRA, 2008).....	6
Table C: Estimation of Importance of Hydrogeology Criteria (NRA, 2008) .....	7
Table D: EPA Biological Q-rating data .....	14
Table E: WFD Summary Information for Surface Water Bodies.....	15
Table F: Summary of Receptors, likelihood of Impact and Constraints .....	22

# 1. INTRODUCTION

## 1.1 OVERVIEW

Hydro-Environmental Services (HES) were commissioned by Galetech Energy Services Ltd (GES) to undertake a desktop-based Land, Soil and Water Scoping Assessment for the proposed Cush Wind Farm Development, located ~2.5km north of Birr, Co. Offaly.

The purpose of this scoping assessment is to identify risks/constraints and potential receptors in the local (and downstream) geological, hydrological and hydrogeological environments that could potentially affect or be affected by the proposed development works. A brief overview of the risks/constraints and potential receptors are described along with their importance / sensitivity, likelihood of impact and if mitigation is likely to be required.

The main objectives of the scoping assessment are:

- To complete a desk study review of available information relating to the baseline geological, hydrological and hydrogeological regime in the area of the proposed development;
- To identify any geological, hydrological and hydrogeological receptors/constraints/risks that may affect the proposed wind farm layout or overall feasibility;
- To identify potential downstream receptors such as designated sites/habitats, geological heritage sites and drinking water supplies;
- To Identify receptors scoped in for further assessment in the EIAR; and,
- To determine likelihood of impact and if mitigation is likely to be required.

This document is largely based on a desk study assessment. A full site inspection has not yet been undertaken to confirm the findings of this report on the ground, particularly on matters relating to ground/geological conditions.

A site specific Stage 3 flood risk assessment/flood zone modelling was undertaken in July 2021 for the purpose of identify areas of the proposed site unsuitable for wind farm development with regard flood risk.

## 1.2 DEVELOPMENT DESCRIPTION

It is understood that the proposed development will comprise 11 no. turbines, grid connection options, control building, 2 no. temporary compounds, met mast, internal site access roads, internal underground cabling, site entrances and all associated works.

It is proposed to source rock for the purpose of turbine base and access road construction from 1 no. on-site borrow pit. Any excess spoil material generated during the construction process will be stored at 2 no. proposed on-site spoil deposition areas.

5 no. grid connection route options are being assessed but only 1 no. will be constructed.

The location of the proposed development site and grid connection options are shown below in **Figure A** and the wind farm site layout is shown as **Figure B**.

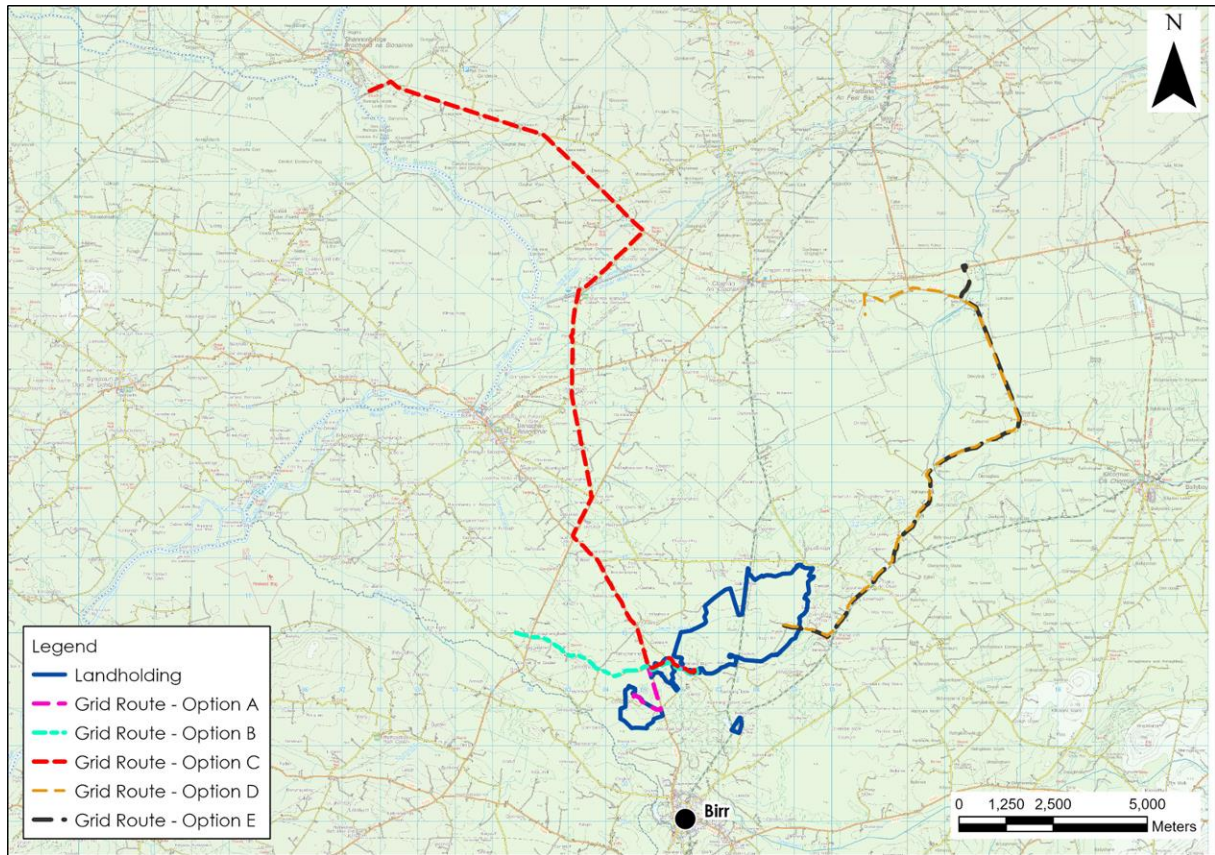
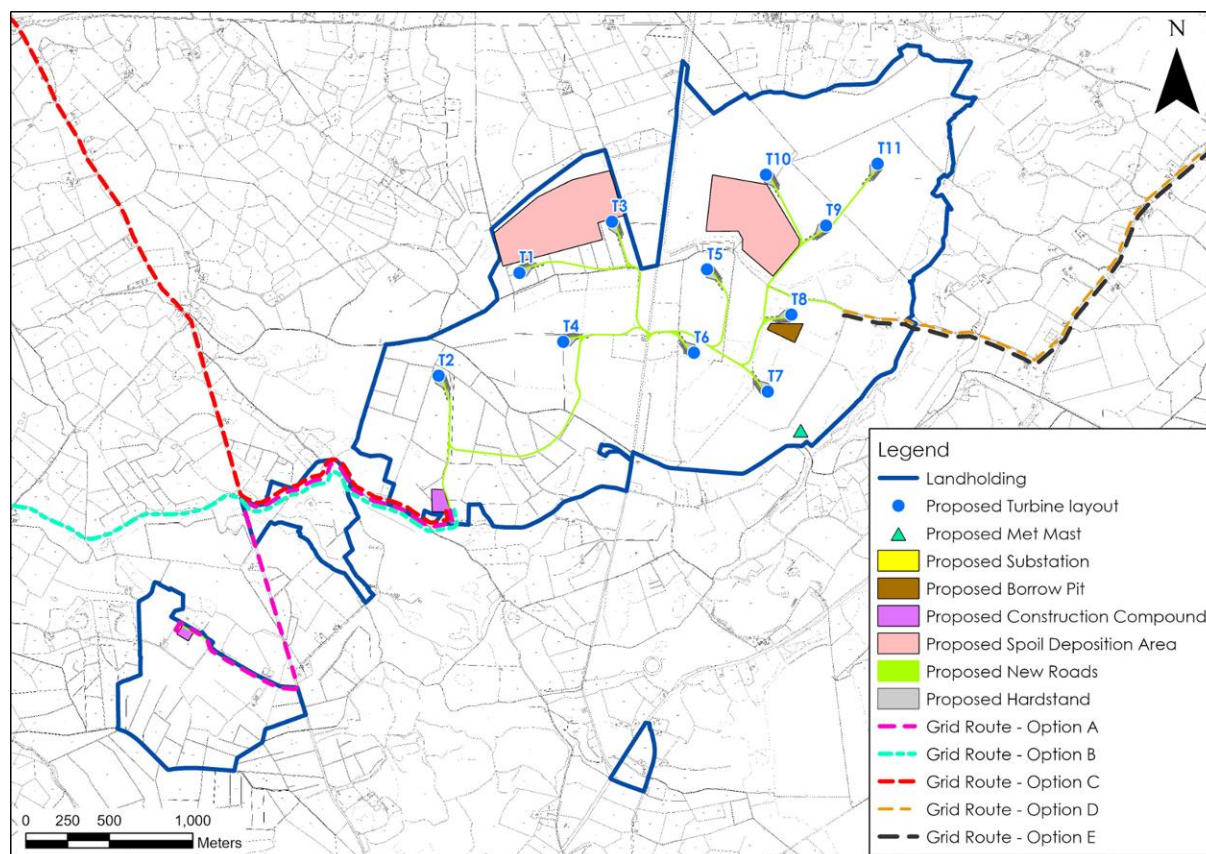


Figure A: Site Location Map



**Figure B: Site Layout Map**

### 1.3 GUIDANCE

The land/soils and water scoping assessments were carried out using the following guidance documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (2006);
- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh; and,
- COFORD (2004): Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads.

## 1.4 METHODOLOGY

### 1.4.1 Desk Study

A desk study of the proposed development and receiving environment (described below) was completed using the following data sources:

- Environmental Protection Agency database ([www.epa.ie](http://www.epa.ie));
- Geological Survey of Ireland - Groundwater Database ([www.gsi.ie](http://www.gsi.ie));
- Met Eireann Meteorological Databases ([www.met.ie](http://www.met.ie));
- National Parks & Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- EPA/Water Framework Directive Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 15 (Geology of Galway - Offaly). Geological Survey of Ireland (GSI, 1999);
- Geological Survey of Ireland – Groundwater Bodies Initial Characterisation Report - Draft (2004);
- Environmental Protection Agency – Catchments Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- OPW Flood Risk Assessment maps ([www.floodinfo.ie](http://www.floodinfo.ie)); and,
- Aerial photography.

### 1.4.2 Receptor Importance/ Sensitivity Criteria

Using the National Roads Authority (2008) guidance, an estimation of the importance of the soils/geology, hydrological and hydrogeological environments within the receiving environment are quantified, using the criteria set out in **Table A**, **Table B** and **Table C**.



**Table A: Estimation of Importance of Soil and Geology Criteria (NRA, 2008)**

Importance	Criteria	Typical Example
<b>Very High</b>	<ul style="list-style-type: none"> <li>• Attribute has a high quality, significance or value on a regional or national scale.</li> <li>• Degree or extent of soil contamination is significant on a national or regional scale.</li> <li>• Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Geological feature rare on a regional or national scale (NHA/SAC).</li> <li>• Large existing quarry or pit.</li> <li>• Proven economically extractable mineral resource.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>• Attribute has a high quality, significance or value on a local scale.</li> <li>• Degree or extent of soil contamination is significant on a local scale.</li> <li>• Volume of peat and/or soft organic soil underlying site is significant on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Contaminated soil on site with previous heavy industrial usage.</li> <li>• Large recent landfill site for mixed wastes.</li> <li>• Geological feature of high value on a local scale (County Geological Site).</li> <li>• Well drained and/or high fertility soils.</li> <li>• Moderately sized existing quarry or pit.</li> <li>• Marginally economic extractable mineral resource.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• Attribute has a medium quality, significance or value on a local scale.</li> <li>• Degree or extent of soil contamination is moderate on a local scale.</li> <li>• Volume of peat and/or soft organic soil underlying site is moderate on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Contaminated soil on site with previous light industrial usage.</li> <li>• Small recent landfill site for mixed Wastes.</li> <li>• Moderately drained and/or moderate fertility soils.</li> <li>• Small existing quarry or pit.</li> <li>• Sub-economic extractable mineral resource.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Attribute has a low quality, significance or value on a local scale.</li> <li>• Degree or extent of soil contamination is minor on a local scale.</li> <li>• Volume of peat and/or soft organic soil underlying site is small on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Large historical and/or recent site for construction and demolition wastes.</li> <li>• Small historical and/or recent landfill site for construction and demolition wastes.</li> <li>• Poorly drained and/or low fertility soils.</li> <li>• Uneconomically extractable mineral resource.</li> </ul>

**Table B: Estimation of Importance of Hydrology Criteria (NRA, 2008)**

Importance	Criteria	Typical Example
<b>Extremely High</b>	<ul style="list-style-type: none"> <li>Attribute has a high quality or value on an international scale.</li> </ul>	<ul style="list-style-type: none"> <li>River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid Waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.</li> </ul>
<b>Very High</b>	<ul style="list-style-type: none"> <li>Attribute has a high quality or value on a regional or national scale.</li> </ul>	<ul style="list-style-type: none"> <li>River, wetland or surface water body ecosystem protected by national legislation – NHA status.</li> <li>Regionally important potable water source supplying &gt;2500 homes.</li> <li>Quality Class A (Biotic Index Q4).</li> <li>Flood plain protecting more than 50 residential or commercial properties from flooding.</li> <li>Nationally important amenity site for wide range of leisure activities.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>Attribute quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Salmon fishery Locally important potable water source supplying &gt;1000 homes.</li> <li>Quality Class B (Biotic Index Q3-4).</li> <li>Flood plain protecting between 5 and 50 residential or commercial properties from flooding.</li> <li>Locally important amenity site for wide range of leisure activities.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>Attribute has a medium quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Coarse fishery.</li> <li>Local potable water source supplying &gt;50 homes Quality Class C (Biotic Index Q3, Q2-3).</li> <li>Flood plain protecting between 1 and 5 residential or commercial properties from flooding.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Attribute has a low quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Locally important amenity site for small range of leisure activities.</li> <li>Local potable water source supplying &lt;50 homes.</li> <li>Quality Class D (Biotic Index Q2, Q1)</li> <li>Flood plain protecting 1 residential or commercial property from flooding.</li> <li>Amenity site used by small numbers of local people.</li> </ul>

**Table C: Estimation of Importance of Hydrogeology Criteria (NRA, 2008)**

Importance	Criteria	Typical Example
<b>Extremely High</b>	<ul style="list-style-type: none"> <li>Attribute has a high quality or value on an international scale.</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.</li> </ul>
<b>Very High</b>	<ul style="list-style-type: none"> <li>Attribute has a high quality or value on a regional or national scale.</li> </ul>	<ul style="list-style-type: none"> <li>Regionally Important Aquifer with multiple wellfields.</li> <li>Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status.</li> <li>Regionally important potable water source supplying &gt;2500 homes Inner source protection area for regionally important water source.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>Attribute quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Regionally Important Aquifer Groundwater</li> <li>Provides large proportion of baseflow to local rivers.</li> <li>Locally important potable water source supplying &gt;1000 homes.</li> <li>Outer source protection area for regionally important water source.</li> <li>Inner source protection area for locally important water source.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>Attribute has a medium quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Locally Important Aquifer</li> <li>Potable water source supplying &gt;50 homes.</li> <li>Outer source protection area for locally important water source.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>Attribute has a low quality or value on a local scale.</li> </ul>	<ul style="list-style-type: none"> <li>Poor Bedrock Aquifer Potable water source supplying &lt;50 homes.</li> </ul>

## 2. EXISTING ENVIRONMENT

### 2.1 SITE DESCRIPTION & TOPOGRAPHY

The proposed development site, which has an area of approximately 683ha, is located ~2.5km north of Birr, Co. Offaly. The N62 separates the proposed development site in a north/northeast - south/southwest direction. Access to the proposed development site is from the N62 at various forestry and bog entrances. Refer to **Figure A** above for location map.

Current land use within the proposed development site areas comprises mainly of mixed forestry, cutover peat bogs, grassland with some areas of transitional woodland/scrub.

Following inspection of aerial photography and Corine (2018) land cover mapping, it was found that 4 no. turbines (T3, T9, T10 and T11) located towards the north of the proposed development site are located on cutover peat bogs. The proposed 2 no. spoil deposition areas are also located on cutover peat bogs.

A total of 4 no. turbines are situated in heavily vegetated areas, mapped by Corine as mixed forests (T2 and T4) and transitional woodland scrub (T5 and T6).

The remaining 3 no. turbines (T1, T7 and T8), proposed off-site substation, 2 no. temporary compounds and borrow pit are located on agricultural land.

The proposed development site is low lying with topography being slightly undulating to flat and with ground elevations ranging between 47 and 63m OD (Ordnance Datum). The overall slope is to the west.

The most elevated section of the proposed development site is found along the eastern margin where agricultural grassland rises up steadily to 63m OD. The ground slopes in a westerly direction from this eastern section to the lowest point on the far west of the site which follows the valley of the Rapemills River.

The grid connection options typically follow public roads. The grid option lengths vary from 3.6km (Option A) to 23.3km (Option C).

The grid connection Option A follows public roads for 2.9km with an off-road section through private lands for 0.7km. The off-road section is through rough grassland/derelict land.

The proposed off-site substation location for grid Option A is a grassland area adjacent to the existing ESB owned Dallow 110kV substation, located 1.7km to the southwest of the proposed development site.

### 2.2 SUPERFICIAL GEOLOGY

Based on the GSI/Teagasc soils mapping ([www.gsi.ie](http://www.gsi.ie)) the proposed development site is mainly overlain by cutover raised bog (Cut), with some basic shallow well-drained mineral soils located in the east of the site and overlying 2 no. proposed turbine locations (T7 and T8). A small area of basic poorly drained mineral soils are mapped towards the centre of the WF site along the N62.

The grid connection route from the proposed development site pass predominantly through peat and basic shallow soils.

GSI subsoils mapping ([www.gsi.ie](http://www.gsi.ie)) show that the proposed development site is underlain predominantly by cutover raised peat (Cut) with Gravels derived from Limestones (GLs) mapped on the east of the site, underlying both turbines T7 and T8. A small area of Till derived from Limestones (TLs) is mapped towards the centre of the proposed development site along the N62.

Meanwhile, Eskers comprised of gravels of basic reaction (BasEsk) are mapped along sections of the grid connection route options near the wind farm site location and then limestone tills and peat further afield. Cutover peat is mapped between the esker ridges.

Peat depth data for the proposed development site is limited. There is some peat depth data available along the proposed route of Cloghan Windfarm grid connection overhead line which passes through the eastern portion of the proposed development site. Peat depths of over 3m were recorded in areas of intact bog while the cutover areas ranged between 0.7 and 1.4m.

According to the GSI natural resource mapping, the majority of the proposed development site is not mapped as having potential for granular aggregate due to the coverage of blanket peat.

Those areas to the east and west of the proposed development site which are underlain by gravels have moderate to high potential for granular aggregates. The proposed sub-station location is mapped in an area of high potential. The granular aggregate potential along the grid route options range from no potential to very high potential. The very high potential for granular aggregate corresponds to the mapped extent of the esker deposits.

Based on criteria shown in the **Table A** above, the local soils and subsoils are of Low to Medium Importance.

Local subsoil geology map is shown as **Figure C** and **Figure D** below.

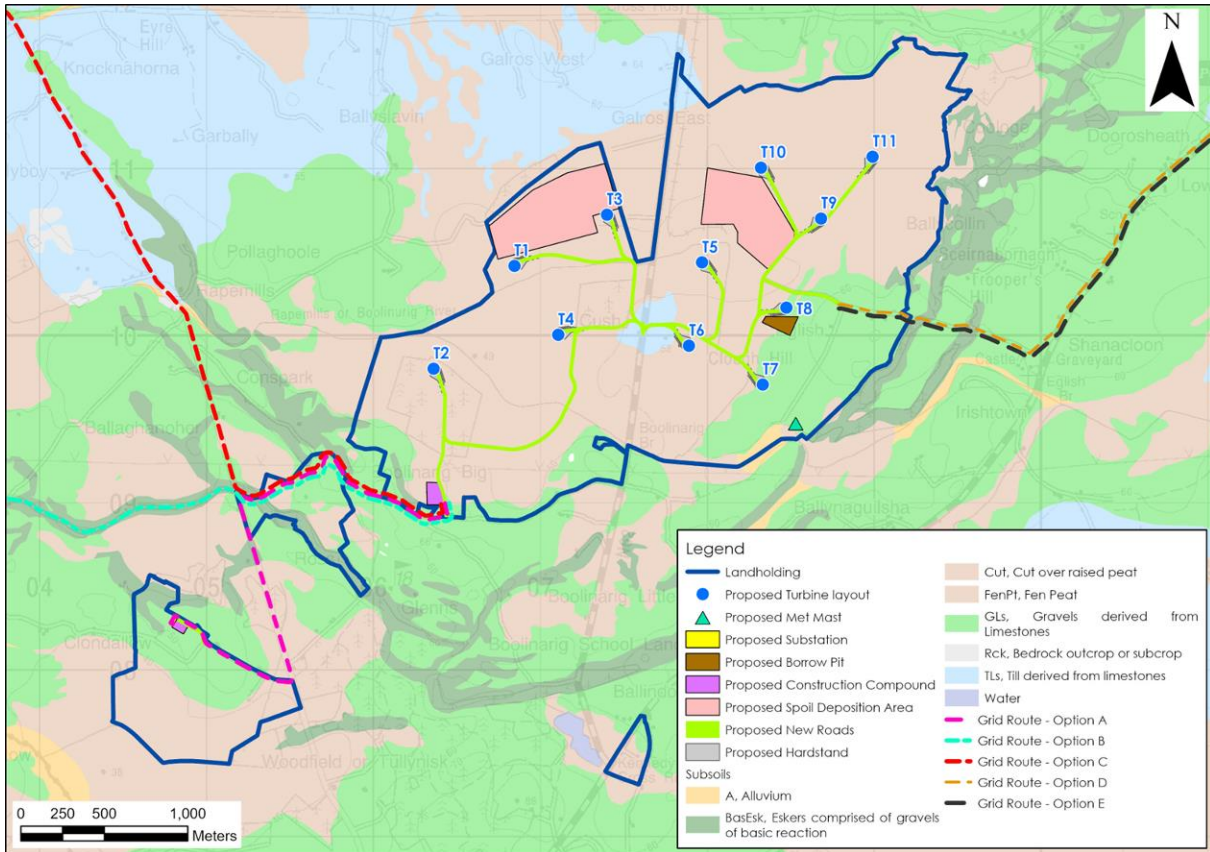


Figure C: Local Subsoils Map (Wind Farm Site)

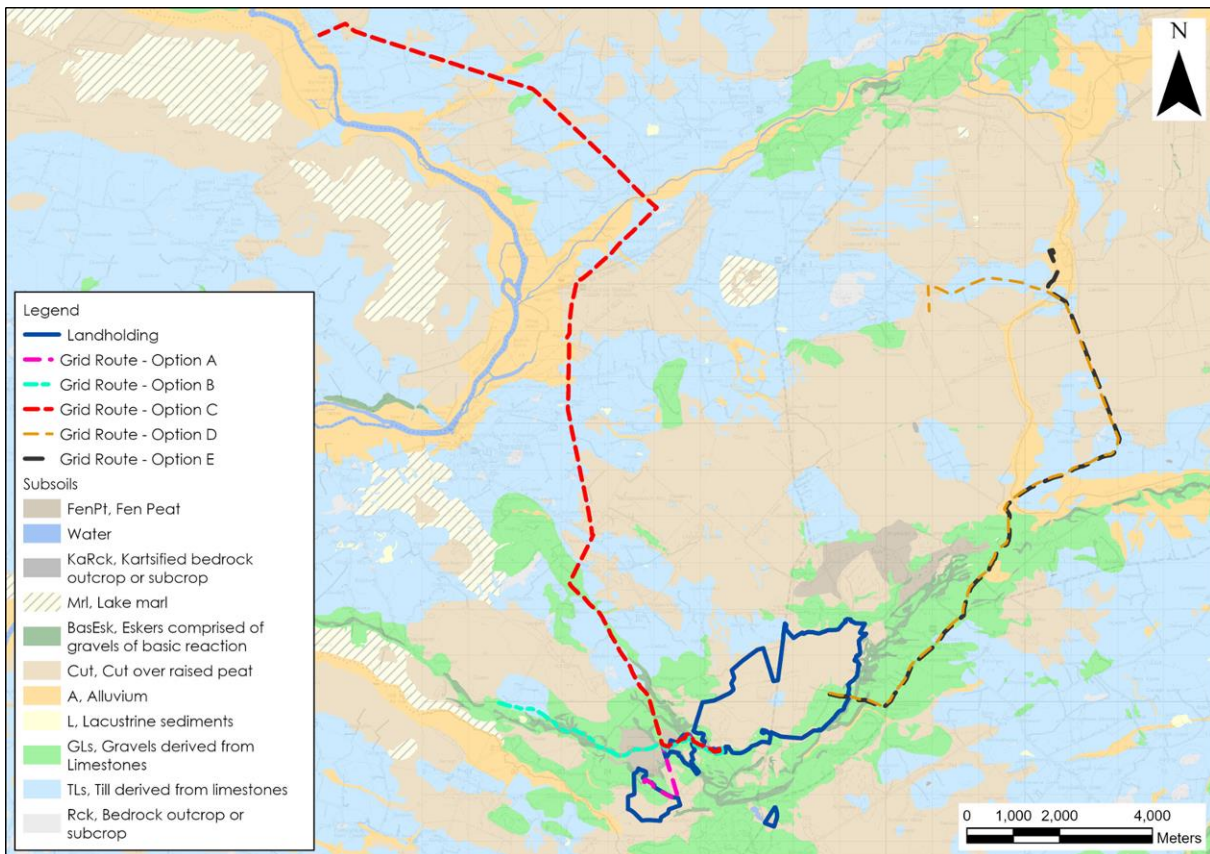


Figure D: Local Subsoils Map (Grid Connection Options)

## 2.3 BEDROCK GEOLOGY

The underlying bedrock at the proposed development site is mapped by the GSI as being broadly Carboniferous limestones.

Dinantian Pure Unbedded Limestones underlie the north and east of the proposed development site. This bedrock consists of dominantly grey, crudely bedded or massive limestones.

The grid connection options are all exclusively underlain by limestone.

The GSI do not map the presence of any bedrock outcrop within the proposed development site.

A NW-SE orientated fault is mapped in the southwestern corner of the proposed development site. However, this bedrock fault is likely to have no consequence for the proposed development due to the shallow nature of the works.

A bedrock geology map for the area is shown as **Figure E** below.

According to the GSI natural resource mapping, the area of the proposed development has a very low to high crushed rock aggregate potential. The high potential area corresponds to the mapped extent of the Dinantian Pure Unbedded Limestones. Meanwhile, the majority of the main WF site has moderate potential with the southwest of the site mapped as having very low potential.

Based on criteria shown in the **Table A** above and the GSI aggregate potential the local bedrock underlying the WF site has a Low to Medium Importance.

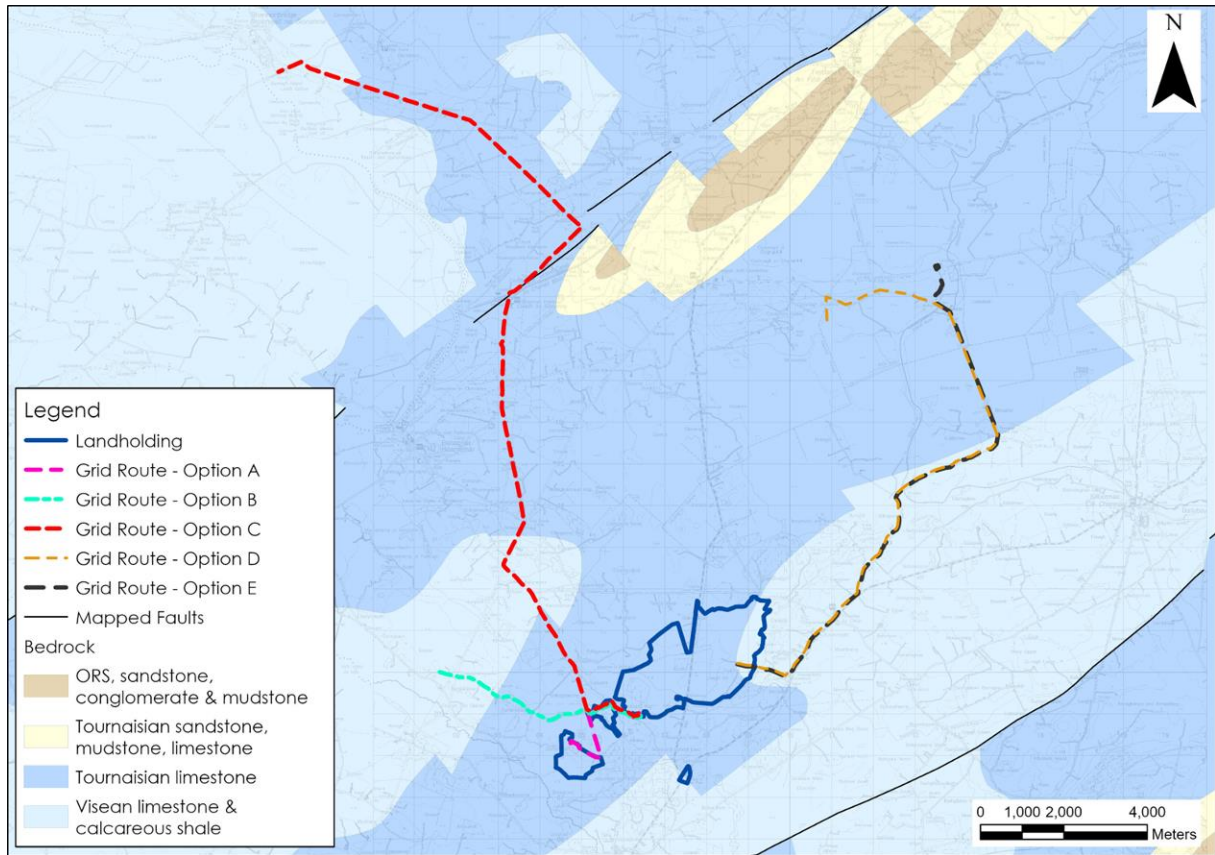


Figure E: Local Bedrock Geology Map



## 2.4 GEOLOGICAL HERITAGE SITES

Kilcormac Esker Geological Heritage Area (GHA) (Site Code: OY018), which forms part of the much larger Killimor-Birr-Fivedalley-Kilcormac Esker System, is mapped in the area of the proposed development. This GHA is described as a good example of a deglacial, meltwater-deposited complex.

In terms of the proposed development infrastructure, the temporary construction compound located to the south of T2 is located within the mapped extent of the GHA. Furthermore, ~270m of the proposed grid route Option A to the substation crosses this GHA.

The GSI do not map any additional GHA within or in the immediate vicinity of the proposed development. Annagh Mushroom Rock (Site code: TY001) and the Little Brosna Callows (Site Code: TY046) are located ~2.3km and 2.6km west of the proposed sub-station.

Based on criteria shown in the **Table A** above, geological heritage sites have a High Importance.

## 2.5 HYDROLOGY & DRAINAGE

On a regional scale, the proposed development is located within Hydrometric Area 25 (Lower Shannon Catchment) in accordance with the Water Framework Directive.

On a local scale the proposed development site is located in the Rapemills River surface water catchment (Shannon[lower]\_SC\_040). The Rapemills River (Rapemills\_010) flows in a westerly direction through the proposed development site. There is a smaller watercourse that merge with the Rapemills River from the northern section of the proposed development site which is heavily modified for the purpose of bog drainage. 5 no. watercourse crossings are likely to be required within the proposed development site. The watercourse crossing numbers are estimated using the EPA mapping. Therefore, there are likely to be additional smaller watercourses that require crossing.

The peat bogs within the proposed development site are heavily drained and all drains flow towards the Rapemills River or its tributary.

The grid connection options are located in the Brosna and Shannon sub-catchments.

A local hydrology map is shown as **Figure F** below.

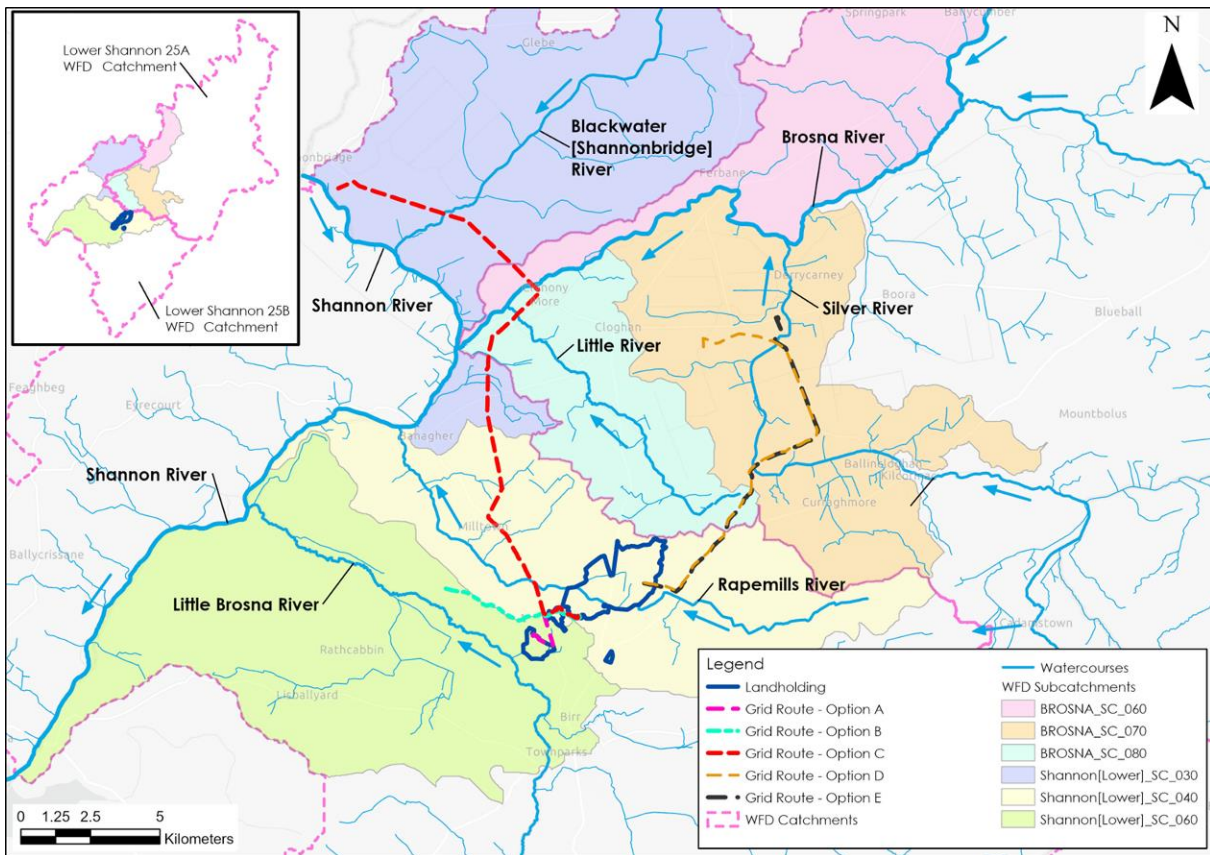


Figure F: Local Hydrology Map

### 2.6 WATERBODY QUALITY & WFD STATUS

Biological Q-rating data for EPA monitoring points on nearby river water bodies are shown in **Table D** below. Most recent data available (2017-2022) show that the Q-ratings for the Rapemills River range from Moderate to High while ratings for the Little Brosna range from Good to High.

Table D: EPA Biological Q-rating data

Station Name/Code	River Waterbody	Q-Value Score	Status
Boolarig Bridge	Rapemills_010	3 - 4	Moderate
Br at Rapemills	Rapemills_010	4	Good
Br SW of Taylors X Rds	Rapemills_020	4 - 5	High
Derrinsallow Bridge	Little Brosna_060	5	High
New Br	Little Brosna_060	4	Good

River Water Body status information is available for view from [www.catchments.ie](http://www.catchments.ie). A summary of WFD status of surface water bodies (SWBs) immediately downstream of the proposed development is shown in **Table E** below.

Within the area of the proposed development river water body status information is available for the Rapemills River, Little Brosna and Lower Shannon.

The Rapemills River along with the downstream Lower Shannon has been assigned an overall 'Moderate Status' along with a risk result of "At Risk". The Little Brosna is assigned a 'Good Status' along with a risk result of "Not At Risk".

**Table E: WFD Summary Information for Surface Water Bodies**

Regional Catchment	Water Body	Overall WFD Status (2013-2018)	Risk result
Shannon	Rapemills_010	Moderate	At Risk
	Rapemills_020	Moderate	At Risk
	Shannon Lower_020	Moderate	At Risk
	Little Brosna_060	Good	Not At Risk
	Shannon Lower_030	Moderate	At Risk

Taking the view that all watercourses are required to have at least "Good Status" in terms of the Water Framework Directive and by applying the criteria in **Table B** above, local and downstream watercourses have a High to Very High Importance.

## 2.7 PUBLISHED FLOOD RISK MAPPING

OPW's River Flood Extents Mapping, National Indicative Fluvial Mapping, Past Flood Event mapping (<https://www.floodinfo.ie/map/floodmaps/>) and historical mapping (i.e. 6" & 25" base maps) were consulted to identify those areas of the proposed development as being at risk of fluvial flooding.

No recurring flood incidents within the proposed development site were identified from OPW's Past Flood Event Mapping. 2 no. recurring events are mapped along grid Option C (refer to **Figure G**).

The closest mapped recurring flooding event to the overall proposed development is on the Little Brosna approximately 5km downstream of the proposed substation location.

The closest mapped recurring flooding event to the proposed development site is on the Lower Shannon approximately 10.5km downstream of the proposed site.

There is no text on local available historical 6" or 25" mapping for the proposed development site, grid connection options or substation location that identify areas that are "prone to flooding".

OPW's River Flood Extents Mapping is currently the most accurate available flood mapping for the country, however this is not available for the area of the proposed development.

OPW National Indicative Fluvial Mapping is available for the area of the proposed development which shows the estimated 100-year and 1000-year flood zones. The National Indicative Fluvial Mapping is not as accurate as the Flood Extents Mapping and is also not intended to replace site specific flood risk assessments (discussed below).

According to the National Indicative Fluvial Mapping (**Figure H**), 1 no. turbine (T2) is located in a 100-year flood zone along with approximately 350m of its connecting spur road. Approximately 370m of the proposed access road between turbines T2 and T4 is also in a mapped 100-year flood zone along with approximately 120m of the proposed access road leading to turbine T1.

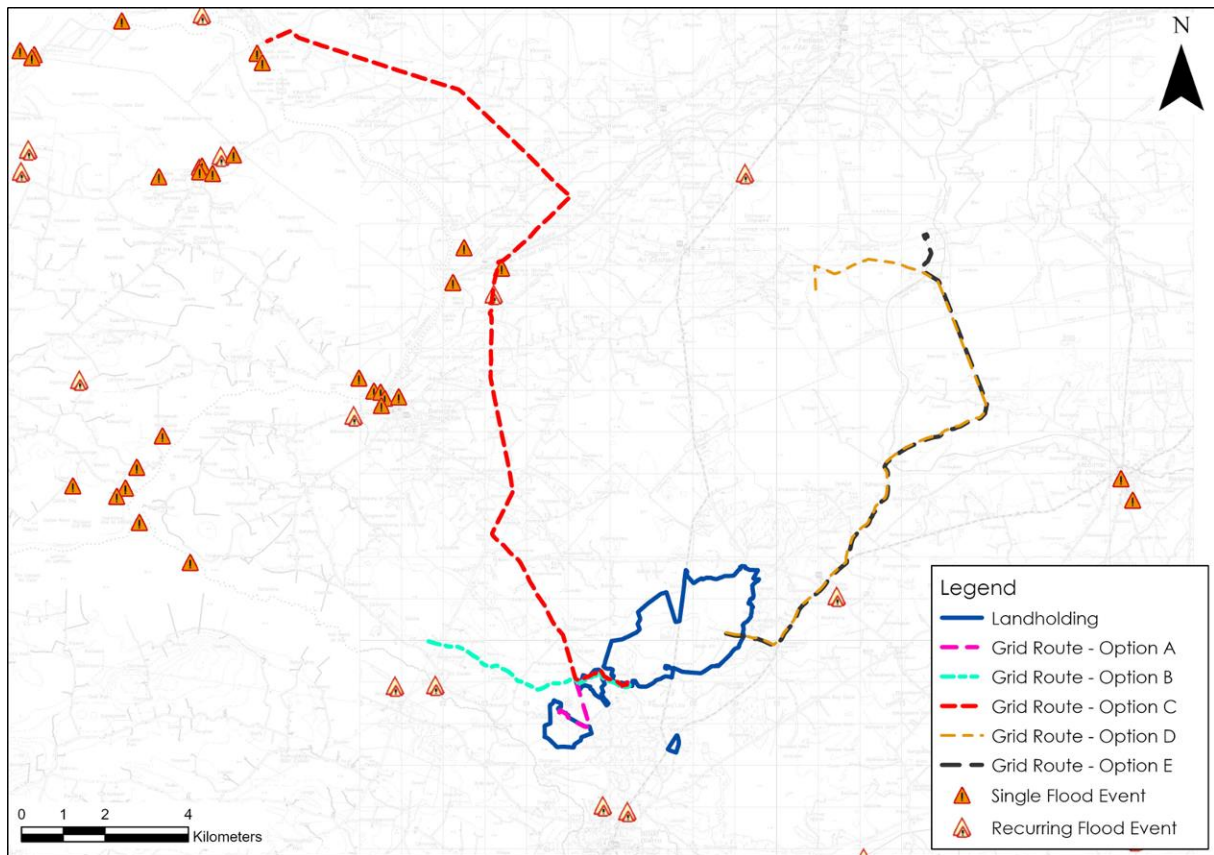


Figure G: OPW's Past Flood Event Mapping

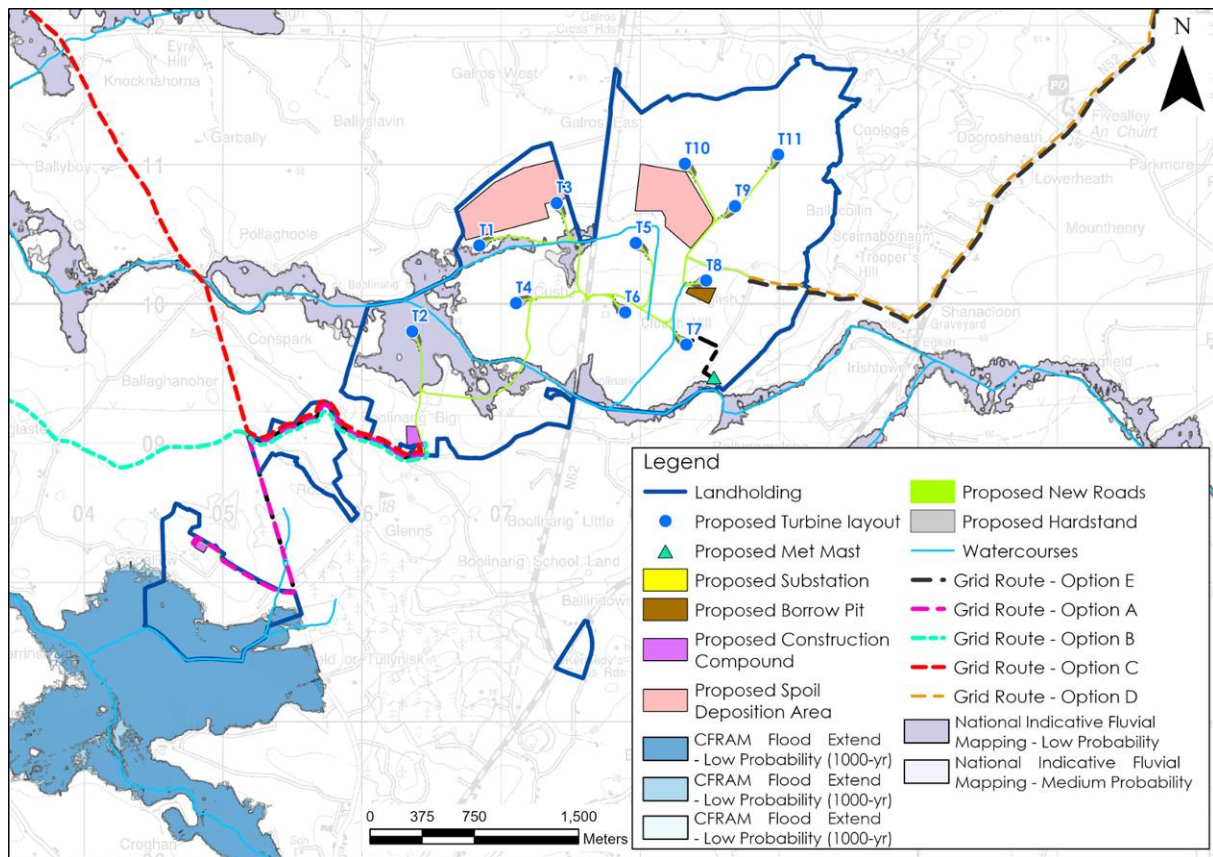


Figure H: OPW National Indicative Fluvial Mapping

## 2.8 SITE SPECIFIC FLOOD RISK ASSESSMENT

A Stage 3 site specific flood risk assessment including flood modelling was completed by HES for the proposed development site in July 2021. This was done to assess the accuracy of the Preliminary Flood Risk Assessment (PFRA) mapping which was the only available published flood mapping for the area at the time.

The PFRA mapping was a national screening exercise, based on preliminary analysis, to identify areas where there may be a significant risk associated with flooding. The mapping was not site specific and had inherited inaccuracies.

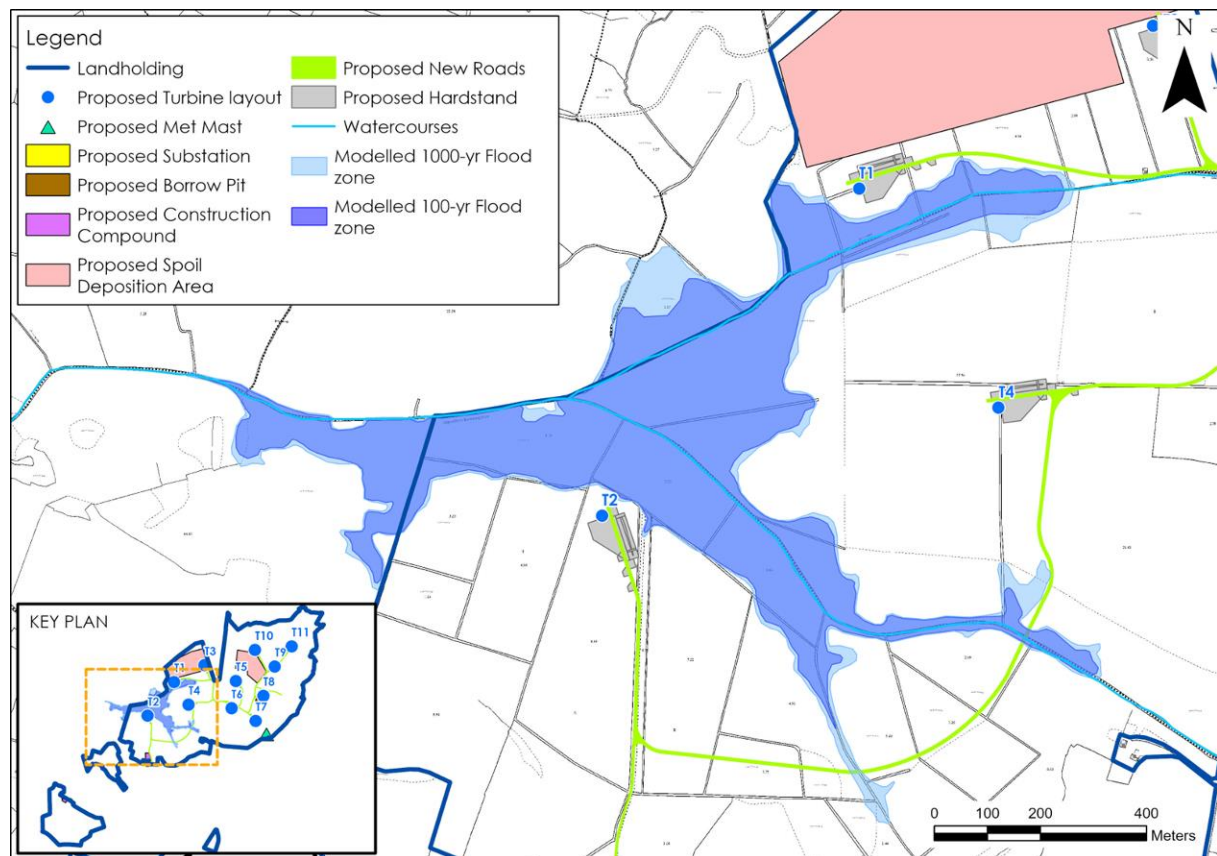
Please note that the site specific flood risk assessment also overrides the National Indicative Fluvial Mapping in terms of its flood zone mapping accuracy.

The Stage 3 site specific flood risk assessment involved detailed site topographic surveys, use of Lidar data and flood flow modelling of the Rapemills River and floodplain.

The site specific modelled 100-year and 1000-year flood for the proposed development site are shown on **Figure I** below.

The site specific flood zone modelling shows that proposed turbine location T2 is outside the 100-year and 1000-year flood zones. Two sections of access road at watercourse crossing locations between turbine locations T2 and T4 (which amounts to approximately 100m of access road) are located within the 1000-year flood zone.

Therefore, with the exception of the 100m of access road, the proposed development site, grid connection and substation location are in Flood Zone C (Low Risk).



**Figure I: Site Specific Modelled Flood Zones**

## 2.9 HYDROGEOLOGY

The Dinantian Lower Impure Limestones and Dinantian Pure Unbedded Limestones which underlie the proposed development are classified by the GSI ([www.gsi.ie](http://www.gsi.ie)) as a Locally Important Aquifer, having bedrock which is moderately productive only in local zones (LI).

Sand and gravels are mapped to overlie the bedrock along the majority of the grid connection including the proposed substation location at Clondallow. These gravels deposits are classified as a Locally Important Gravel Aquifer (Lg) by the GSI.

In terms of local Groundwater Bodies (GWBs), the proposed wind farm site is located in the Banagher GWB (IE\_SH\_G\_040) while the proposed substation is located in the Birr Gravels GWB (IE\_SH\_G\_244). The grid connection options pass through the Birr Gravels GWB, Clare GWB, Banagher GWB and Tullamore GWB.

As stated above the aquifers in these GWBs comprise mainly Locally Important bedrock aquifers with some overlying locally important gravel aquifers.

Based on criteria shown in the **Table C** above, Locally Important aquifer in the area of the proposed development have Medium Importance.

## 2.10 DESIGNATED SITES

Within the Republic of Ireland designated sites include National Heritage Areas (NHAs), proposed National Heritage Areas (pNHAs), candidate Special Areas of Conservation (cSAC), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). No designated sites are mapped within the proposed site boundaries.

Designated sites in close proximity to the wind farm site include Woodville Woods pNHA (Site Code: 000927) and Ridge Road, SW of Rapemills SAC and pNHA (Site Code:000919). Grid route Option C passes through the Middle Shannon Callows (SPA, SAC and pNHA).

The proposed site drains to the northwest via the Rapemills River, which passes the All Saints Bog and Esker SAC and pNHA (Site Code: 000566) and the All Saints Bog SPA (Site Code:004103) ~3.5km from the site. The Rapemills ultimately drains into the River Shannon and flows through the River Shannon Callows SAC (Site Code: 00216) and the Middle Shannon Callows SPA (Site Code:004096), which lie approximately 6.8km northwest of the site.

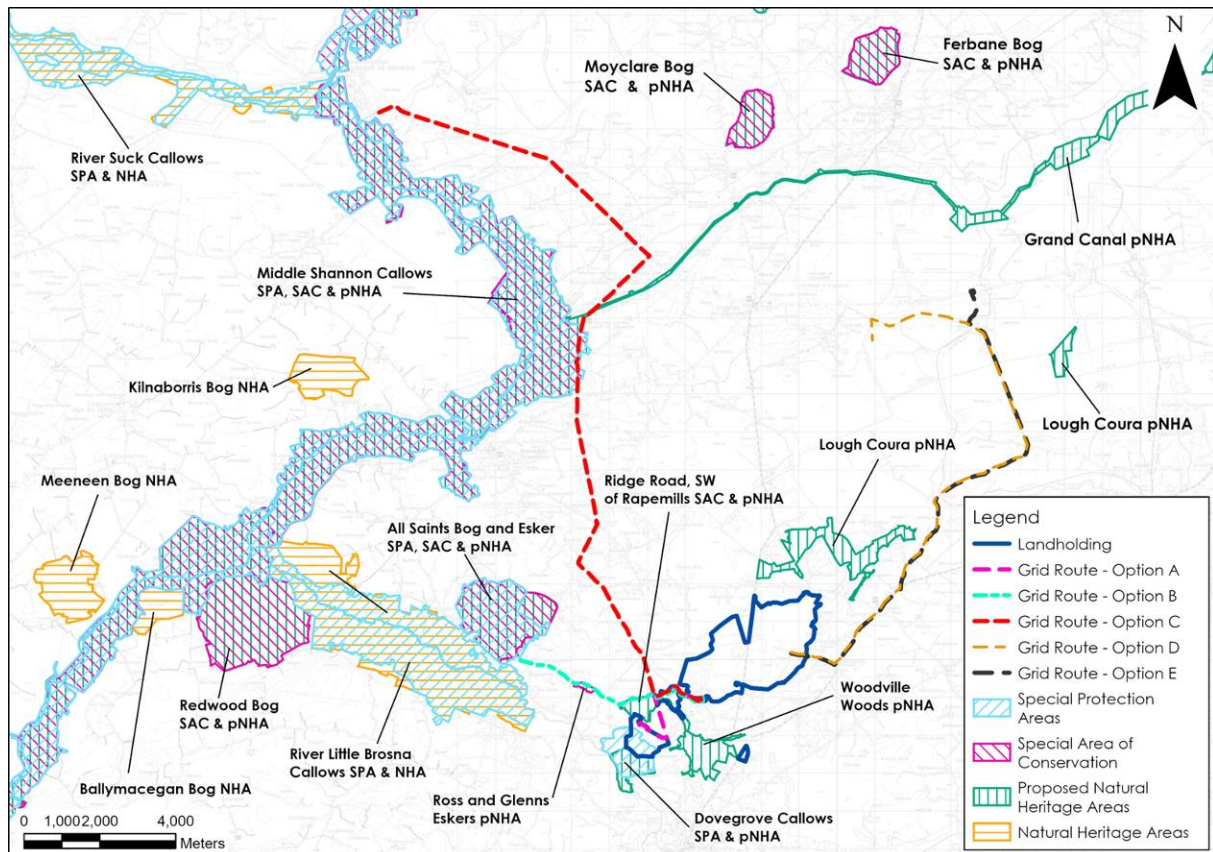


Figure J: Local Designated Site Map

## 2.11 DRINKING WATER SUPPLIES

The proposed development site, grid connection route options or substation location are not mapped within any groundwater protection area (public water supply or group scheme related protection areas).

The closest mapped groundwater protection area is for the Rath Group Water Scheme which is located 3km to the east of the proposed development site. None of the proposed development is located inside the groundwater protection area to this source.

There are no surface waters protected for drinking (Article 7 Abstraction for Drinking Water) within 20km of the proposed development site.

Based on the GSI well database, groundwater is likely to be used locally as a private drinking water source, but the overall mapped well density is low in the area which may suggest that residents are connected to the public water mains. However, the GSI database is not exhaustive and other wells not in the database are likely to be present.

Based on criteria shown in **Table C** local wells have Low Importance and the public supply has a Medium Importance.



### 3. IDENTIFICATION OF POTENTIAL EFFECTS

#### 3.1 POTENTIAL EFFECTS AND CONSTRAINTS

A summary of receptors, likelihood of Impact and potential constraints is shown in **Table F** below.

Potential impacts on surface water and groundwater will mainly be water quality related. However due to the shallow nature of the works and the potential for site runoff, surface waters will be the main receptor in terms of water quality impacts.

No significant effects on surface water or groundwater flows levels or volumes are likely (i.e. quantity). Potential effects on the soils, subsoils and geology will be both quantity (excavations) and quality (spills and leaks).

The main mitigation requirements will be drainage/runoff control and mitigation and best practice use for oils/fuels and cement. Best practice wind farm drainage will have to be implemented.

The main potential site layout constraints identified by this desk based scoping assessment are on-site watercourses (a 50m buffer has been applied to all on-site watercourses) along with the modelled fluvial flood zones.

All the proposed turbine locations, the substation, borrow and spoil storage areas and the majority of the access roads are located outside the 50m stream buffers and the modelled flood zones.

Cutover peat is present at the site. Areas of deep peat are a potential constraint and this needs to be assessed by investigations.

A geotechnical and peat stability assessment should be carried out at an early stage in the EIAR & design layout process.

Downstream designated sites such as the River Shannon Calllows SAC are sensitive receptors.

**Table F: Summary of Receptors, likelihood of Impact and Constraints**

Potential Receptor	Likelihood of Potential Impact	Impacts Type	Mitigation Required	Layout Constraint
Mineral Soil/Subsoil	High	Quantity & Quality	Yes	Unlikely
Cutover Bog/Deep Peat	High	Quantity, Quality & Peat Stability Risk	Yes	Likely
Bedrock	High	Quantity & Quality	Yes	Unlikely
Surface Water	High	Quality/Quantity	Yes	Yes
Flood Risk	Low	Quantity/Level	Yes	Yes
Groundwater	Low/Medium	Quality	Yes	Unlikely
River Shannon Calllows SAC	Medium/High	Quality	Yes	Unlikely
Local Private Wells	Low	Quantity & Quality	Yes	Unlikely

## 4. EIAR ASSESSMENT METHODOLOGY

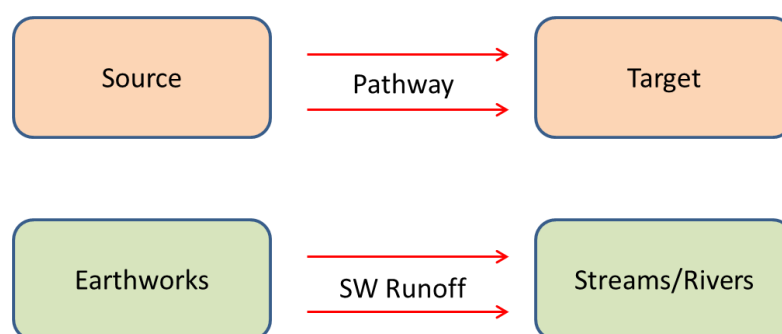
### 4.1 SITE SURVEYS AND INVESTIGATIONS

The following site surveys and investigations should be undertaken to address the Land/Soil and Water Sections of the EIAR:

- Intrusive site investigations by means of trial pitting, peat probes and gouge cores to investigate peat and mineral subsoil lithology along with depth to bedrock;
- Boreholes are recommended to assess the subsoil conditions below the bog;
- Geotechnical and Peat Stability Assessment to inform layout;
- Inspection and mapping of all relevant hydrological features, such as existing drainage ditches, streams and springs etc in terms of potential receptors, constraints and pathways;
- Complete field hydrochemistry measurements (electrical conductivity, pH and temperature) to determine the origin and nature of surface water and groundwater flows;
- Surface water samples will be undertaken to assess the contemporary baseline water quality of the primary surface waters originating from the proposed WF site and along the grid connection route;
- Assessment of downstream receptors such as public water supplies, private wells, surface water abstractions and designated sites using the Source-Pathway-Receptor model (see below); and,
- WFD Status Assessment.

### 4.2 IMPACT ASSESSMENT PROCESS

The conventional source-pathway-target model (see below, top) will be applied to assess potential impacts on local and downstream environmental receptors (see below, bottom as an example) as a result of the proposed development.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);

- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process that will be applied, we have firstly presented below a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process. The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all project (wind farm and grid connection) construction and operation activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Step 1	<b>Identification and Description of Potential Impact Source</b> This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	<b>Pathway / Mechanism:</b>	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of wind farm/grid connection developments, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	<b>Receptor:</b>	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant/animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	<b>Pre-mitigation Impact:</b>	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	<b>Proposed Mitigation Measures:</b>	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to wind farm/grid connection developments, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	<b>Post Mitigation Residual Impact:</b>	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	<b>Significance of Effects:</b>	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

## 5. REPORT CONCLUSIONS

The conclusions of this scoping assessment are presented as follows:

- The proposed development site is low lying with topography being slightly undulating to flat and with ground elevations ranging between 47 and 63m OD (Ordnance Datum). The overall slope is to the west;
- The site is dominated by cutover bog and forestry;
- The mapped geology in the area of the proposed wind farm site comprises mainly cutover bog and sand and gravels over limestone;
- The proposed development drains to the Lower Shannon via the Rapemills River and Little Brosna River;
- The main potential site layout constraints identified by this desk based scoping assessment are on-site watercourses (a 50m buffer has been applied to all on-site EPA mapped watercourses), fluvial flood zones and potentially deep peat;
- In terms of constraints imposed by stream buffer zones, the current proposed layout does not appear to be affected, albeit more detailed drainage mapping will be required;
- With the exception of short sections of proposed access roads, the proposed layout avoids the modelled fluvial flood zones;
- A geotechnical and peat stability assessment should be carried out at an early stage in the EIAR & design layout process;
- The main downstream receptors identified by this assessment include the Rapemills River, Little Brosna River and River Shannon Calllows SAC;
- The River Shannon Calllows SAC will not constrain the layout of the proposed development, but increased mitigation will be required particularly during the construction phase; and,
- All receptors identified in this report remain scoped in for further assessment in the EIAR.

\*\*\*\*\*



**Annex 3 –  
Air Quality & Climate Scoping Report**



# AIR QUALITY AND CLIMATE SCOPING REPORT

-  
**CUSH  
WIND FARM**

---

Technical Report Prepared For

**Galetech Energy Services**

---

Technical Report Prepared By

**Dr. Avril Challoner CSci**

---

Our Reference

227501.0002

---

Date Of Issue

11/02/2022



---



## Document History

Document Reference		Original Issue Date	
227501.0002		11/02/2022	
Revision Level	Revision Date	Description	Sections Affected

## Record of Approval

Details	Written by	Approved by
Signature		
Name	Dr. Avril Challoner	Ciara Nolan
Title	Senior Environmental Consultant	Environmental Consultant
Date	11/02/2022	11/02/2022

## 1 INTRODUCTION

The purpose of this section of the Environmental Scoping Report is to describe the scope of work and methods to be applied in the identification and assessment of air quality impacts associated with the proposed Cush Wind Farm. A high-level overview of the baseline conditions is included, together with the proposed methodology and a scope of work likely to be required to undertake a detailed assessment of the impact of the proposed development on air quality as part of the Environmental Assessment.

### 1.1 Policy and Plan Context – Air Quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set. The assessment of air quality will be conducted with consideration of the relevant legislation and guidance including:

- Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC);
- European Union Directive on air quality assessment and management (96/62/EC) and the associated “daughter Directives”, which set the Limit Values;
- Air Quality Standards Regulations 2011 (S.I. 180 of 2011), which incorporates European Commission Directive 2008/50/EC which has set limit values for the pollutants sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM<sub>10</sub>), benzene and carbon monoxide (CO);
- Air Pollution Act 1987 (No. 6 of 1987);
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (2014);
- Local Authority air quality and planning guidance;
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality HA 207/07 Air Quality (UK Highways Agency 2019a); and
- Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (TII 2011).

### 1.2 Policy and Plan Context – Climate

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements. In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). Ireland’s obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019 followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021 ) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021a). The 2021 Climate Act was

---

prepared for the purposes of giving statutory effect to the core objectives stated within the Climate Action Plan (CAP).

The purpose of the 2021 Climate Act is to provide for the approval of plans ‘for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050’. The 2021 Climate Act will also ‘provide for carbon budgets and a decarbonisation target range for certain sectors of the economy’. The 2021 Climate Act defines the carbon budget as ‘the total amount of greenhouse gas emissions that are permitted during the budget period’.

The Climate Action Plan (CAP) (Government of Ireland, 2021) outlines the status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The 2021 Climate Action Plan (CAP) set a national target of up to 80% of electricity demand by renewables by 2030 for the national electricity grid. Currently, approximately 40% of the national grid electricity comes from renewable sources.

Climate Change Adaptation Strategies were published in 2019 by Offaly County Council (Offaly County Council 2019). the National Adaptation Framework outlines the measures of each county council to help in mitigating and adapting to climate change. One of the key measures to be included in these documents includes the increased use of renewable energy sources as opposed to traditional fossil fuels.

The assessment of climate will be conducted with consideration of the relevant legislation and guidance including:

- European Commission (EC) (2014) 2030 Climate and Energy Policy Framework;
- Climate Action and Low Carbon Development (Amendment) Act (No. 32 of 2021);
- Climate Action and Low Carbon Development – National Policy Position Ireland (DCCAIE 2013);
- National Mitigation Plan: July 2017 (DCCAIE 2017);
- Climate Action Plan 2021 (Government of Ireland 2021);
- IAQM Guidance on the Assessment of Dust from Demolition and Construction (2014);
- Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (TII, 2011);
- Local Authority’s climate and planning guidance; and
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency 2019b)

### **1.3 Study Area**

The Cush Wind Farm will be sited in west County Offaly, c. 4km north of Birr and c. 29km west of Tullamore.

The development will comprise 11 no. wind turbines with an overall tip height of up to 185m; turbine foundations; turbine hardstandings; internal site access tracks; internal wind farm underground cabling; 3 no. site entrances; and all associated site development, access and reinstatement works.

---

The land use in the immediate vicinity of the proposed Cush Wind Farm is rural farmland with a low number of once off houses. There is a quarry and golf club to the south. There are areas of peatland in proximity to the proposed wind farm.

It is determined that the scheme will require appropriate assessment of the degree of sensitivity of the siting and design (i.e. sensitivity of surroundings) of proposed infrastructure associated with the proposed development. It is expected that there will be sensitive residential receptors located within 200m of the construction traffic routes for the wind farm.

The construction phase study area is focused on potential impacts generally due to dust. These impacts usually occur within 350 metres of the dust generating activity as dust particles fall out of suspension in the air. Dust impacts during the construction phase due to material handling activities, including excavation and backfill, on site may typically emit dust. Deposition typically occurs in close proximity to each site and therefore the study area is limited to a 350 m radius from any dust generating activities and up to 500 m along haul routes from the site exit.

The study area with respect to impacts to air quality due to emissions from vehicle and HGV movements is limited to sensitive receptors less than 200 m from road links which are affected by significant changes in traffic volume (i.e. above 5%). This study area is the same for designated areas of conservation (either Irish or European designation) with respect to ecology as the potential impact is highest within 200 m of the road links and when significant changes in AADT (>5%) occur.

Due to the nature of climatic effects, if significant emissions occur, they will have the potential to impact Ireland's commitments and targets under various EU Climate Agreements and other international agreements. Therefore, the study area can be classed as Ireland.

## **2 DESCRIPTION OF THE EXISTING ENVIRONMENT**

### **2.1 Air Quality**

A desktop review of available baseline air quality data within the study area will be undertaken.

Assessment Criteria for the impact of dust during the construction phase are set out in the TII guidelines (TII 2011) and the Institute of Air Quality Management (IAQM) guidelines (IAQM 2014). These are used to assess the impact of dust emissions from construction and demolition activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. It is important to note that the predicted impacts associated with the earthworks and construction phases of the proposed development are short term in nature.

The following data sources will be referred to during the air quality assessment:

- Environmental Protection Agency – National Ambient Air Quality Monitoring Data Archive;
- Environmental Protection Agency – Air Quality in Ireland 2020 Report and previous reports (1997 – 2021);
- National Parks and Wildlife Service Maps; and
- Environmental Protection Agency – Integrated Pollution Control Licences.

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2020" (EPA 2021), details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA 2022). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less

---

than 15,000, is defined as Zone D. In terms of air monitoring, the region of the proposed development is categorised as being rural Zone D (EPA 2022).

In 2020 the EPA reported (EPA 2021a) that Ireland was compliant with EU legal air quality limits at all air monitoring locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA report '*Air Quality in Ireland 2020*' details the effect that the Covid-19 restrictions had on monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section. Long-term monitoring data from previous years has been used to inform estimated background concentrations for this assessment.

NO<sub>2</sub> monitoring was carried out at two rural Zone D locations in 2019, Emo and Kilkitt (EPA 2021a). The NO<sub>2</sub> annual average in 2019 for Emo was 4 µg/m<sup>3</sup> and for Kilkitt was 5 µg/m<sup>3</sup>. Hence, long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m<sup>3</sup>. The average results over the last five years at a range of rural Zone D locations suggest an average of no more than 8 µg/m<sup>3</sup> as a background concentration, with maximum rural concentrations of 5 µg/m<sup>3</sup>. Based on the above information a conservative estimate of the background NO<sub>2</sub> concentration in the region of the proposed wind farm is 5 µg/m<sup>3</sup>.

Long-term PM<sub>10</sub> monitoring was carried out at the Zone D locations of Castlebar, Kilkitt and Claremorris in 2019 (EPA 2021a). The long-term average of the 90<sup>th</sup> percentile of 24-hour concentration is 19 µg/m<sup>3</sup>. The average annual mean concentration measured is 11.3 µg/m<sup>3</sup> (EPA 2021a). The average results over the last five years at a range of Zone D locations suggests an upper average of 13 µg/m<sup>3</sup> as a background concentration. Hence long-term average PM<sub>10</sub> concentrations measured at this location were significantly lower than the annual average limit value of 40 µg/m<sup>3</sup>.

The results of PM<sub>2.5</sub> monitoring at Claremorris (Zone D) in 2019 (EPA 2021a) indicated an average PM<sub>2.5</sub>/PM<sub>10</sub> ratio of 0.52. Based on this information, a conservative ratio of 0.6 was used to generate a rural background PM<sub>2.5</sub> concentration of 7.8 µg/m<sup>3</sup>. Hence long-term average PM<sub>2.5</sub> concentrations measured at this location were significantly lower than the annual average limit value of 25 µg/m<sup>3</sup>.

In summary, existing baseline levels of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> based on extensive long-term data from the EPA are well below ambient air quality limit values in the vicinity of the proposed wind farm.

---

## 2.2 Climate

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2020 (EPA 2021b). The data published in 2021 states that Ireland has exceeded its 2020 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.73 Mt. For 2020, total national greenhouse gas emissions are 57.7million tonnes carbon dioxide equivalent (Mt CO<sub>2</sub>eq) with 44.38 MtCO<sub>2</sub>eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2020 at 37.1% of the total, with the transport sector accounting for 17.8% of emissions of CO<sub>2</sub>.

GHG emissions for 2020 are estimated to be 3.6% lower than those recorded in 2019. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO<sub>2</sub>eq, 2.94 MtCO<sub>2</sub>eq, 5.57 MtCO<sub>2</sub>eq, 6.85 MtCO<sub>2</sub>eq and 6.73 MtCO<sub>2</sub>eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021c) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "With Additional Measures scenario" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2 MtCO<sub>2</sub>eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario (EPA, 2021c). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available.

After the publication of the 2021 Climate Act in July 2021 and the 2021 CAP, carbon budgets and sectoral ceilings for the built environment sector will be adopted in the coming months and will be outlined in the 2022 CAP which will allow a comparison with the net CO<sub>2</sub> project GHG emissions.

## 2.3 Consultation

Consultation is important in order to ensure that a sufficiently robust environmental baseline is established for the proposed development and its surroundings. It helps to identify specific concerns and issues relating to air quality and climate early on in the process. Public consultation will continue to be carried out at intervals throughout this process the Environmental Protection Agency (EPA) and National Parks and Wildlife Service (NPWS) will also be included.

Consultation with all relevant authorities, organisations and stakeholders will continue throughout the assessment and design process.

---

### **3 DESCRIPTION OF POTENTIAL IMPACTS**

#### **3.1 Potential Construction Phase Impacts – Air Quality**

During the construction phase there is potential for an impact on air quality from the following:

- Potential for construction dust emissions and nuisance dust. This will potentially be caused by activities such as excavation, soil movement, soil storage and backfilling, and would be exacerbated by winds and dry weather. Dust tends to be deposited within 350 metres of the generation site, and therefore sensitive receptors which fall within this distance of construction activities would be most at risk;
- There is the potential impact of traffic emissions on nearby sensitive receptors and this will be reviewed in accordance with the UK Highways Agency guidance LA 105 – Air Quality (2019) criteria; and
- Emissions from Heavy Goods Vehicles (HGVs) and on site construction plant and equipment which may give rise to emissions including; particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) and nitrogen oxides (NO<sub>x</sub>).

In order to minimise dust emissions during construction, a series of mitigation measures will be included in the EIAR and will be implemented during the construction phase of the project, such as speed restrictions on site and water misting. The contractor appointed to design and build the proposed development will be required to comply with these measures. The mitigation measures will ensure no significant impact on sensitive receptors.

#### **3.2 Potential Construction Phase Impacts – Climate**

GHG emissions from construction traffic and embodied energy from construction materials will increase Ireland's GHG emissions potentially causing climate change. The impact of this will be assessed in the EIAR. The embodied energy of the construction material is expected to be the dominant source of GHG emissions as a result of the development. Emissions with the potential to cause climate change will arise from embodied carbon dioxide in site materials, removal of existing material and backfill as well as kilometres travelled by vehicles delivering/removing this material to and from the construction site. These emissions will be quantified using the TII Carbon Assessment Tool (Version 2.1) (TII 2021) for construction sites and compared to Ireland's greenhouse gas emissions. The potential construction traffic emissions will be reviewed in accordance with the UK Highways Agency guidance LA 114 – Climate (2019) criteria.

The proposed wind farm development has the potential to cause a loss of forestry and removal of peat during the construction phase, this may have a negative impact on the sequestration of GHG emissions, this will be reviewed as part of the EIAR.

#### **3.3 Potential Operational Phase Impacts– Air Quality**

Due to the size, nature and location of the proposed development, increased road traffic emissions resulting from the proposed development are expected to have an imperceptible impact on air quality. However, the potential impact of traffic emissions will be reviewed in accordance with the UK Highways Agency guidance LA 105 – Air Quality (2019) criteria. Baseline levels of pollutants in the area are quite low and due to the low numbers of vehicles associated with the proposed development these are unlikely to increase them above limit values.

The generation of electricity due to the installation of the wind farm will lead to a net savings in terms of NO<sub>x</sub> emissions resulting in a potentially significant beneficial impact.

---

### **3.4 Potential Operational Phase Impacts– Climate**

The potential operational traffic emissions will be reviewed in accordance with the UK Highways Agency guidance LA 114 – Climate (2019) criteria.

In the absence of specific sectoral carbon budgets, it is anticipated that any negative changes in net GHG emissions due to the proposed development will be significant. This viewpoint aligns with the Institute of Environmental Management and Assessment (IEMA) guidance note on Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2017) which advises that all carbon emissions contribute to climate change and in the absence of a defined threshold (e.g. national sector-specific targets and trajectories), any decrease in carbon emissions may be considered as significant. As a result, GHG emissions from the operational phase have the potential to be significantly beneficial.

The benefit in terms of offset greenhouse gas emissions is calculated from the average fossil fuel electricity mix which will be offset by use of wind energy. This helps to fulfil Offaly County Council's Climate Change Adaptation Strategy's (Offaly County Council, 2019) commitment to more renewable energy sources.

## **4 Proposed Methodology and Assessment**

It is proposed that an assessment of air quality will be carried out in accordance with the following guidance and established best practice, it will be tailored accordingly based on professional judgement and local circumstance:

- Environmental Protection Agency (EPA) Guidelines on the Information to be contained in the Environmental Impact Statement (EPA, 2002) and will follow all future revisions or finalised EIA guidelines as appropriate (draft revised EPA guidelines on EIAR were published in 2017);
- Best Practice Guidelines for the Irish Wind Energy Industry (2012);
- EPA Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003) and will follow all future revisions or finalised EIA advice notes as appropriate (draft revised EPA Advice Notes for Preparing Environmental Impact Statements were published in 2015);
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality HA 207/07 Air Quality (UK Highways Agency 2019);
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, LA 114 Climate (UK Highways Agency 2019);
- Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (TII, 2011)); and
- TII Carbon Assessment Tool (Version 2.1) (TII 2021).

In line with the above guidance, the assessment will cover potential impacts to air quality and climate, it will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed Cush Wind Farm. The impact assessment process will involve:

- Assigning the receptor sensitivity;
  - Identifying and characterising the magnitude and significance of any potential impacts;
  - Incorporating measures to avoid and mitigate (reduce) these impacts; and
-



- Assessing the significance of any residual effects after mitigation.

The air quality assessment carried out on the proposed Cush Wind Farm will include the following elements:

- Review of standards and legislation;
- Identification of air quality issues relevant to the components of the proposed development;
- Review of background ambient air quality in the vicinity of the proposed development (relevant air quality baseline data will be obtained from the EPA);
- Assessment of potential impacts of plant and equipment processes on air quality; and
- Assessment of potential impacts of traffic on ambient air quality.

The Climate assessment carried out on the proposed Cush Wind Farm will include the following elements:

- Review of standards and legislation;
- Identification of impacts on climate relevant to the components of the proposed development;
- Review of the baseline climate (relevant air quality baseline data will be obtained from the EPA);
- Assessment of potential impacts embodied carbon and operation on the Wind Farm on Climate; and
- Assessment of potential impacts of traffic on Climate.

The assessment will take account of sensitive receptors relevant to the proposed development. Sensitive receptors include locations where people spend significant periods of time, such as domestic properties. Ecological receptors are habitats that might be sensitive to dust. Examples of these sensitive receptors include:

- Residential dwellings;
  - Industrial or commercial uses sensitive to dust;
  - Recreational areas and sports grounds;
  - Schools and other educational establishments;
  - Buildings of religious sensitivity;
  - Designated ecological area of conservation (either Irish or European designation);
  - Hospitals and nursing homes; and
  - Offices or Shops.
-

A series of mitigation measures to minimise any foreseen impacts for both the construction phase and operational phase of the project will be proposed as required as part of the EIAR. Monitoring of construction dust deposition at nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure proposed mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m<sup>2</sup>\*day) during the monitoring period between 28 - 32 days.

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, a dust management plan will be formulated by drawing on best practice guidance from Ireland, the UK and USA.

---

## 5 References

Environmental Protection Agency (EPA) (2002) Guidelines On Information To Be Contained in Environmental Impact Statements

EPA (2003) Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements)

European Council (2014) European Council (23<sup>rd</sup> and 24<sup>th</sup> October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14

EPA (2015) Advice Notes for Preparing Environmental Impact Statements (Draft) on the Information to be Contained in Environmental Impact Assessment Reports (Draft)

EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft)

EPA (2021a) Air Quality Monitoring Report 2020 (& previous annual reports 1997-2020)

Environmental Protection Agency (2021b) Ireland's Provisional Greenhouse Gas Emissions 1990 – 2020

Environmental Protection Agency (2021c) GHG Emissions Projections Report - Ireland's Greenhouse Gas Emissions Projections 2020 - 2040

EPA (2022) EPA Website: <http://epa.ie/pubs/reports/air/>

European Council (2014) European Council (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14

Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction

Offaly County Council (2019) Climate Change Adaptation Strategy 2019 - 2024

Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes

TII (2020) TII Carbon Assessment Tool (Version 2)

UKHA (2019). Design Manual for Roads and Bridges Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 - Climate

UKHA (2019) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality HA 207/07 Air Quality

---

**Annex 4 –  
Landscape Scoping Report**



# LANDSCAPE AND VISUAL SCOPING REPORT



Cush Wind Farm

Co. Offaly



Registered  
Landscape  
Architect

June 2022

# 1 LANDSCAPE AND VISUAL SCOPING

## 1.1 INTRODUCTION

The purpose of this Scoping Report is to describe the scoping methodology and present outcomes of initial desk study and fieldwork stages and also establish the scope of work and methods applied in the identification and assessment of landscape and visual impacts associated with the proposed Cush Wind Farm. It will present key landscape and visual receptors and highlight potential effects that will be assessed. Another key element of the landscape and visual scoping report is the selection of the preliminary set of representative Viewshed Reference Points (VRPs), from which, it is intended to prepare photomontage simulations of the development and undertake the visual impact assessment.

The proposed Cush Wind Farm is situated in a relatively flat area of terrain that comprises of a mix of open peat bog, conifer forest plantations and pastoral farmland. It is situated across the townlands of Ballycollin, Whigsborough, Eglis, Galros East, Galros West, Cush and Boolinarg Big in County Offaly, 4.5km north of the settlement of Birr. The site lies over 3.5km west of the Offaly - Tipperary border, and approximately 8km southwest of the Offaly – Galway border. The periphery of the study area overlays County Roscommon to the north and County Laois to the west.

## 1.2 POLICY PLAN AND CONTEXT

The European Landscape Convention promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The Convention was adopted on the 20<sup>th</sup> October 2000 and came into force on the 1<sup>st</sup> March 2004. The Convention was ratified by Ireland in 2002. As one of the obligations under the convention, a draft National Landscape Strategy was issued for public consultation by the *Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs*, (formally the Department of Art, Heritage and the Gaeltacht in July 2014. Following consideration of submissions, the 'National Landscape Strategy for Ireland 2015-2025' was published in mid-2015 by the Department of Arts, Heritage and the Gaeltacht.

One of the key objectives of the National Landscape Strategy, and a requirement of the European Landscape Convention, is to prepare a National Landscape Character Assessment (LCA). However, this is not likely to be prepared prior to the submission of the planning application. On this basis, county level Landscape Character Assessments for County Offaly and County Tipperary (both contained within the respective County Development Plans) will be a key consideration. With those through the wider study (Galway, Roscommon, and Laois) area reviewed for key sensitivities and considerations. In all cases, these Landscape Character Assessments have also been integral to the development of wind energy strategies / policy contained within the CDPs.

Wind Energy Development within the Republic of Ireland is undertaken in accordance with the Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006/2019 revision). Recommendations on the siting and design of wind energy developments are provided in Chapter 6 of the current / draft revised Guidelines based on six potential

landscape character types. The proposed development is considered to be most associated with the 'Flat Peatland' and 'Hilly and Flat Farmland' landscape type. This guidance will be a key consideration of the landscape and visual assessment.

The Landscape and Visual Assessment of Cush Wind Farm will be undertaken in strict accordance with the Landscape Institute and the Institute of Environmental Management and Assessment publication entitled 'Guidelines for Landscape and Visual Impact Assessment' – Third Edition (2013). This is recognised as the principal best practice guidance for landscape and visual assessment of all forms of development in Ireland and the UK.

Regard will also be given to the overarching Environmental Impact Assessments guidelines and advice notes set out by the EPA:

- Environmental Protection Agency (EPA) Guidelines on the Information to be contained in the Environmental Impact Assessment Reports (EPA, 2022)
- EPA Advice notes on current practice in the preparation of Environmental Assessment Reports (EPA, Draft 2015)

Other relevant LVIA and wind energy specific guidance that will be considered includes;

- Scottish Natural Heritage (SNH) Siting and Designing Wind Farms in the Landscape (version 3a – 2017)
- Scottish Natural Heritage (SNH) Assessing the Cumulative Impact of Onshore Wind Energy Developments (2012).
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

The most relevant landscape and visual policies with regard to the proposed wind farm development are contained with the County Development Plan for County Offaly and County Tipperary, with secondary consideration to those within County Galway, County Roscommon and County Laois.

### **Offaly County Development Plan 2021-2027**

As with previous iteration, the latest Offaly County Development Plan does not incorporate a traditional Landscape Character Assessment. Instead, it simply categorises the landscape of the county into High, Moderate and Low sensitivity classes based on topographical and land cover features such as eskers and peatland.

The Cush site is classified as Medium and Low sensitivity on the basis of being within cutaway peatland, mixed conifer/woodland and farmland, whereas, areas of 'High' sensitivity in the surrounding area are associated with Eskers, Lough Boora and the Shannon River corridor (including Clonmacnoise). Medium sensitivity areas are described as;

*“Moderate sensitivity areas can accommodate development pressure but with limitations in the scale and magnitude. In this category of sensitivity, elements of the landscape can accept some changes while others are more vulnerable to change.”*

Low sensitivity landscapes are described as:

*“Low sensitivity areas are robust landscapes which are tolerant to change, such as the county’s main urban and farming areas, which have the ability to accommodate development.”*

A number of ‘Areas of High Amenity’ are also designated in County Offaly, eight (of 13) of which are located within the study area and include the Shannon River and Callows (1), The Grand Canal (2), Lough Boora Discovery Park (3), Pallas Lake (4), Slieve Bloom Mountains (5), Eiscir Riada (9), Other Eskers (11), Clonmacnoise (12). These Areas of High Amenity (AHA) are deemed *“worthy of special protection / enhancement due to their uniqueness and scenic / amenity value”* and the designation is *“additional to statutory national and European designations which may overlap with these AHA”*.

The Wind Energy strategy included in the current CDP overlays these higher sensitivity areas, as well as the scenic views and routes, in order to classify areas of the county for a Wind Energy Strategy. The site/central study area is located within areas 7 and 8. Within area 7: Area generally south of Cloghan and Birr Environs, the ‘Area generally south of Cloghan’ is deemed *“Open for consideration for Wind Energy Development in principle”*, while ‘Birr Environs’ is deemed *“not suitable for windfarms”*. Within Area 8 ‘Area generally south and west of Kilcormac’ is deemed *“Area not deemed Suitable for Windfarms”*. However, the more detailed ‘Wind Energy Designations’ map shows that the site generally aligns with the identified ‘Areas Open for Consideration for Wind Energy Development’.

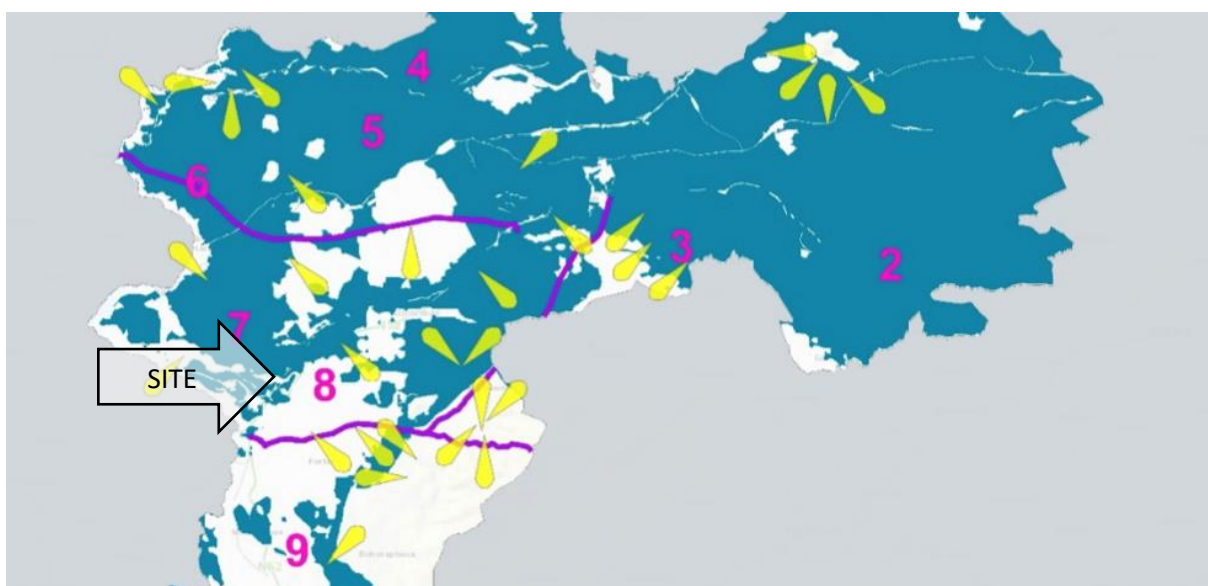
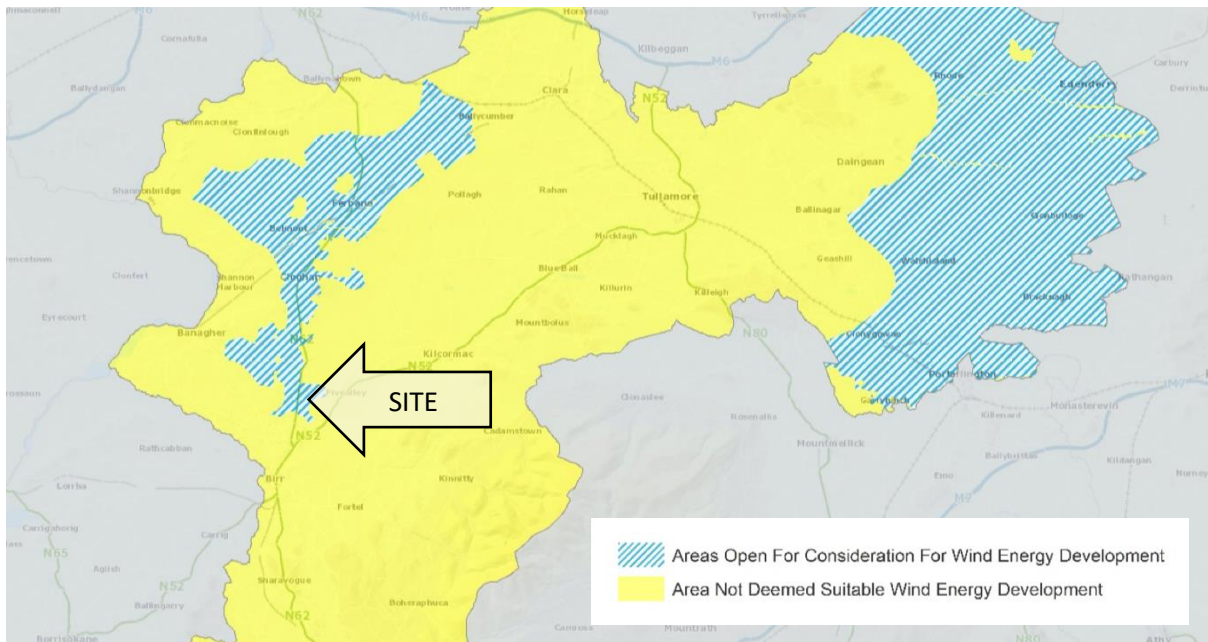


Figure 1.1 Wind Energy Strategy Map No. 8: Protected Views and Potential Wind Energy Areas





**Figure 1.2 Wind Energy Strategy Map No. 10: Wind Energy Strategy Designations**

### **Draft Tipperary County Development Plan 2022-2028**

Whilst the proposal site is wholly contained within county Offaly, the Tipperary county border is situated less than 4km from the site at its nearest point. The nearest and most relevant landscape character areas in County Tipperary are ‘LCA 7 – Borriskane lowlands’, which is described as *“Peatlands and wet mixed farmlands. The plains also contain large areas where impeded drainage and peat formation give rise to less densely inhabited areas and more marginal agriculture with very open vistas”*, and LCA 11 – Lakeland Waterside (Shannon Callows), which is described as *“some of Ireland’s most important and cherished large lake scenery and recreation areas”*. The following sensitivity and compatibility with ‘Wind Farm’ land use apply for each landscape character area: LCA 7: Borriskane Lowlands has been classified with a Moderate sensitivity to change, reduced capacity, and low compatibility with wind farms land use. LCA 7: Borriskane Lowlands has been classified with a Class 3 High sensitivity to change, low capacity, and least compatibility with wind farms land use.

Two other LCAs occurs along the Tipperary – Offaly border within/adjacent to the central study area and include ‘LCA 5 – Templemore Plains’.

### **County Development Plan Scenic Designations**

Scenic views and routes designations from both the Offaly and Tipperary County Development Plan will be considered as well as those from other Planning Authority jurisdictions (Galway, Roscommon, Laois) within the study area. Those considered relevant in terms of viewing direction and potential visibility of the proposed development will be included as a representative viewpoint for the purposes of the visual impact assessments. A list of those designated scenic views that have been scoped out and the reasoning why will be included within the Viewshed Reference Point Selection Report.

### **1.3 STUDY AREA**

The Wind Energy Development Guidelines published by the Department of the Environment, Heritage and Local Government (2006/2019 draft revised) specify different radii for examining the Zone of Theoretical Visibility of proposed wind farm projects ('ZTV'). The extent of this study area is influenced by turbine height as follows;

- 15km radius for blade tips up to 100m;
- 20km radius for blade tips greater than 100m; and
- 25km in order to incorporate features of national or international renown.

In the case of this project, the blade tips will be over 100m high and, thus, the minimum ZTV radius required is 20km from the outermost turbines of the proposed development. However, Clonmacnoise historical site is situated just over 20km northeast of the site on the banks of the Shannon River and consequently, it is recommended to increase the study area as per the Wind Energy Development Guidelines to include this.

#### **1.3.1 Consultation**

It is considered that consultation on the landscape and visual impact assessment will be undertaken with the Local Authorities - Offaly and Tipperary County Councils, along with local residents.

### **1.4 SCOPING METHODOLOGY**

Scoping for this LVIA will consist of a combination of 'Desk Study' and fieldwork in order to understand the nature of the receptors within the study area and the nature of likely impacts that are likely to occur as a result of the proposed development. The Desk Study element proceeds fieldwork as the latter is used to scope-in or scope-out potentially affected receptors that are identified as part of the desk study.

Establishing the landscape baseline includes consideration of the geographic location and landscape context of the proposed wind farm site as well as the essential landscape character and salient features of the wider Study Area and is discussed with respect to; landform and drainage and; vegetation and land use. The visual baseline is more population based, but still overlaps with elements of the landscape baseline. The visual baseline is discussed in relation to; centres of population and houses; transport routes and; public amenities and facilities.

#### **1.4.1 Desk Study**

The desktop study will comprise of the following:

- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;

- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Online review of tourism, recreational and heritage features within the study area that may be potential visual receptors.
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity;
- Production of wireframe images of the development at each potential viewpoint (illustrating the turbines in a bare-ground context) to aid fieldwork / viewpoint selection.

#### **1.4.2 Fieldwork**

Fieldwork to be carried out during Spring/Summer in 2022 and to comprise of the following:

- Examination of the salient landscape character of the site and its immediate surrounds as well as the wider study area.
- Investigation of potential viewpoint locations identified at the desk study stage and selection / rejection of each.
- Selection of other relevant viewpoints that may not have been apparent from the desk study (local monuments, walkways etc.)
- Capture high quality base photography from which to prepare photomontages of the proposal.
- Examine the route of the proposed grid connection options.
- Preparation of a viewpoint selection report and associated map for consultation purposes (Planning Authorities) indicating the intended VP selection set to be used for the preparation of photomontages to support the visual impact assessment.

### **1.5 POTENTIAL IMPACTS**

As described in the Scoping Methodology Section (1.4), analysis of ZTV maps provides the basis for initial desk based VP selection, as these maps identify from where in the study area the development is potentially visible in a bare-ground scenario. Importantly, they also indicate areas where there is no potential for visible, which can then be confidently scoped-out of further investigation / assessment. Overall, there is potential for short range (0-5km), mid-range (5-15km) and long range (15km+) views of the development, but with the highest potential for significant landscape and visual impacts to occur for short range views, where these might coincide with highly sensitive receptors. Views of the proposed development from beyond 20km, though feasible, could only occur from elevated vantage points and in very clear viewing conditions. At such distances, any visual impacts from the proposed development are not considered to have potential for significant effects even at highly sensitive receptor locations.

Potential landscape and visual impacts could also occur in respect of ancillary development such as access roads, hard stands, and grid connection.

### 1.5.1 Analysis of ZTV maps

The ZTV maps show that comprehensive visibility of all the proposed turbines will be theoretically afforded from the central portions of the study area (<5km from the site) and extending up to 10km. This large block of comprehensive visibility relates to the notably flat nature of the landscape in the central study area which principally comprises of large peatbogs and pastoral farmland. Nevertheless, within the wider surrounds of the 20km study radius consistent theoretical visibility begins to become patchy in places as the terrain begins to transition in to a low rolling landscapes comprising of low hills and eskers. This is most evident in the scenic southwest and east/southeast extents of the study area where the Shannon River Corridor towards Lough Derg and the foothills of the Slieve Bloom mountains introduce variety to the landform and influence the degree of visibility. There are pockets of rapidly changing visibility throughout the study area caused by similar landform variability (including Eskers to the north of the site) although not to the same extent as the southern half.

Key receptors contained within the ZTV (i.e with potential visibility) within the central study area include the settlements of Birr (the largest within the study area by some margin). In terms of transport receptors, the to the N62 and N52 national secondary routes and R439, R438, R440, R421, R357, R437, R444, and R356 regional roads. The central study area also contains a network of local roads, rural residential dwellings and farmsteads, all of which will be afforded comprehensive theoretical visibility of the proposed development. Consequently, a strong emphasis will be place on representing these local community receptors in the LVIA.

A relatively large number of settlements are also situated within the wider study area (in addition to Birr) the largest and most notable of which include Ferbane, Kilcormac, Shannonbridge, Banagher, Eyrecourt and Kinnity. Viewpoints will be included from all settlements within the study area where there is likely visibility of the proposed development.

The study area is highly variable with regards to scenic amenity, with large swathes of low landscape sensitivity across the central study area, however intersecting these and overlaying the periphery of the study area are areas of medium and high landscape sensitivity, alongside a high density of scenic views. In particular, the wider southern (to the east and west) portions of the study area in both Offaly and Tipperary are of higher scenic amenity and sensitivity as a consequence of the rolling terrain and bordering the natural attractions of the Shannon River, Lough Derg, and Slieve Bloom Mountains. The same landform changes that introduce higher levels of amenity through the southern section of the landscape reflect the degree of visibility through these areas, and aside from upper reaches of hills and ridges, the southern portion of the study here has varied potential for visibility. The northern and north-eastern quadrants of the study area similarly have a notable degree of scenic amenity due to the numerous river and canal corridors, however there is a more consistent (high) degree of visibility through these areas. Where there is potential for scheme visibility from any of these designated viewpoints, they are to be included as viewpoints within the LVIA chapter. It is important to note that due to the large number of scenic views within the wider study area, one viewpoint may be chosen to represent a cluster of designated views.

### 1.5.2 Viewshed Reference Point (Viewpoint) Selection Report

Based on the ZTV map analysis a preliminary viewpoint selection was generated. These viewpoints are to be investigated during fieldwork and will result in the preparation Viewshed Reference Point Selection Report that will identify viewpoints that are intended to be used for the visual impact assessment and views that were investigated but will be scoped out. Below is a map of the preliminary viewpoints to be investigated;

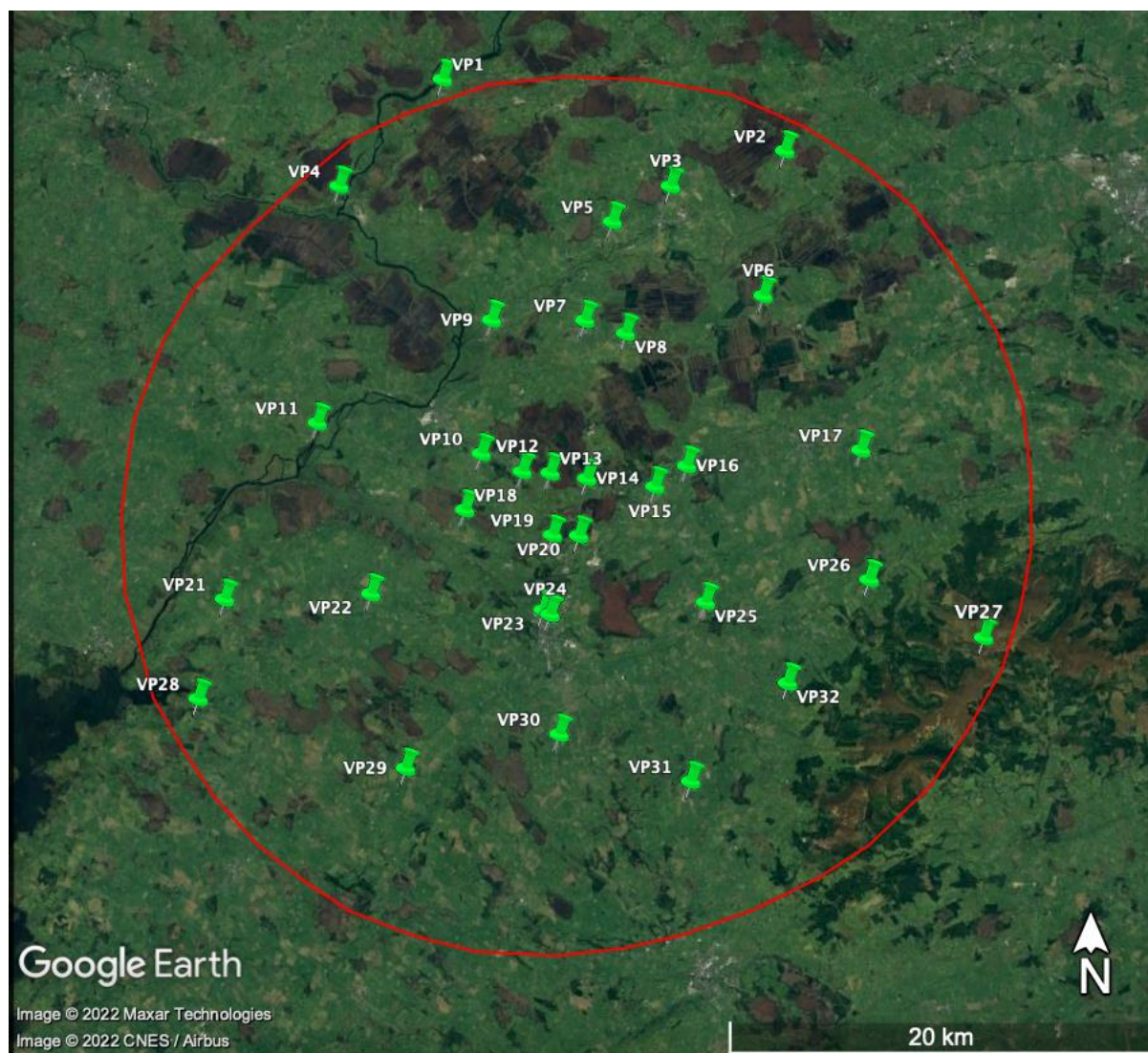


Figure 3: Preliminary Viewpoint Map

### 1.5.3 Scoping Responses from Statutory Consultees

There are no specific responses to landscape and visual elements, however there are comments on features which overlay and contribute to the landscape character. In general, the points identified from statutory consultees will be addressed as parts of the overall landscape and visual assessment, rather than extracted for specific analysis. There are comments surrounding Geological Survey Ireland (GSI) with regards to the Kilcormac Esker south of the site, which is listed as a County Geological Site, defined below:

*County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation.*

This also indicates that the value placed on this feature is of a more local level, contributing to the landscape, however not (as above) the 'very best example'. The feature within the vicinity of the site is:

*Kilcormac Esker, Co. Offaly (GR 215100, 213236), under IGH theme: IGH 7 Quaternary. The Kilcormac Esker and surrounding sands and gravels include an exceptionally large accumulation of sands and gravels deposited both under the ice sheet and at its margin as the ice withdrew westwards across Offaly at the end of the last Ice Age. The esker forms part of the much larger Killimor-Birr-Fivealley-Kilcormac Esker System, extending across the Midlands for over 70 km linear extent. Many of the esker ridge segments themselves are worthy of pNHA status geologically and geomorphologically. Link to Site Report: OY018.*

The following policies derived from the Offaly County Development Plan were listed within the response from GSI, along with others with regards to protecting and maintaining the character and landscape/amenity values of Eskers.

*BLP-11 It is Council policy to protect and conserve the landscape, natural heritage and biodiversity value of esker systems in the county as identified in the Offaly Esker Study, 2006.*

While there is no overlap between the proposed turbine locations and the esker outline provided within the GSI data, they are in close proximity. The change in landscape character due to presence of turbines will be assessed within the wider landscape and visual section of the report, as the presence of these eskers adds an overlay of geological heritage within the typical wider landscape, but the sections within the immediate surrounds of the site are not a highly sensitive, scenic feature in their own right.

There are also comments from the Forestry Division, which re-iterate that the application should:

*"[Application should] include an assessment of the impact of and measures, as appropriate, to prevent, mitigate or compensate for any significant adverse effects direct or indirect identified on the environment arising from such felling and replanting of trees, deforestation for the purposes of conversion to another type of land use, or replacement of broadleaf high forest by conifer species"*

These will be addressed through the landscape impacts section with regards to the landscape character and values associated with any vegetation over the site. It is expected that the more detailed ecological values of any impacts will be assessed elsewhere.

Other response, such as from Failte Ireland and with regards to waterways within the site and study area, will be addressed within the report as far as they relate to the landscape and visual values of the site and impacts of the proposal. The technical assessment of these elements (specifically waterways), will be addressed by the relevant specialists, this also applies to the above forestry and geological points.

#### **1.5.4 Potential Cumulative Impacts**

There are 5 other existing or permitted wind farm developments within the central study area or its surrounds. The cumulative impacts of the site will take account of the permitted and existing windfarms in the study area and assess the cumulative impacts of the proposal with the others within the study area. The name, relative distance and number of turbines of these are as follows:

<b>Name</b>	<b>Number of turbines</b>	<b>Distance between nearest turbines (to nearest km)</b>
<b>Leabeg Wind Farm</b>	2	11km (NE)
<b>Derrinlough Wind Farm</b>	21	3km (N)
<b>Cloghan Wind Farm</b>	9	4km (N)
<b>Meenwaun Wind Farm</b>	4	2km (NE)
<b>Carrig and Skehanagh</b>	3 & 5	13km (S/SW)

## **1.6 EIAR ASSESSMENT METHODOLOGY**

Production of the Landscape and Visual Impact Assessment will involve desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects.

### **1.6.1 Assessment**

In accordance with the Guidelines for Landscape and Visual Impact Assessment (2013), the method for estimating the significance of landscape impacts and visual impacts is very similar. This is summarised in the diagram below;

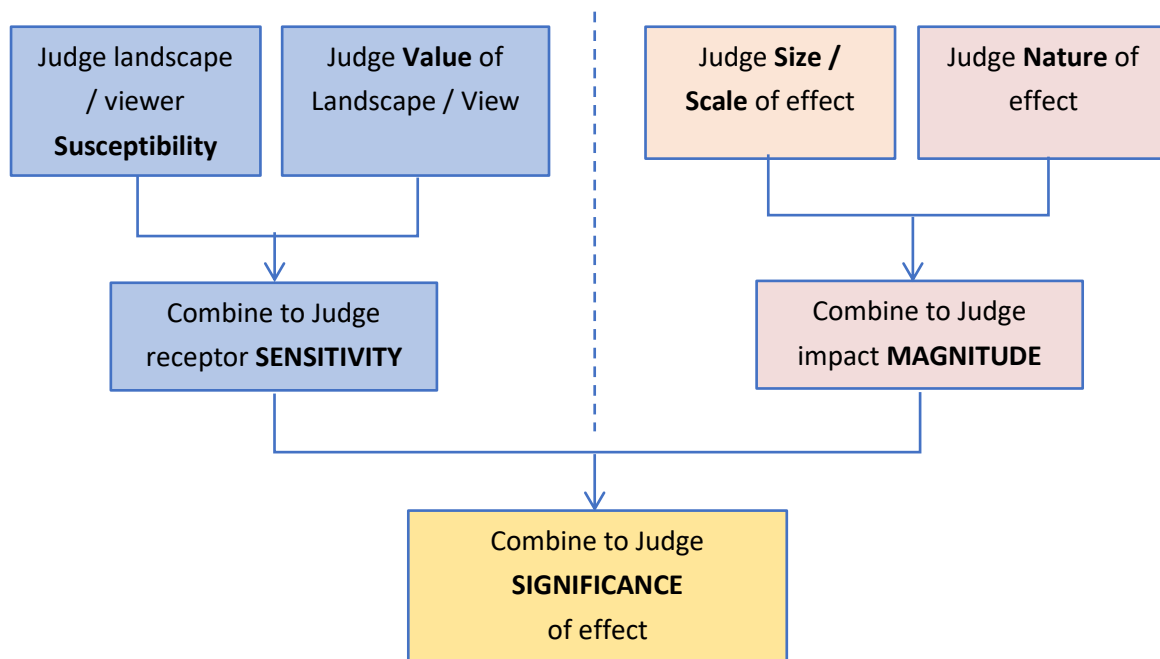


Figure 4: Method for assessing Landscape Impact Significance and Visual Impact Significance (based on GLVIA – 2013)

### 1.7 ASSESSMENT CRITERIA FOR LANDSCAPE IMPACTS

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria;



<b>Sensitivity</b>	<b>Description</b>
<b>Very High</b>	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
<b>High</b>	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
<b>Medium</b>	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
<b>Low</b>	Areas where the landscape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration.
<b>Negligible</b>	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

**Table 1: Landscape Value and Sensitivity**

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the proposal site boundary that may have an effect on the landscape character of the area.

<b>Magnitude of Impact</b>	<b>Description</b>
<b>Very High</b>	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
<b>High</b>	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.

<b>Medium</b>	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
<b>Low</b>	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
<b>Negligible</b>	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.

**Table 2: Magnitude of Landscape Impacts**

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix:

	<b>Sensitivity of Receptor</b>				
<b>Scale/ Magnitude</b>	<i>Very High</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Negligible</i>
<i>Very High</i>	Profound	Profound-substantial	Substantial	Moderate	Slight
<i>High</i>	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
<i>Medium</i>	Substantial	Substantial - moderate	Moderate	Slight	Imperceptible
<i>Low</i>	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
<i>Negligible</i>	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

**Table 3: Landscape/Visual Impact Significance Matrix**

\*Orange shaded cells are considered to equate with 'significant' impacts in EIA terms.

Note that potential beneficial landscape impacts are not accounted for in the tables and matrix above. This is on the basis that commercial scale wind energy projects are very unlikely to generate beneficial landscape impacts. In the rare instances that this might occur, perhaps by facilitating the rehabilitation of a degraded landscape, the benefits will be discussed in the assessment and the significance of impact would default to the lowest end of the range (Imperceptible).

## **1.8 ASSESSMENT CRITERIA FOR VISUAL IMPACTS**

As with the landscape impact, the visual impact of the proposed wind farm will be assessed as a function of receptor sensitivity versus magnitude. In this instance, the sensitivity of visual receptors, weighed against the magnitude of visual effects.

### **1.8.1 Visual Sensitivity**

Unlike landscape sensitivity, visual sensitivity is population based. Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location.

### **1.8.2 Susceptibility of Receptors**

In accordance with the Guidelines for Landscape and Visual Assessment (2013), visual receptors most susceptible to changes in views and visual amenity are:

- Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting enjoyed by residents in the area; and
- Travellers on road, rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened.

Visual receptors that are less susceptible to changes in views and visual amenity include:

- People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape; and
- People at their place of work whose attention may be focussed on their work or activity, not their surroundings, and where the setting is not important to the quality of working life.

### **1.8.3 Value of Views**

To assess the amenity value of views, Macro Works use a range of criteria that might typically be related to high amenity value including but not limited to, scenic designations. These are set out below:

- **Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Development Plans, at least, a public consultation process is required;

- **Views from within highly sensitive landscape areas.** Again, highly sensitive landscape designations are usually part of a county's Landscape Character Assessment, which is then incorporated with the County Development Plan, and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;
- **Intensity of use, popularity.** Whilst not reflective of the amenity value of a view, this criterion relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;
- **Provision of elevated panoramic views.** This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas.
- **Sense of remoteness and/or tranquillity.** Remote and tranquil viewing locations are more likely to heighten the amenity value of a view and have a lower intensity of development in comparison to dynamic viewing locations such as a busy street scene, for example;
- **Degree of perceived naturalness.** Where a view is valued for the sense of naturalness of the surrounding landscape, it is likely to be highly sensitive to visual intrusion by obvious human interventions;
- **Presence of striking or noteworthy features.** A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
- **Historical, cultural or spiritual value.** Such attributes may be evident or sensed at certain viewing locations that attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
- **Rarity or uniqueness of the view.** This might include the noteworthy representativeness of a certain landscape type and considers whether other similar views might be afforded in the local or the national context;
- **Integrity of the landscape character in view.** This criterion considers the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
- **Sense of place.** This criterion considers whether there is special sense of wholeness and harmony at the viewing location; and

- **Sense of awe.** This criterion considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations where highly susceptible receptors or receptor groups are present and which are deemed to satisfy many of the view value criteria above are likely to be judged to have a high visual sensitivity and vice versa.

#### 1.8.4 Visual Impact Magnitude

The magnitude of visual effects is determined on the basis of two factors: the visual presence of the proposal and its effect on visual amenity.

Visual presence is a somewhat quantitative measure relating to how noticeable or visually dominant the proposal is within a particular view. This is based on a number of aspects beyond simply scale in relation to distance. Some of these include the extent of the view as well as its complexity and the degree of existing contextual movement experienced, such as might be obtained where turbines are viewed as part of / beyond a busy street scene. The backdrop against which the development is presented and its relationship with other focal points or prominent features within the view is also considered. Visual presence is essentially a measure of the relative visual dominance of the proposal within the available vista and is often expressed as such i.e. minimal, sub-dominant, co-dominant, dominant and highly dominant.

For wind energy developments, a strong visual presence is not necessarily synonymous with adverse impact and this is reflected in Wind Energy Development Guidelines (2006/2019 revision) wherein, it is advocated that a clear and comprehensive view of a wind farm might be preferable in many instances to a partial or cluttered view of turbine components that are not so prominent within a view. On the basis of these reasons, the visual amenity aspect of assessing impact magnitude is qualitative and considers such factors as the spatial arrangement of turbines both within the scheme and in relation to surrounding terrain and land cover. It also examines whether the development contributes positively to the existing qualities of the vista or results in distracting visual effects and disharmony.

It should be noted that as a result of this two-sided analysis, a high order visual presence can be moderated by a low level of effect on visual amenity and vice versa. Given that wind turbines do not represent significant bulk, visual impacts result almost entirely from visual ‘intrusion’ rather than visual ‘obstruction’ (the blocking of a view). The magnitude of visual impacts is classified in the following table:

Criteria	Description
<b>Very High</b>	The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual

	disorder or disharmony is also generated, strongly reducing the visual amenity of the scene
<b>High</b>	The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual disorder or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
<b>Medium</b>	The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual disorder or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity
<b>Low</b>	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
<b>Negligible</b>	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene

**Table 4: Magnitude of Visual Impact**

### **1.2.1 Visual Impact Significance**

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix as for Landscape impacts provided at Table 4 above.

## **1.9 CONCLUSION**

Following the scoping stage desk study, it is considered that the central study area is a working rural landscape that is predominantly contained in large peat bogs and pastoral farmlands. Aside from open views across neighbouring peat bogs, visibility within the study area is generally limited as a consequence of the dense layers of intervening mature tree lines and hedgerows throughout the surrounding landscape. The central study area is a robust rural setting that encompasses some sensitive elements including the northern section of the main centre of Birr. Specifically, the town centre and Birr Castle, as well as the main routes (N52, N62) between the site and Birr, and the Birr Golf Club, immediately south of the site.

Notwithstanding, the generally robust landscape character of the site and its immediate surrounds, there is potential for notable visual effects at Local community receptors (local roads and residents) due to the perceived scale of the proposed turbines when viewed from short distances.

Although there is very limited and variable identified scenic amenity within the central study area, the wider study area most notably to the northeast and the majority of the southern portion have a high

number of scenic designations. There is also potential for visual effects at a number of sensitive heritage and amenity receptors within the wider surrounds of the study area including the Grand Canal situated in the northern half of the study area and Clonmacnoise situated 21km northwest of the site.

There are 5 other existing or permitted wind farm developments within the central study area or its surrounds. The cumulative impacts of the site will take account of the permitted and existing windfarms in the study area and assess the cumulative impacts of the proposal with the others within the study area.

Aside from Clonmacnoise which is located 20.8km from the site, and will be included due to historic significance and proximity to the study area (800m), visual impacts at receptors outside of the 20km radius study area are scoped-out of further assessment. This is due to the very limited potential for visibility beyond this distance as well as the fact that if the proposed turbines are seen from beyond 20km (in the clearest of viewing conditions) they will present at a very small scale with a low degree of contrast against a backdrop of sky. Thus, there is not considered to be potential for significant visual impacts to occur. For similar reasons, cumulative impacts in relation to receptors (except for Clonmacnoise) or other wind farm developments beyond the 20km radius study area have also been scoped-out of further assessment. Visual effects at receptors that are not contained within the ZTV pattern will also be scoped-out on the basis that there will be no potential for views of the proposed development in such instances.

# VIEWSHED REFERENCE POINT (VRP) SELECTION REPORT



Cush Wind Farm

Co. Offaly



Registered  
Landscape  
Architect

June 2022



# 1 VIEWSHED REFERENCE POINT (VRP) SELECTION

## 1.1 INTRODUCTION

This report provides a rationale for the selection of viewshed reference points (VRP's) for the proposed Cush Wind Farm is situated across the townlands of Ballycollin, Whigsborough, Eglis, Galros East, Galros West, Cush and Boolinarig Big in County Offaly, 4.5km north of the settlement of Birr. The site lies over 3.5km west of the Offaly - Tipperary border, and approximately 8km southwest of the Offaly – Galway border. The periphery of the study area overlays County Roscommon to the north and County Laois to the west.

The VRP selection is based on computer generated visibility modeling, a desk survey and subsequent field work to establish actual visibility and relative landscape sensitivity at each proposed VRP.

## 1.2 METHODOLOGY

### 1.2.1 *Generation of a Zone of Theoretical Visibility*

Gaeltech Ltd. carried out a computer automated study of the zone of theoretical visibility (ZTV). The purpose of this exercise is to identify the '**theoretical**' extent and degree of visibility of turbines. This is a theoretical exercise because it is based on topography only at 10m contour intervals and does not allow for intermittent screening provided by, for example, hedgerows, forests or buildings and does not involve the actual height of crests (but using the nearest 10m contour below). Thus the ZTV map, assuming no screening, represents a **worse than 'worse-case-scenario'** with respect to viewing exposure. For the purposes of this project a 20km radius study area was used for the ZTV in accordance with the DOEHLG Wind Energy development Guidelines (2006/2019 review) for turbines in excess of 100m overall height. However, the study area was further increased to 25km to incorporate features of national or international renown.

### 1.2.2 *Identification of Viewshed Reference Points as a Basis for Assessment*

The results of the ZTV analysis provide the basis for selection of key viewpoints from which to study the visual and landscape impact of the proposed wind farm in detail. It is not warranted to include each and every single location that provides a view of the development as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the project. Instead, the assessors endeavoured to select a variety of location types that would provide views of the proposed wind farm from different distances, different angles and different contexts. These locations are significant because they comprise, for example, centres of population and important communication routes whether due to traffic volume or their scenic value. An initial broad set of potential views is generated from a desk study using the ZTV map. Each potential VRP is colour coded to identify which of the following receptor types it represents;

- Key Views - from features of international or national importance;
- Amenity Views from important heritage or amenity locations;
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population; and
- Major Routes.

## Cush Wind Farm

Some VRP's may be applicable to several receptor categories, in which case, they will be assessed under the group that best reflects that location's particular sensitivities.

Fieldwork is then undertaken using the broad set of potential VRP's in order to systematically identify those that will actually provide a view of the proposed wind farm and those from which potential views are screened by vegetation or structures. This process involves the use of wireframe images of the proposed turbines within the terrain context of each potential VRP location. It is also an opportunity to experience the character and features of each location and make initial value judgements in relation to the sensitivity and therefore the significance of each VRP. The actual VRP used to carry out the assessment for a given location may not be at the centre of a town or village or fall within a particular designation in a County Development Plan. The VRP is used to represent such areas, locations or routes that are close by but which perhaps do not provide as clear a view. Where two or more potential VRP's are within close proximity to each other, the most sensitive VRP may be selected in lieu of the others to represent the visual impact from that general viewing distance and angle.

### 1.2.3 Designated Views

#### 1.2.3.1 Offaly County Development Plan 2021 - 2027

The current Offaly County Development Plan includes its range of protected views and prospects in Chapter 4 Biodiversity and Landscape, Figure 4.24. All identified views situated within the 20km study radius are included in Table 1.1 below in addition to their relevance to the proposed development.

**Table 1.1 Rational for selection of scenic designations within the Offaly County Development Plan**

Offaly CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
2	<b>Yes Relevant</b> – Elevated views oriented in the direction of the site. Representative view has been selected.	VP27
3	<b>Yes Relevant</b> – Views oriented in the direction of the site. (One illustrative view has been chosen from this area to represent multiple elevated designated views)	VP1
4	<b>Yes Relevant</b> – Views oriented in the direction of the site. (One illustrative view has been chosen from this area to represent multiple elevated designated views)	VP13
5	<b>Yes Relevant</b> – Scenic view oriented away from the proposed development, however due to proximity, a representative view has been selected.	VP16
6	<b>Not Relevant</b> – Scenic view oriented away from the proposed development.	-
10	<b>Yes Relevant</b> – Views oriented in the direction of the site.	VP5
11	<b>Yes Relevant</b> – Views oriented in the direction of the site.	VP6
12	<b>Yes Relevant</b> – Views oriented in the direction of the site.	VP8
13	<b>Not Relevant</b> - Scenic view oriented in the opposite direction to the proposal and partially screened on ZTV.	-

## Cush Wind Farm

<b>14</b>	<b>Yes Relevant</b> – Scenic view oriented away from the proposed development, however due to proximity and presence in the periphery of the view, representative view has been selected (representative of length of R440)	VP25
<b>15</b>	<b>Not Relevant</b> - Scenic view oriented in the opposite direction to the proposed development and outside of ZTV. Leap Castle VP selected in close proximity.	VP31
<b>16</b>	<b>Yes Relevant</b> – Views oriented in the direction of the site.	VP32
<b>17</b>	<b>Not Relevant</b> - Scenic views feature a high degree of mature vegetation occurs in the direction of the site. Alternative location chosen in close proximity	VP17
<b>18</b>	<b>Yes Relevant</b> – Views oriented in the direction of the site.	VP32

### 1.2.3.2 Roscommon County Development Plan 2022-2028

There is one designated viewpoint within the areas of County Roscommon (Appendix 1, Landscape Character Assessment, Figure 10) that occur within the northwest quadrant of the study area.

**Table 1.2 Rational for selection of scenic designations within the Roscommon County Development Plan**

Roscommon CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
<b>25</b>	<b>Not Relevant</b> – Scenic view oriented in the opposite direction to the proposed development.	-

### 1.2.3.3 Draft Galway County Development Plan 2022-2028

There is one designated viewpoint within the areas of County Galway (Appendix 4, Landscape Character Assessment, Map 8 – View Points) that occur within the southeast quadrant of the study area.

**Table 1.3 Rational for selection of scenic designations within the Galway County Development Plan**

Galway CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
<b>51</b>	<b>Yes Relevant</b> – Views afforded in the direction of the site	VP11
<b>52</b>	<b>Not Relevant</b> - Scenic view oriented in the opposite direction to the proposed development.	-

### 1.2.3.4 Tipperary County Development Plan 2022-2028

Volume 3, Appendix 3 of the Draft Tipperary County Development Plan includes a range of preserved views and prospects in County Tipperary. The current labelling of these locations are included as well as their new reference numbers as per the 2022-2028 Draft. All identified views situated within the 20km study radius are included in Table 1.4 below in addition to their relevance to the proposed development.

## Cush Wind Farm

**Table 1.4 Rational for selection of scenic designations within the Tipperary County Development Plan**

Tipperary CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
<b>51 (Old V08)</b>	<b>Yes Relevant</b> – Views oriented in the direction of the site. (One illustrative view has been chosen from this area to represent multiple elevated designated views)	VP28
<b>52 (Old V09)</b>	<b>Yes Relevant</b> – Views oriented in the direction of the site. (One illustrative view has been chosen from this area to represent multiple elevated designated views)	VP22
<b>30</b>	<b>Not Relevant</b> – Viewpoint located outside of ZTV	-
<b>32</b>	<b>Not Relevant</b> – Scenic view oriented in the opposite direction to the proposed development.	-
<b>39</b>	<b>Not Relevant</b> – Low degree of theoretic turbine visibility and a high degree of mature vegetation in the direction of the site. Views of turbines unlikely.	-
<b>45</b>	<b>Not Relevant</b> – Scenic view oriented in the opposite direction to the proposed development.	-
<b>46</b>	<b>Not Relevant</b> – Viewpoint located outside of ZTV	-

### 1.2.3.5 Laois County Development Plan 2021-2027

There is one designated viewpoint within the areas of County Laois that occur within the western periphery of the study area.

**Table 1.5 Rational for selection of scenic designations within the Laois County Development Plan**

Laois CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
<b>7</b>	<b>Not Relevant</b> – Viewpoint located outside of ZTV	-

### 1.2.4 VRP selection by other Agencies

It is a common occurrence that VRP locations are suggested or required by Statutory or non-Statutory bodies with stakeholder interest in the site. The most likely source of VRP selection input is from the Local Authority that will assess the planning application or surrounding Local Authorities that may be impacted by the proposal. VRP locations may also be requested by An Taisce or other tourism, heritage or conservation groups with an interest in the area. If a third-party proposes a VRP, it can be evaluated for inclusion.

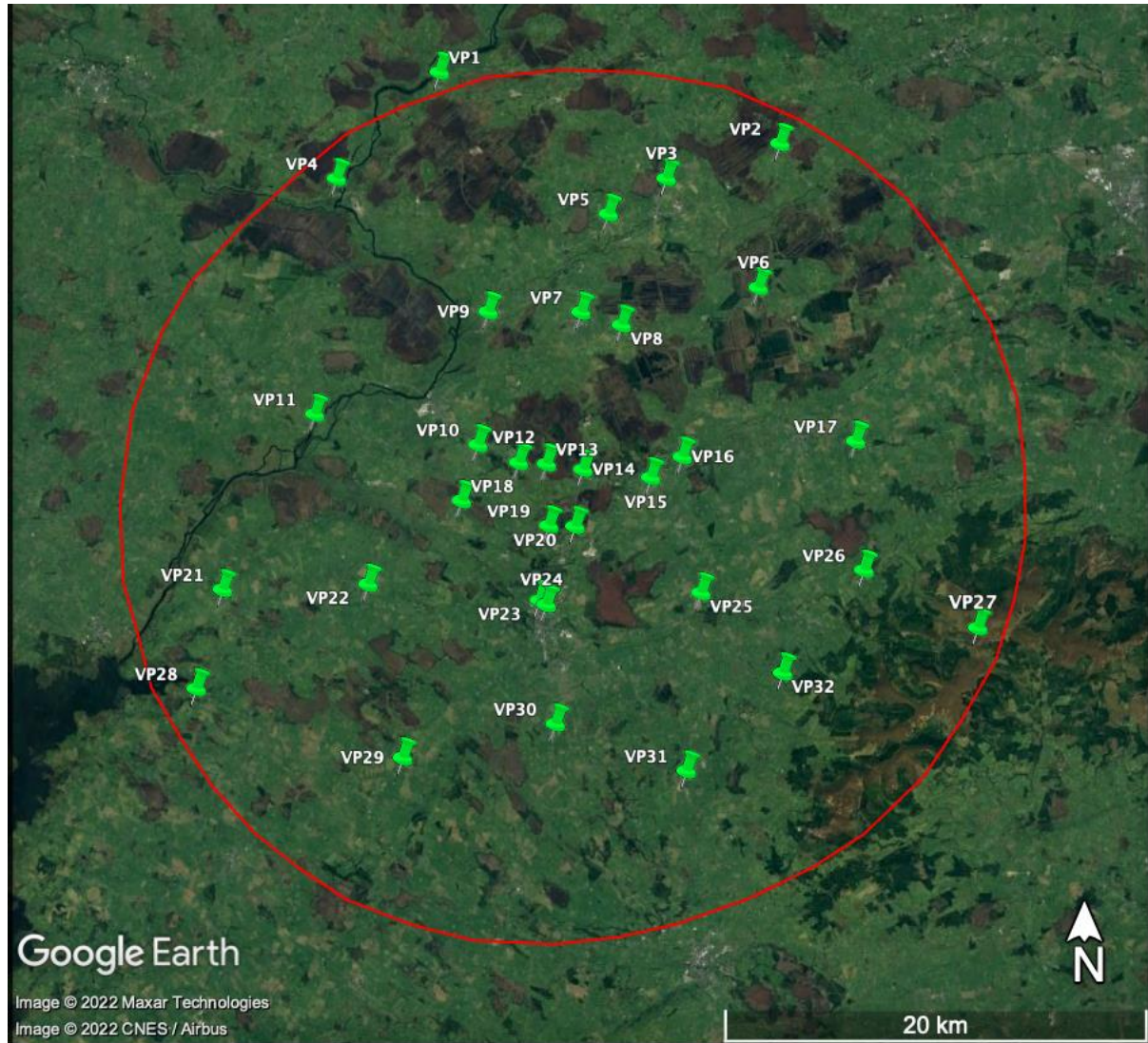
### 1.2.5 Final VRP selection and use

The VRP's selected at this stage of the project are those from which Macro Works intend to assess the landscape and visual impacts of the proposal within the context of the project EIS. Notwithstanding, this VRP selection report is intended as a discussion document and VRP locations may be added to or removed from this set in consultation with the Planning Authority.

## Cush Wind Farm

**Table 1** provides the grid coordinate location of the selected VRP's for the Cush Wind Farm. A viewpoint map is also provided at **Figure 1** below. The panoramic photographs (**included in Appendix 1**) represent each of the selected VRP locations and can be used in conjunction with the grid reference coordinates by the Visualization Specialist to find the precise location of the VRP and to capture their own images required for photomontages.

**Note:** An increase/decrease in the total number of viewpoints selected for the LVIA chapter is possible as the scoping process progresses.



**Figure 1 Preliminary Viewpoint Map**

Cush Wind Farm

**Table 1: Outline Description of Selected Viewshed Reference Points (VRP)**

<b>VRP No.</b>	<b>Location</b>	<b>Initial selection criteria (Desk Study)</b>	<b>National Grid Coordinates ITM (Eastings and Northings)</b>	<b>Direction of View</b>
<b>VP1</b>	Clonmacnoise	Amenity and heritage feature Designated scenic view	600949.951, 730360.636	SE
<b>VP2</b>	Offaly Way Start Point	Amenity feature	617046.352, 727024.208	SW
<b>VP3</b>	N62 at Ferbane	Centre of population	611674.509, 725364.606	S
<b>VP4</b>	Shannonbridge	Designated scenic view	596098.434, 725338.296	SE
<b>VP5</b>	Moyclare	Designated scenic view	608942.985, 723689.856	S
<b>VP6</b>	Lough Boora	Designated scenic view	616030.75, 720227.817	SW
<b>VP7</b>	Cloghan	Centre of population Major route	607654.638, 719059.858	S
<b>VP8</b>	Stonestown	Designated scenic view	609569.589, 718456.726	S
<b>VP9</b>	Shannon Harbour	Amenity and heritage feature	603274.828, 719068.184	SE
<b>VP10</b>	Taylor's Cross	Designated scenic view	603279.119, 712807.805	SE
<b>VP11</b>	Meelick Quay	Designated scenic view Amenity and heritage feature	595088.676, 714231.121	E
<b>VP12</b>	L3006 at Garbally	Local community views	604722.842, 711968.81	E
<b>VP13</b>	L3006 at Ballyslavin	Local community views	606039.612, 711905.485	S
<b>VP14</b>	N62 at Galros Cross Roads	Major route Local community views	607761.28, 711640.138	S
<b>VP15</b>	Fivealley	Major Route Local community views	610960.86, 711270.456	W
<b>VP16</b>	N52 at Glenamony Glebe	Major route Designated scenic view	612452.806, 712246.681	W/SW
<b>VP17</b>	Local Road at Knockhill and Drinagh	Designated scenic view Local community views	620644.118, 712999.267	W
<b>VP18</b>	R438 at Deerpark	Local community views	602027.576, 710163.515	E
<b>VP19</b>	Local Road at Birr Golf Club	Local community views	606150.839, 708992.759	N
<b>VP20</b>	N62 at Cooleeny	Major route	607390.731, 708958.336	N
<b>VP21</b>	R489 at Lisinisky	Designated scenic view	590738.906, 705950.311	NE

Cush Wind Farm

<b>VP22</b>	R489 at Pike	Designated scenic view	597619.204, 706217.317	NE
<b>VP23</b>	R439 at Birr Castle Demesne	Centre of population Amenity and heritage feature	605727.899, 705473.075	N
<b>VP24</b>	N52 at Birr	Centre of population Amenity and heritage feature	606040.999, 705266.73	N
<b>VP25</b>	R440 at Ballygowan	Designated scenic view	613346.844, 705841.703	NW
<b>VP26</b>	R421 at Lissanure	Designated scenic view	621046.676, 706918.883	W
<b>VP27</b>	R440 at Slieve Blooms	Designated scenic view	626433.93, 704201.237	W/NW
<b>VP28</b>	R493 at Carrigahorig	Designated scenic view	589501.694, 701270.153	E/NE
<b>VP29</b>	N52 at Hazelfort	Major Route	599259.172, 698027.74	N
<b>VP30</b>	N62 at Rathbeg Lane	Major Route	606479.231, 699642.956	N
<b>VP31</b>	Local Road at Leap Castle	Amenity and heritage feature	612670.538, 697432.965	N/NW
<b>VP32</b>	Local Road at Clonlee	Designated scenic view	617217.839, 702061.497	NW

**Table 2: Outline Description of Rejected Viewshed Reference Points (VRP)**

VRP No.	Location	Direction of potential view	Initial selection criteria (Desk Study)	Rejection Rationale (From Fieldwork)
<b>VP7</b>	Cloghan	S	<i>Centre of population Major route</i>	<i>Represented by VP8</i>
<b>VP16</b>	N52 at Glenamony Glebe	W/SW	<i>Scenic View Major route</i>	<i>Represented by VP15, focus of scenic view not towards site, VP15 closer and clearer view, along same major route.</i>
<b>VP23</b>	R439 at Birr Castle Demesne	N	<i>Centre of population Amenity and heritage feature</i>	<i>Relatively enclosed, represented by VP24</i>

**Table 2: Outline Description of Additional Viewshed Reference Points (VRP)**

VRP No.	Location	Direction of potential view	Initial selection criteria (Desk Study)	Addition Rationale (From Fieldwork)
<b>Birr Heritage View 1</b>	Walled Garden within Birr Castle and Demesne	N/NE	<i>Amenity and heritage feature.</i>	<i>Representative of specific features within historic grounds. Requested by heritage consultant.</i>

Cush Wind Farm

<b>Birr Heritage View 2</b>	'The Leviathan' telescope within Birr Castle and Demesne	N/NE	<i>Amenity and heritage feature.</i>	<i>Representative of specific features within historic grounds. Requested by heritage consultant.</i>
<b>Birr Heritage View 3</b>	St Johns Hall, William Parsons, 3rd Earl of Rosse Statue, R440	N	<i>Amenity and heritage feature, Major route, Centre of population</i>	<i>Representative of historic features within Birr Town. Requested by heritage consultant.</i>

These viewpoints are re-ordered and compiled into the following list:

**Table 1: Outline Description of Selected Viewshed Reference Points (VRP)**

<b>VRP No. **</b>	<b>Location</b>	<b>Initial selection criteria (Desk Study)</b>	<b>National Grid Coordinates ITM (Eastings and Northings)</b>	<b>Direction of View</b>
<b>VP1</b>	Clonmacnoise	Amenity and heritage feature Designated scenic view	600949.951, 730360.636	SE
<b>VP2</b>	Offaly Way Start Point	Amenity feature	617046.352, 727024.208	SW
<b>VP3</b>	N62 at Ferbane	Centre of population	611674.509, 725364.606	S
<b>VP4</b>	Shannonbridge	Designated scenic view	596098.434, 725338.296	SE
<b>VP5</b>	Moyclare	Designated scenic view	608942.985, 723689.856	S
<b>VP6</b>	Lough Boora	Designated scenic view	616030.75, 720227.817	SW
<b>VP7 (Old VP8)</b>	Stonestown	Designated scenic view	609569.589, 718456.726	S
<b>VP8 (Old VP9)</b>	Shannon Harbour	Amenity and heritage feature	603274.828, 719068.184	SE
<b>VP9 (Old VP10)</b>	Taylor's Cross	Designated scenic view	603279.119, 712807.805	SE
<b>VP10 (Old VP11)</b>	Meelick Quay	Designated scenic view Amenity and heritage feature	595088.676, 714231.121	E
<b>VP11 (Old VP12)</b>	L3006 at Garbally	Local community views	604722.842, 711968.81	E
<b>VP12 (Old VP13)</b>	L3006 at Ballyslavin	Local community views	606039.612, 711905.485	S
<b>VP13 (Old VP14)</b>	N62 at Galros Cross Roads	Major route Local community views	607761.28, 711640.138	S
<b>VP14 (Old VP15)</b>	Fivealley	Major Route Local community views	610960.86, 711270.456	W
<b>VP15 (Old VP17)</b>	Local Road at Knockhill and Drinagh	Designated scenic view Local community views	620644.118, 712999.267	W



## Cush Wind Farm

<b>VP16 (Old VP18)</b>	R438 at Deerpark	Local community views	602027.576, 710163.515	E
<b>VP17 (Old VP19)</b>	Local Road at Birr Golf Club	Local community views	606150.839, 708992.759	N
<b>VP18 (Old VP20)</b>	N62 at Cooleeny	Major route	607390.731, 708958.336	N
<b>VP19 (Old VP21)</b>	R489 at Lisinisky	Designated scenic view	590738.906, 705950.311	NE
<b>VP20 (Old VP22)</b>	R489 at Pike	Designated scenic view	597619.204, 706217.317	NE
<b>VP21 (Old Birr Heritage View 1)</b>	Walled Garden within Birr Castle and Demesne	Amenity and heritage feature.	605619.734, 705478.518	NE
<b>VP22 (Old VP24)</b>	N52 at Birr	Centre of population Amenity and heritage feature	606040.999, 705266.73	N/NE
<b>VP23 (Old Birr Heritage View 2)</b>	'The Leviathan' telescope within Birr Castle and Demesne	Amenity and heritage feature.	605531.895, 705165.53	N/NE
<b>VP24 (Old Birr Heritage View 3)</b>	St Johns Hall, William Parsons, 3rd Earl of Rosse Statue, R440	Centre of population, Major Route, Amenity and heritage feature	606157.048, 705000.056	N
<b>VP25</b>	R440 at Ballygowan	Designated scenic view	613346.844, 705841.703	NW
<b>VP26</b>	R421 at Lissanure	Designated scenic view	621046.676, 706918.883	W
<b>VP27</b>	R440 at Slieve Blooms	Designated scenic view	626433.93, 704201.237	W/NW
<b>VP28</b>	R493 at Carrigahorig	Designated scenic view	589501.694, 701270.153	E/NE
<b>VP29</b>	N52 at Hazelfort	Major Route	599259.172, 698027.74	N
<b>VP30</b>	N62 at Rathbeg Lane	Major Route	606479.231, 699642.956	N
<b>VP31</b>	Local Road at Leap Castle	Amenity and heritage feature	612670.538, 697432.965	N/NW
<b>VP32</b>	Local Road at Clonlee	Designated scenic view	617217.839, 702061.497	NW

\*\* Viewpoint numbers are presented "VP 'New Number' (Old VP 'Old Number')"



---

# Cush Wind Farm

## APPENDIX 1

*Representative images of VRP locations*

---



## VRP 1



### CLONMACNOISE

Initial selection criteria: Designated scenic view, amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 600949.951, 730360.636  
Direction of View: Southeast

**VRP 2**



**OFFALY WAY START POINT**

Initial selection criteria: Amenity feature  
National Grid Coordinates ITM (Eastings and Northings): 617046.352, 727024.208  
Direction of View: Southwest

VRP 3



**N62 AT FERBANE**

Initial selection criteria: Centre of population  
National Grid Coordinates ITM (Eastings and Northings): 611674.509, 725364.606  
Direction of View: South

**VRP 4**



**SHANNONBRIDGE**

Initial selection criteria: Designated scenic view

National Grid Coordinates ITM (Eastings and Northings): 596098.434, 725338.296

Direction of View: Southeast

**VRP 5**



**MOYCLARE**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 608942.985, 723689.856  
Direction of View: South

**VRP 6**



**LOUGH BOORA**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 616030.75, 720227.817  
Direction of View: Southwest



## VRP 7



### STONESTOWN

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 609569.589, 718456.726  
Direction of View: South

**VRP 8**



**SHANNON HARBOUR**

Initial selection criteria: Amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 603274.828, 719068.184  
Direction of View: Southeast

**VRP 9**



**TAYLOR'S CROSS**

Initial selection criteria: Designated scenic view

National Grid Coordinates ITM (Eastings and Northings): 603279.119, 712807.805

Direction of View: Southeast

VRP 10



MEELICK QUAY

Initial selection criteria: Designated scenic view, amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 595088.676, 714231.121  
Direction of View: Southeast

**VRP 11**



**L3006 AT GARBALLY**

Initial selection criteria: Local community views  
National Grid Coordinates ITM (Eastings and Northings): 604722.842, 711968.81  
Direction of View: East

**VRP 12**



**L3006 AT BALLYSLAVIN**

Initial selection criteria: Local community view  
National Grid Coordinates ITM (Eastings and Northings): 606039.612, 711905.485  
Direction of View: South

**VRP 13**



**N62 AT GALROS CROSS ROADS**

Initial selection criteria: Major route, Local community views  
National Grid Coordinates ITM (Eastings and Northings): 607761.28, 711640.138  
Direction of View: South

**VRP 14**



**FIVEALLEY**

Initial selection criteria: Major Route, Local community views  
National Grid Coordinates ITM (Eastings and Northings): 610960.86, 711270.456  
Direction of View: West



**VRP 15**



**LOCAL ROAD AT KNOCKHILL AND DRINAGH**

Initial selection criteria: Designated scenic view, Local community views  
National Grid Coordinates ITM (Eastings and Northings): 620644.118, 712999.267  
Direction of View: West

**VRP 16**



**R438 AT DEERPARK**

Initial selection criteria: Local community views  
National Grid Coordinates ITM (Eastings and Northings): 602027.576, 710163.515  
Direction of View: East

**VRP 17**



**LOCAL ROAD AT BIRR GOLF CLUB**

Initial selection criteria: Local community views  
National Grid Coordinates ITM (Eastings and Northings): 606150.839, 708992.759  
Direction of View: North

**VRP 18**



**N62 AT COOLEENY**

Initial selection criteria: Major route  
National Grid Coordinates ITM (Eastings and Northings): 607390.731, 708958.336  
Direction of View: Northeast

**VRP 19**



**R489 AT LISINISKY**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 590738.906, 705950.311  
Direction of View: Northeast

**VRP 20**



**R489 AT PIKE**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 597619.204, 706217.317  
Direction of View: Northeast

**VRP 21**



**WALLED GARDEN WITHIN BIRR CASTLE AND DEMESNE**

Initial selection criteria: Amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 605619.734, 705478.518  
Direction of View: North/Northeast

VRP 22



**N52 AT BIRR**

Initial selection criteria: Centre of population, Amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 606040.999, 705266.73  
Direction of View: North



**VRP 23**



**‘THE LEVIATHAN’ TELESCOPE WITHIN BIRR CASTLE AND DEMESNE**

Initial selection criteria: Amenity and heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 605531.895, 705165.53  
Direction of View: North/Northeast

VRP 24



**ST JOHNS HALL, WILLIAM PARSONS, 3RD EARL OF ROSSE STATUE, R440**

Initial selection criteria: Amenity and heritage feature, major route, centre of population  
National Grid Coordinates ITM (Eastings and Northings): 606157.048, 705000.056  
Direction of View: Northeast

**VRP 25**



**R440 AT BALLYGOWAN**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 613346.844, 705841.703  
Direction of View: Northwest

**VRP 26**



**R421 AT LISSANURE**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 621046.676, 706918.883  
Direction of View: West

**VRP 27**



**R440 AT SLIEVE BLOOMS**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 626433.93, 704201.237  
Direction of View: North/Northwest

**VRP 28**



**R493 AT CARRIGAHORIG**

Initial selection criteria: Designated scenic view  
National Grid Coordinates ITM (Eastings and Northings): 589501.694, 701270.153  
Direction of View: East/Northeast

**VRP 29**



**N52 AT HAZELFORT**

Initial selection criteria: Major Route  
National Grid Coordinates ITM (Eastings and Northings): 599259.172, 698027.74  
Direction of View: North

**VRP 30**



**N62 AT RATHBEG LANE**

Initial selection criteria: Major Route  
National Grid Coordinates ITM (Eastings and Northings): 606479.231, 699642.956  
Direction of View: North



**VRP 31**



**LOCAL ROAD AT LEAP CASTLE**

Initial selection criteria: Heritage feature  
National Grid Coordinates ITM (Eastings and Northings): 659282.045, 752835.431  
Direction of View: Northeast

**VRP 32**



**LOCAL ROAD AT CLONLEE**

Initial selection criteria: Designated scenic view

National Grid Coordinates ITM (Eastings and Northings): 617217.839, 702061.497

Direction of View: Northwest

**Annex 5 –  
Cultural Heritage Scoping Report**





ARCHAEOLOGICAL, ARCHITECTURAL AND  
CULTURAL HERITAGE SCOPING REPORT

CUSH WIND FARM,  
COUNTY OFFALY

PREPARED BY  
DERMOT NELIS ARCHAEOLOGY

FOR  
CUSH WIND LTD.

17<sup>th</sup> June 2022

## **CONTENTS**

<b>1</b>	Introduction	1
<b>2</b>	Methodology	2
<b>3</b>	Baseline Conditions	7
<b>4</b>	Assessment of Potential Construction Impacts	27
<b>5</b>	Assessment of Potential Operational Impacts	28
<b>6</b>	Proposed Assessment & Mitigation Measures	29
<b>7</b>	Micrositing	29
	References	30

---

## List of Figures

- Figure 1 Aerial photograph showing location of Turbines 1 – 11, 2 no. spoil deposition areas, borrow pit, meteorological mast and site compound
- Figure 2 Aerial photograph showing proposed Grid Connection Option 1
- Figure 3 Aerial photograph showing proposed Grid Connection Option 2
- Figure 4 Aerial photograph showing proposed Grid Connection Option 3
- Figure 5 Recorded Monuments within 1km of the proposed wind farm
- Figure 6 Recorded Monument within 100m of proposed Grid Connection Option 1
- Figure 7 Recorded Monuments within 100m of proposed Grid Connection Option 3
- Figure 8 Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 11, 2 no. spoil deposition areas, borrow pit, meteorological mast and site compound
- Figure 9 Birr Archaeological Zone of Notification
- Figure 10 Protected Structure nos. 19-012, 29-002 and 29-009 within proposed Grid Connection Option 3
- Figure 11 Protected Structure nos. 29-001, 29-003, 29-004 and 29-005 within 100m either side of proposed Grid Connection Option 3
- Figure 12 Protected Structure no. 49-004 within 100m either side of proposed Grid Connection Option 3
- Figure 13 Preservation Order no. 43/1976 (Motte and bailey castle), located 4.9km south west of the proposed site compound and 5.7km south west of Turbine 2
- Figure 14 Moystown House (NIAH Site ID 2) and Huntston House (not recorded on the NIAH) within proposed Grid Connection Option 3

# 1 INTRODUCTION

## 1.1 General

This desk-based scoping report has been prepared on behalf of Cush Wind Ltd. by Dermot Nelis Archaeology to assess and define any effects which the construction, operation and decommissioning of an 11 no. turbine wind farm and associated infrastructure, including 3 no. grid connection options, 2 no. spoil deposition areas, a borrow pit, a meteorological mast and a site compound, may have on the archaeological, architectural and cultural heritage resource (figures 1 - 4). The scoping report includes an identification of potential impacts or effects which may arise and outlines mitigation measures, based on current information, which may be used to avoid, reduce or offset any potential adverse impacts or effects.

## 1.2 Objectives of Scoping Report

The key objectives of this scoping report are to assess, as far as is reasonably possible from existing records and current information, any impacts the proposed development may have on the archaeological, architectural and cultural heritage resource. The following key issues are addressed:

- Direct and indirect impacts of the construction of the development on the archaeological, architectural and cultural heritage resource.
- Direct and indirect impacts of the operation of the development on the archaeological, architectural and cultural heritage resource.
- Cumulative impacts of the construction and operation of the development on the archaeological, architectural and cultural heritage resource with other existing, permitted or proposed developments or projects.

## 1.3 Project Team

### **Dermot Nelis BA ArchOxon AIFA MIAI**

Dermot Nelis graduated from Queen's University Belfast, and after gaining extensive fieldwork experience undertook postgraduate studies at the University of Oxford in archaeological consultancy and project management.

Dermot has acted as Senior Archaeologist on several road schemes for various County Councils, and Directed large-scale multi-period excavations associated with those

developments. He has completed over 180 Licensed fieldwork programmes and over 250 archaeological, architectural and cultural heritage desk-based reports and Environmental Impact Assessments.

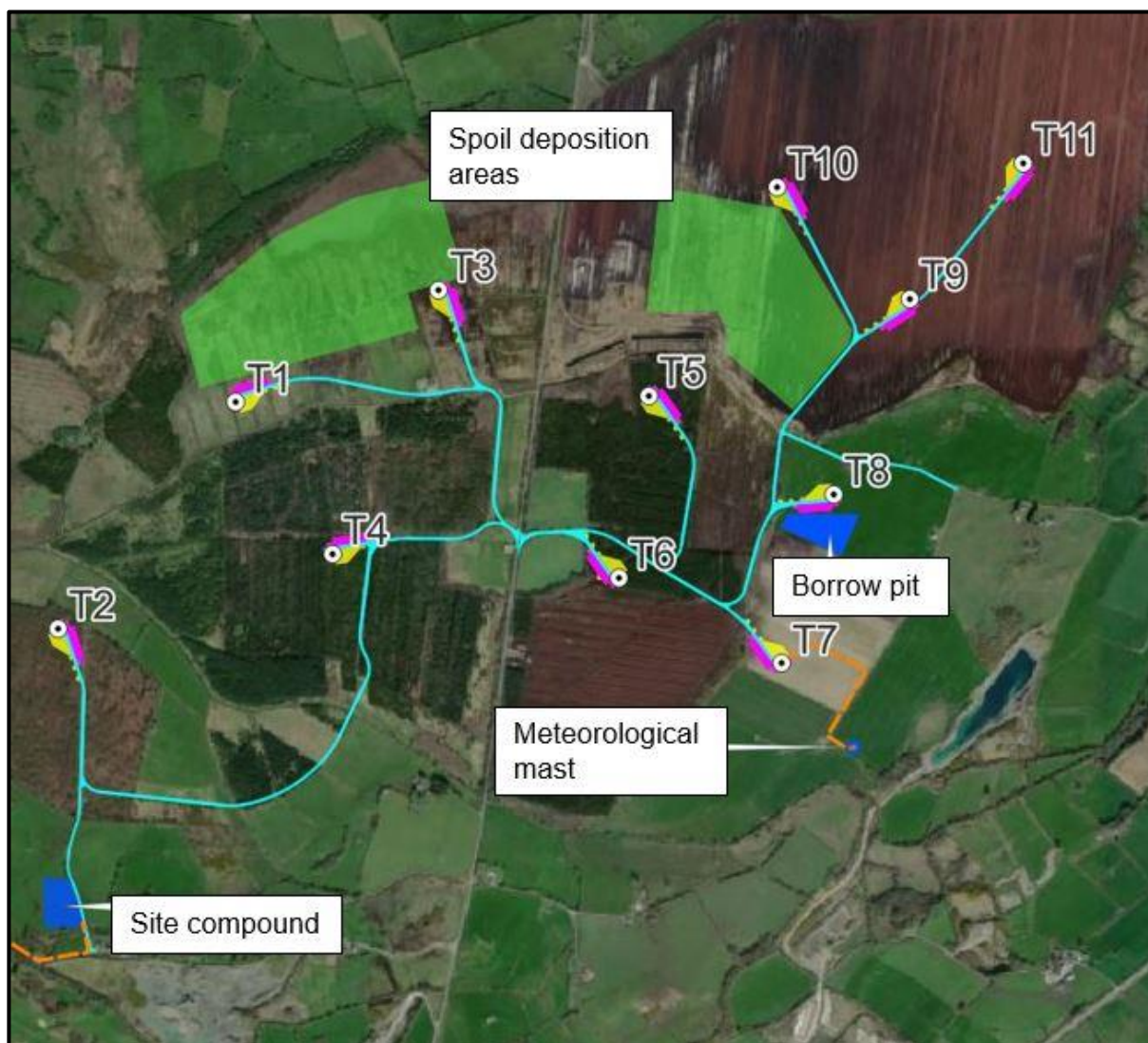


Figure 1: Aerial photograph showing location of Turbines 1 – 11, 2 no. spoil deposition areas, borrow pit, meteorological mast and site compound

## 2 METHODOLOGY

### 2.1 Study Area

There is no professional standard for defining the extent of a study area when assessing the likelihood of effects on archaeological, architectural or cultural heritage remains. A 1km study area has been applied around the proposed wind farm to assess the presence of statutorily protected archaeological remains (RMP sites). In addition, a 5km study area has been applied around the proposed wind farm to assess the presence of any World Heritage Sites, sites



included in the Tentative List as consideration for nomination to the World Heritage List, National Monuments, sites with Preservation Orders or Temporary Preservation Orders, Protected Structures, Conservation Areas or Proposed Conservation Areas.

A 1km study area has been applied around the proposed wind farm to record the presence of any structures recorded on the National Inventory of Architectural Heritage (NIAH). An assessment has also been made of any historic gardens or designed landscapes as recorded on the NIAH that may exist within the proposed wind farm or the 3 no. proposed grid connection options.

A 100m study area has been applied around the 3 no. proposed grid connection options.

## 2.2 Data Sources

The following sources were examined and a list of sites and areas of archaeological, architectural and cultural heritage potential was compiled:

- Record of Monuments and Places of County Offaly;
- Cartographic and documentary sources relating to the study area;
- Aerial photographs of Ordnance Survey Ireland and Bing aerial photography;
- Offaly County Development Plan (2021 – 2027), North Tipperary County Development Plan (2010 – 2016) and Draft Tipperary County Development Plan (2022 - 2028); and
- National Inventory of Archaeological Heritage.

**Record of Monuments and Places (RMP)** is a list of archaeological sites known to the National Monuments Service. Back-up files of the Sites and Monuments Record (SMR) provide details of documentary sources and field inspections where these have taken place.

**Cartographic sources** are important in tracing land-use development within an area of land take, as well as providing important topographical information on sites and areas of archaeological potential. Cartographic analysis of relevant maps has been made to identify any topographical anomalies that may no longer remain within the landscape. **Documentary sources** were consulted to gain background information on the historical and archaeological

landscape of the development area.

**Aerial photographic** coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its potential to contain previously unidentified archaeological remains.

**Offaly County Development Plan (2021 – 2027), North Tipperary County Development Plan (2010 – 2016) and Draft Tipperary County Development Plan (2022 - 2028)** contain Objectives and Policies on the preservation and management of archaeological, architectural and cultural heritage features.

**National Inventory of Architectural Heritage** is a section within the Department of Housing, Local Government and Heritage. The work of NIAH involves identifying, recording and evaluating on a non-statutory basis the architectural heritage of Ireland from 1700 to the present day.





Figure 3: Aerial photograph showing proposed Grid Connection Option 2



Figure 4: Aerial photograph showing proposed Grid Connection Option 3

### 3 BASELINE CONDITIONS

#### 3.1 Site-Specific Archaeological Background

There are no Recorded Monuments within any areas of land take required for the proposed development.

There are six Recorded Monuments within 1km of the proposed wind farm (figure 5):

##### ***RMP OF030-017: Ritual site- holy well***

A slight depression beside a small stream probably indicates the location of the destroyed well.

##### ***RMP OF030-023: Mass rock***

Mass-rock situated in a large natural hollow close to Tobernapearla Holy Well (OF030-017). The rock lies near the top of the north west slope of a hollow. The stone (length 1.5m; width 2m; height 2.5m) is mostly buried.

##### ***RMP OF030-080: Road- class 3 togher***

The site (width 0.92m; depth 0.13m) is composed of parallel pieces of brushwood, flanked on either side by two heavy roundwoods, all orientated east/west, evident in a single drain. A single worked piece of brushwood was recorded.

**RMP OF030-081: Structure- peatland**

A roundwood (diameter 0.09m) located in a drain face with evidence of wood working. It was set within moderately humified Sphagnum peat with ericaceous remains immediately above the peat. This site is not scheduled for inclusion in the next revision of the RMP.

**RMP OF030-082: Structure- peatland**

An isolated post (length 0.43m; diameter 0.06m) situated in a drain face 0.63m below the field surface and set at a 60° angle. The wood was in good condition with surviving bark and had been worked to a wedge point with a metal tool. The piece is within moderately humified Sphagnum peat. This site is not scheduled for inclusion in the next revision of the RMP.

**RMP OF030-083: Structure- peatland**

A single piece of roundwood (diameter 0.06m) located 0.57m below the field surface in a drain face and set at a 35° angle. It is within moderately humified Sphagnum peat which contained ericaceous remains and Eriophorum. This site is not scheduled for inclusion in the next revision of the RMP.

There are no additional Recorded Monuments within 1km of the proposed wind farm.



Figure 5: Recorded Monuments within 1km of the proposed wind farm

There is one Recorded Monument within 100m of proposed Grid Connection Option 1 (figure 6):

**RMP OF035-001: Ringfort- rath**

Natural hill with no archaeological features visible. The site is however known locally as the “Deans Fort”, and is marked on the first edition of the Ordnance survey 1:10,560 map.



Figure 6: Recorded Monument within 100m of proposed Grid Connection Option 1

There are no Recorded Monuments within 100m of proposed Grid Connection Option 2.

There are three Recorded Monuments within 100m of proposed Grid Connection Option 3 (figure 7):

**RMP OF013-007001- Church**

Situated on a low rock outcrop on the low-lying floodplains of the river Shannon. A small rectangular church (external dimensions 6.7m north/south; 13.2m east/west; wall thickness 0.8m) built with roughly coursed rubble limestone with only the east end of the south wall surviving and wall footings elsewhere. At the west end of the church are the wall footings of a cross wall indicating possible priest's room (external dimensions 6.7m north/south; 5.2m east/west). No architectural features evident. The church is situated within a roughly square shaped area (33m north/south; 34m east/west) enclosed by a bank of earth and stones (width



1.5m; external height 0.5m) which is best preserved at north while elsewhere it has been reduced to a scarp.

### **RMP OF013-007002- Graveyard**

There are rows of upright unmarked stones aligned in north/south rows in the southern sector of the enclosure. These are the grave-markers of unbaptised children according to a survey from 1942.

### **RMP OF014-034- Enclosure**

Not visible at ground level. An aerial photograph shows the cropmark of a D-shaped enclosure.



Figure 7: Recorded Monuments within 100m of proposed Grid Connection Option 3

Class 3 toghers are short stretches of peatland trackway, constructed of wood, up to 15m in length with a discernible orientation. It may not be possible to trace them beyond a single sighting. They have evidence of deliberate structure and are interpreted as having been laid down to cross a small area of bog. They may date from the Neolithic to the Medieval period.

Peatland structures are wood found in peat, which has been deliberately deposited or processed. They vary from single pieces to deposits without a clear form or orientation but

which are indicative of an archaeological structure. They may be of any date from the Neolithic to the Medieval period.

Holy wells are a well or spring, though in some unusual cases a natural rock basin, which usually bear a saint's name and are often reputed to possess miraculous healing properties. They may have their origins in prehistory but are associated with devotions from the Medieval period onwards.

Mass rocks are rocks or earthfast boulders used as an altar or a stone-built altar when Mass was being celebrated during Penal times (1690s to 1750s AD), though there are some examples which appear to have been used during the Cromwellian Period (1650s AD). Some of these rocks/boulders may bear an inscribed cross.

Ringforts are generally circular defensive enclosures which were constructed to protect farmsteads. They were enclosed by an earthen bank and exterior ditch, and ranged from approximately 25m to 50m in diameter. The smaller sized and single banked type (univallate) was more than likely home to lower ranks of society, while larger examples with more than one bank (bivallate/trivallate) housed the more powerful kings and lords. They are regarded as defended family homesteads, and the extant dating evidence suggests they were primarily built between the 7<sup>th</sup> and 9<sup>th</sup> centuries AD (Stout 1997, 22-31). The most recent detailed study (*ibid.*, 53) has suggested that there is an approximate total of 45,119 potential ringforts or enclosure sites throughout Ireland.

Enclosures belong to a classification of monument whose precise nature is unclear. Often, they may represent ringforts, which have either been damaged to a point where they cannot be positively recognised, or are smaller or more irregular in plan than the accepted range for a ringfort. An Early Medieval date is generally likely for this site type, though not a certainty.

Churches are described on National Monuments Service's online database ([www.archaeology.ie](http://www.archaeology.ie)) as buildings used for public Christian worship and which can be of any date from c. 500 AD onwards.

Graveyards are described on National Monuments Service's online database ([www.archaeology.ie](http://www.archaeology.ie)) as the burial area around a church. They date from the Medieval period (5<sup>th</sup> – 16<sup>th</sup> centuries) onwards.

### 3.2 Cartographic Analysis

*Ordnance Survey Maps: First Edition 1:10,560 (1840); First Edition 1:2,500 (1910) and Third Edition 1:10,560 (1912)*

The proposed three grid connection options will cross a number of townland, parish and barony boundaries. The access road from Turbine 2 to Turbine 4 will cross a townland boundary. The access road leading north from Turbine 4 to Turbine 1 and Turbine 3 will cross a townland boundary, while the access road leading east from Turbine 4 to Turbine 6 will also cross a townland boundary. The access road from Turbine 9 to Turbine 11 will cross a townland boundary. Turbine 10 will be located on a townland boundary while Turbine 6 will be located immediately east of a townland boundary. Research suggests that:

*“hoards and single finds of Bronze Age weapons, shields, horns, cauldrons and gold personal objects can all be shown to occur on boundaries.” (Kelly 2006, 28).*

The turbines and associated access roads will generally be located on unenclosed rough pasture or small fields as recorded on the First Edition 1:10,560 map (1840). Several small structures are recorded on the line and in the vicinity of the access road between Turbine 4 and Turbine 6. These structures are recorded on later editions of the Ordnance Survey maps but no longer appear to survive above-ground.

There are no archaeological or additional architectural features recorded within the land take of the proposed turbines on historic cartographic sources.

The historic maps all record the presence of vernacular structures, Ordnance Survey bench marks, springs, *etc.* in the general vicinity of the proposed three grid connection options.

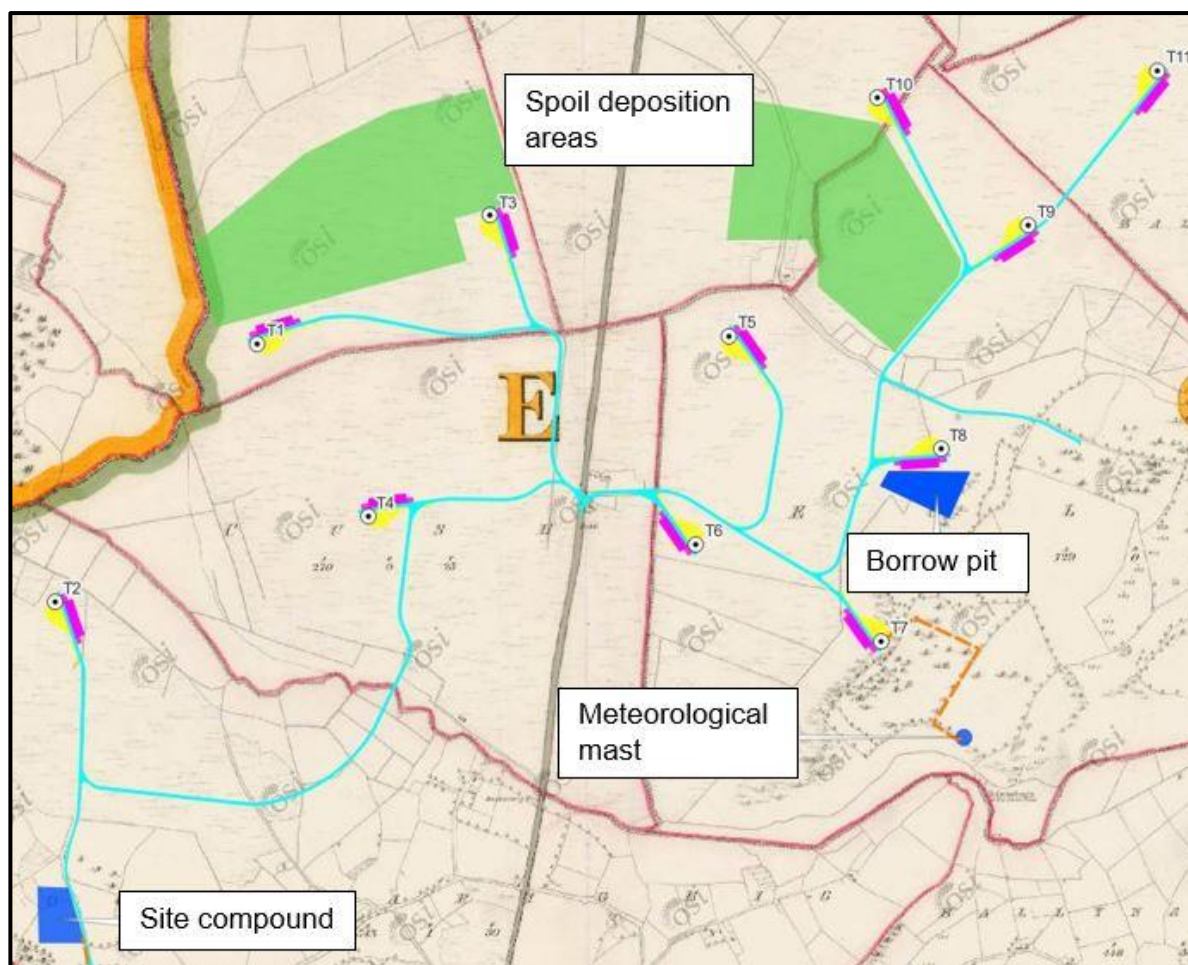


Figure 8: Extract from First Edition 1:10,560 Ordnance Survey map showing location of Turbines 1 – 11, 2 no. spoil deposition areas, borrow pit, meteorological mast and site compound

### 3.3 Aerial Photographs

Aerial photographs held by Ordnance Survey Ireland ([www.map.geohive.ie](http://www.map.geohive.ie)) and Bing aerial photography ([www.bing.com/maps](http://www.bing.com/maps)) were consulted to look for the presence of archaeological or architectural remains within the land take of the proposed development.

There was no evidence of any archaeological or architectural features recorded on aerial photography within any areas of land take required for the proposed development.

### 3.4 County Development Plans

*Offaly County Development Plan 2021 - 2027*

#### 3.4.1 Archaeological Heritage

It is Council policy (BHP-33) to:

*“support and promote the protection and appropriate management and sympathetic enhancement of the county’s archaeological heritage within the Plan area, in particular by implementing the Planning and Development Act 2000 (as amended) and the National Monuments Act 1930 (as amended).”* (Offaly County Council 2021, 334).

It is an Objective (BHO-05) of Offaly County Council to:

*“to protect archaeological sites and monuments, and archaeological objects, which are listed in the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process.”* (*ibid.*, 337).

Table 10.1 of the Offaly County Development Plan (*ibid.*, 325) contains a list of *National Monuments in State Ownership in County Offaly*. There are no National Monuments in State Ownership recorded in the Offaly County Development Plan within the proposed wind farm or within 5km of the proposed wind farm.

Table 10.2 of the Offaly County Development Plan (*ibid.*, 325 - 326) contains a list of *National Monuments in Guardianship of the State in County Offaly*. There are no National Monuments in Guardianship of the State recorded in the Offaly County Development Plan within the proposed wind farm or within 5km of the proposed wind farm.

Table 10.3 of the Offaly County Development Plan (*ibid.*, 326) contains a list of *Monuments Protected by Preservation Order in County Offaly*. There are no Monuments Protected by Preservation Order recorded in the Offaly County Development Plan within the proposed wind farm or within 1km of the proposed wind farm. There is one National Monument with a Preservation Order within 5km of the proposed wind farm (see **Section 3.5** below).

The Offaly County Development Plan (*ibid.*, 327) contains a list of *Zones of Archaeological Potential* within the county. There are no Zones of Archaeological Potential recorded in the Offaly County Development Plan within the proposed wind farm or within 1km of the proposed wind farm. There is one Zone of Archaeological Potential recorded in the Offaly County Development Plan within 5km of the proposed wind farm:

Birr Zone of Archaeological Potential is located approximately 3.8km south west of the proposed site compound and approximately 4.6km south west of the nearest turbine (Turbine 2). The extent of the Zone of Archaeological Potential is not recorded in map form in the County

Development Plan, but the Archaeological Zone of Notification as recorded by National Monuments Service ([www.archaeology.ie](http://www.archaeology.ie)) is shown on Figure 9.

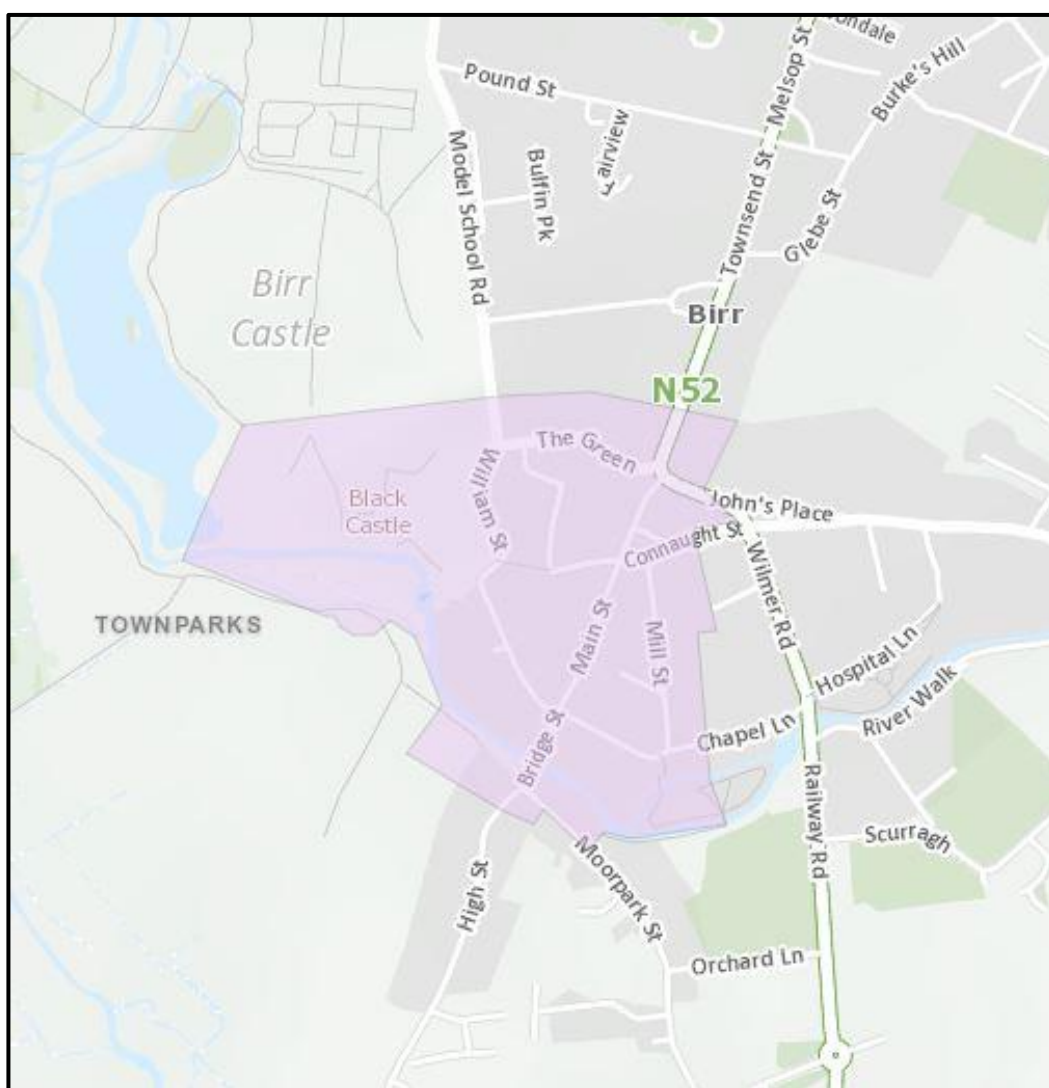


Figure 9: Birr Archaeological Zone of Notification

There are 23 recorded Early Medieval monasteries in County Offaly. Conservation Management Plans have been prepared for Clonmacnoise, Leamanaghan, Durrow, Rahan and Killeigh (*ibid.*, 327), none of which are within the proposed wind farm or within 5km of the proposed wind farm.

### 3.4.2 Architectural Heritage

It is Council policy (BHP-01) to:

*“ensure the protection, sympathetic and sensitive modification, alteration, extension or reuse of protected structures or parts of protected structures, and the immediate surrounds included and proposed for inclusion in the Record of Protected Structures that are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, together with the integrity of their character and setting.” (ibid., 331).*

It is an Objective (BHO-01) of Offaly County Council to:

*“review the Record of Protected Structures on an on-going basis and make additions, deletions and corrections as appropriate over the period of this Plan.” (ibid., 337).*

The Offaly County Development Plan contains the *Record of Protected Structures* for the county. There are no Protected Structures recorded in the Offaly County Development Plan within the proposed wind farm or within 1km of the proposed wind farm. There are approximately 364 Protected Structures recorded in the Offaly County Development Plan within 5km of the proposed wind farm, the majority of which are located in Birr.

There are no Protected Structures recorded in the Offaly County Development Plan within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There are three Protected Structures recorded in the Offaly County Development Plan within proposed Grid Connection Option 3 (figure 10):

RPS no. 19-012: Blackwater Bridge.

RPS no. 29-002: Griffith Bridge.

RPS no. 29-009: Park Brick Jack Arch Bridge.



Figure 10: Protected Structure nos. 19-012, 29-002 and 29-009 within proposed Grid Connection Option 3

There are no Protected Structures recorded in the Offaly County Development Plan within 100m either side of proposed Grid Connection Option 1 or proposed Grid Connection Option 2. In addition to the three Protected Structures within proposed Grid Connection Option 3, there are five Protected Structures recorded in the Offaly County Development Plan within 100m either side of proposed Grid Connection Option 3 (figures 11 and 12):



RPS no. 29-001: Canal bar.

RPS no. 29-003: Cast iron water pump.

RPS no. 29-004: The Grand Hotel.

RPS no. 29-005: Harbour Master's House.

RPS no. 49-004: Thatched house.

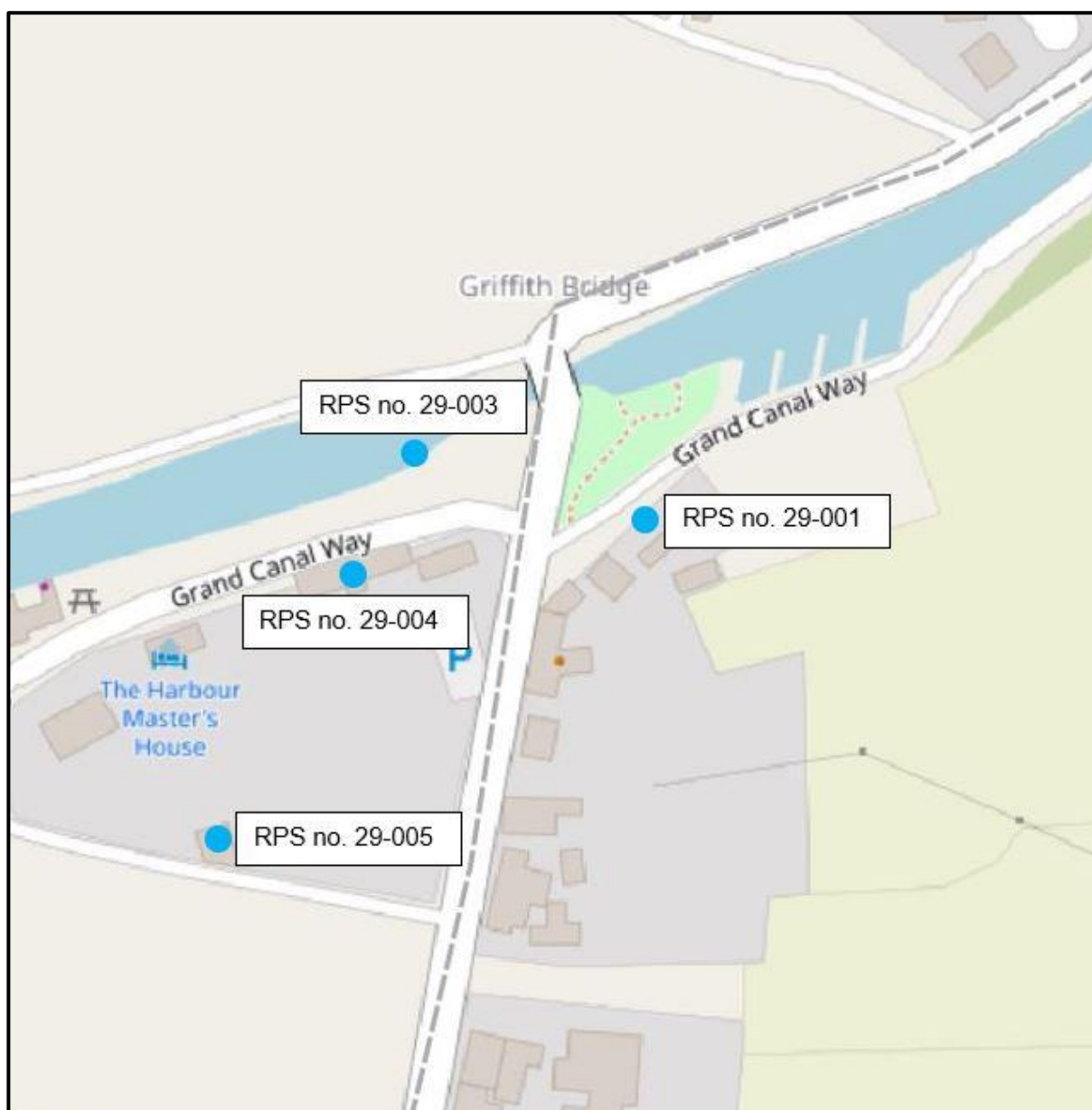


Figure 11: Protected Structure nos. 29-001, 29-003, 29-004 and 29-005 within 100m either side of proposed Grid Connection Option 3

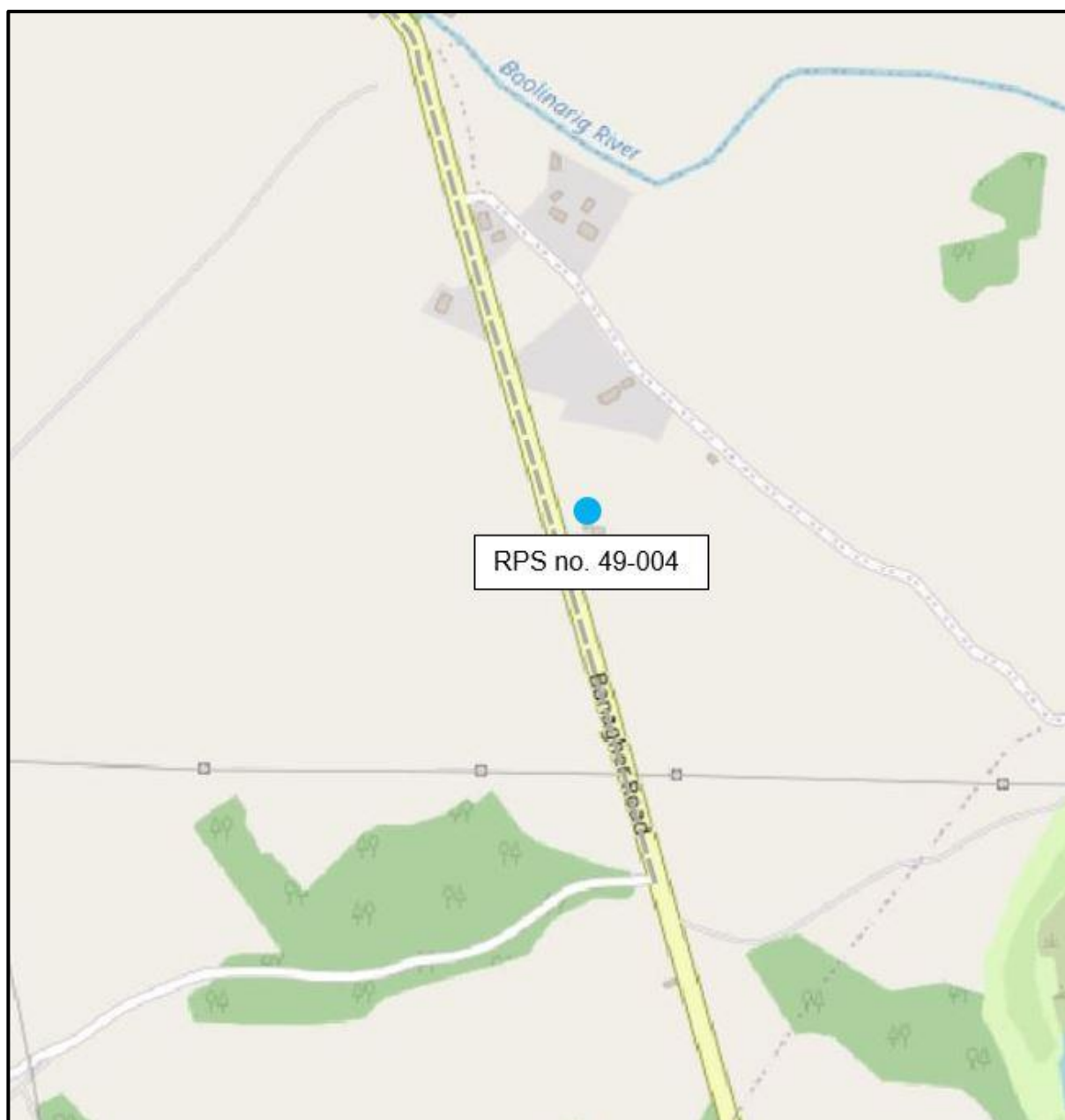


Figure 12: Protected Structure no. 49-004 within 100m either side of proposed Grid Connection Option 3

There are no Architectural Conservation Areas recorded in the Offaly County Development Plan (*ibid.*, 320) within the proposed wind farm or within 5km of the proposed wind farm.

### 3.4.3 Cultural Heritage

There are no designated Cultural Heritage features recorded in the Offaly County Development Plan within the proposed wind farm or within 5km of the proposed wind farm.

*North Tipperary County Development Plan 2010 - 2016*

Part of the 5km study area extends into County Tipperary, and as such the North Tipperary County Development Plan has been assessed to look for the presence of archaeological, architectural or cultural heritage features within the 5km study area.

#### 3.4.4 Archaeological Heritage

There are no designated Archaeological Heritage features recorded in the North Tipperary County Development Plan within 5km of the proposed wind farm.

#### 3.4.5 Architectural Heritage

There is one Protected Structure recorded in the North Tipperary County Development Plan (*ibid.*) within 5km of the proposed wind farm.

There are no Architectural Conservation Areas recorded in the North Tipperary County Development Plan within 5km of the proposed wind farm.

#### 3.4.6 Cultural Heritage

There are no designated Cultural Heritage features recorded in the North Tipperary County Development Plan within 5km of the proposed wind farm.

#### 3.4.7 Draft Tipperary County Development Plan 2022 - 2028

Following a review of the Draft Tipperary County Development Plan 2022 - 2028, it is considered that there have been no substantive changes to objectives or policies relating to the protection of archaeological, architectural or cultural heritage sites.

### 3.5 National Monuments

The Department of Housing, Local Government and Heritage maintains a database on a county basis of National Monuments in State Care. The term National Monument is defined in Section 2 of the National Monuments Act (1930) as:

*“a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto.”* ([www.archaeology.ie](http://www.archaeology.ie)).

There are no National Monuments in State Care within the proposed wind farm or within 5km of the proposed wind farm.

There are no National Monuments in State Care within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options.

The Department of Housing, Local Government and Heritage also maintains a database on a county basis of National Monuments with Preservation Orders or Temporary Preservation Orders.

There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed wind farm or within 1km of the proposed wind farm. There is one National Monument with a Preservation Order within 5km of the proposed wind farm (figure 13):

Preservation Order no. 43/1976. Motte and bailey castle. Located 4.9km south west of the proposed site compound and 5.7km south west of the nearest turbine (Turbine 2).

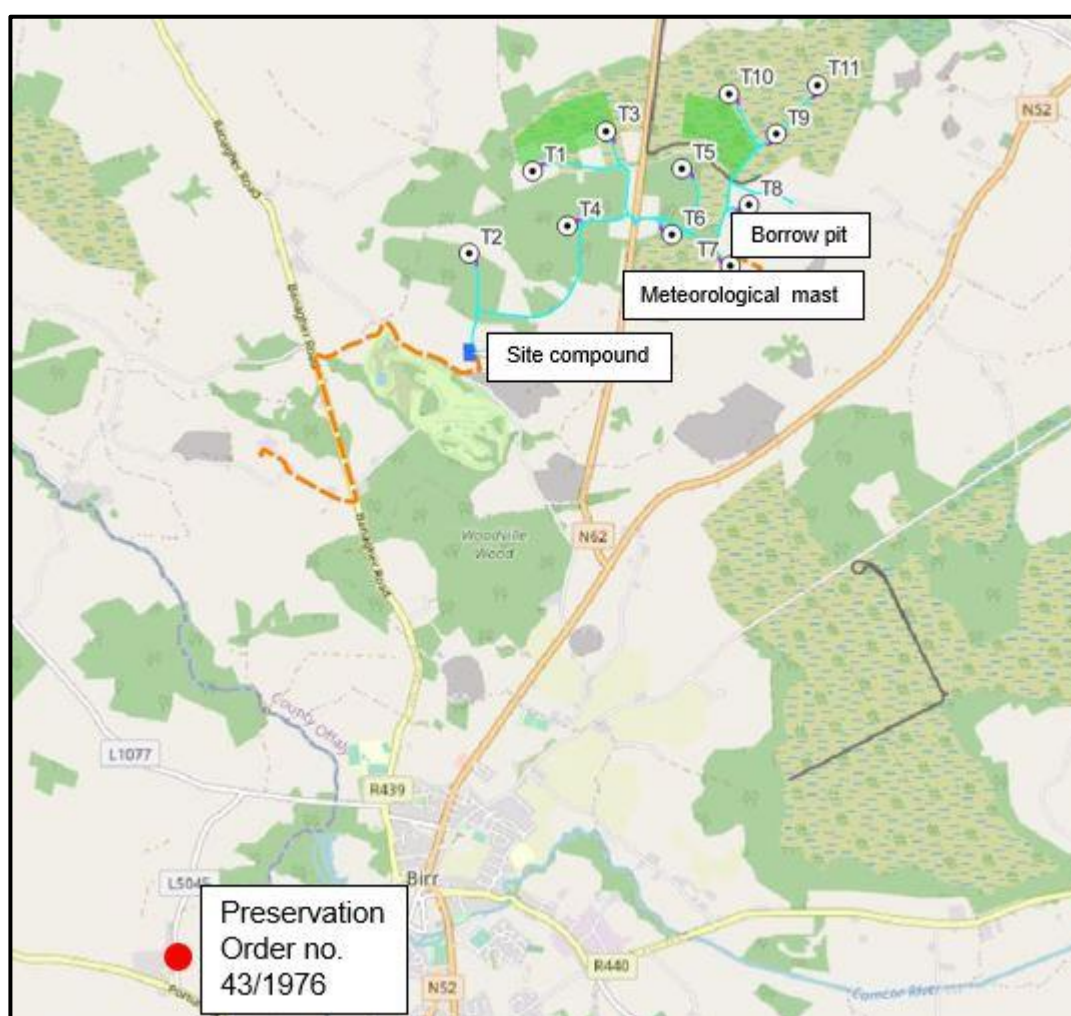


Figure 13: Preservation Order no. 43/1976 (Motte and bailey castle), located 4.9km south west of the proposed site compound and 5.7km south west of Turbine 2

There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options. There is one National Monument with a Preservation Order (Preservation Order No. 86/1940.RMP OF022-008001: Clonony Castle) located approximately 160m east of proposed Grid Connection Option 3.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed wind farm or within 5km of the proposed wind farm.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options.

Clonmacnoise is included in the Tentative List as consideration for nomination to the World Heritage List, and is centered on a point approximately 21km north west of the proposed wind farm.

### **3.6 National Inventory of Architectural Heritage**

#### *Building Survey*

The National Inventory of Architectural Heritage (NIAH) maintains a non-statutory register of buildings, structures *etc.* recorded on a county basis.

There are no structures recorded on the National Inventory of Architectural Heritage within the proposed wind farm or within 1km of the proposed wind farm.

There are no structures recorded on the National Inventory of Architectural Heritage within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There is one structure recorded on the National Inventory of Architectural Heritage within proposed Grid Connection Option 3 (this NIAH structure is also recorded as a Protected Structure: RPS no. 29-002. See figure 10 above):

NIAH no. 14922003: Griffith Bridge.

There are no structures recorded on the National Inventory of Architectural Heritage within 100m either side of proposed Grid Connection Option 1 or proposed Grid Connection Option

2. In addition to the one structure recorded on the National Inventory of Architectural Heritage within proposed Grid Connection Option 3, there are five structures recorded on the National Inventory of Architectural Heritage within 100m either side of proposed Grid Connection Option 3 (these NIAH structures are all recorded as Protected Structures. See figures 11 and 12 above):

NIAH no. 14922002: Canal Bar (same as RPS no. 29-001).

NIAH no. 14922004: Cast iron water pump (same as RPS no. 29-003).

NIAH no. 14922005: The Grand Hotel (same as RPS no. 29-004).

NIAH no. 14922006: Harbour Master's House (same as RPS no. 29-005).

NIAH no. 14930006: Thatched house (same as RPS no. 49-004).

### *Garden Survey*

There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the proposed wind farm.

There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There is one historic garden or designed landscape recorded on the National Inventory of Architectural Heritage within proposed Grid Connection Option 3 (figure 14):

Site ID 2: Moystown House.

Huntston House, which is within proposed Grid Connection Option 3, is shown as a Designed Landscape on the First Edition 1:10,560 Ordnance Survey map (1840) but it is not recorded as such on the National Inventory of Architectural Heritage.

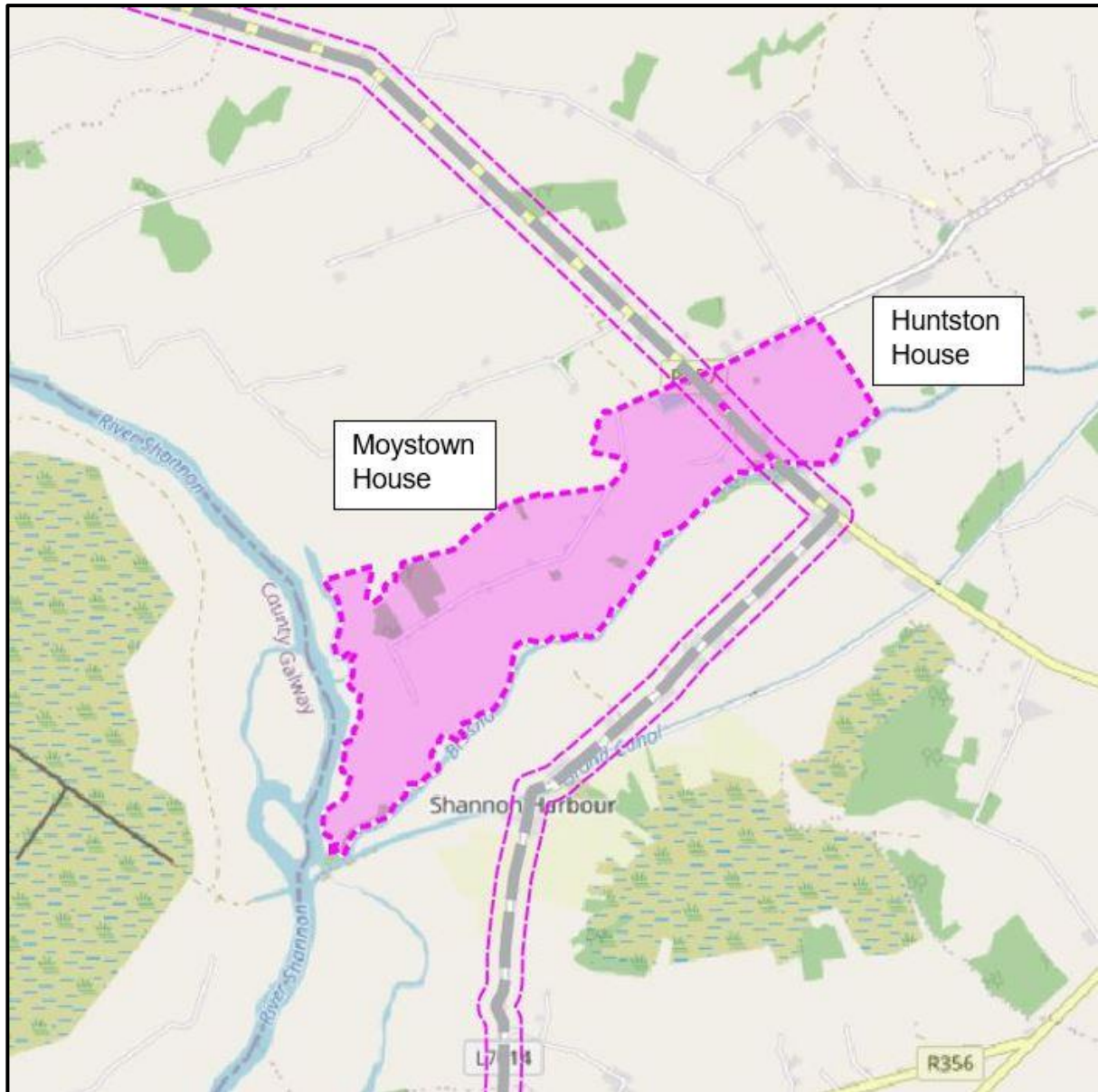


Figure 14: Moystown House (NIAH Site ID 2) and Huntston House (not recorded on the NIAH) within proposed Grid Connection Option 3

### 3.7 Conclusions

There are no Recorded Monuments within any areas of land take required for the proposed development. There are six Recorded Monuments within 1km of the proposed wind farm. There is one Recorded Monument within 100m of proposed Grid Connection Option 1. There are no Recorded Monuments within 100m of proposed Grid Connection Option 2. There are three Recorded Monuments within 100m of proposed Grid Connection Option 3.

There are no Zones of Archaeological Potential within the proposed wind farm or within 1km of the proposed wind farm. There is one Zone of Archaeological Potential (Birr) within 5km of the

proposed wind farm. There are no National Monuments in State Care within the proposed wind farm or within 5km of the proposed wind farm. There are no National Monuments in State Care within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options. There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the proposed wind farm or within 1km of the proposed wind farm. There is one National Monument with a Preservation Order within 5km of the proposed wind farm. There are no National Monuments with Preservation Orders or Temporary Preservation Orders within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options. There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed wind farm or within 5km of the proposed wind farm. There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the 3 no. grid connection options or within 100m either side of the 3 no. grid connection options.

There are no Protected Structures within the proposed wind farm or within 1km of the proposed wind farm. There are approximately 365 Protected Structures within 5km of the proposed wind farm, the majority of which are located in Birr. There are no Protected Structures within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There are three Protected Structures within proposed Grid Connection Option 3. There are no Protected Structures within 100m either side of proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There are five Protected Structures within 100m either side of proposed Grid Connection Option 3. There are no Architectural Conservation Areas within the proposed wind farm or within 5km of the proposed wind farm. There are no designated Cultural Heritage features within the proposed wind farm or within 5km of the proposed wind farm. There are no structures recorded on the NIAH within the proposed wind farm or within 1km of the proposed wind farm. There are no structures recorded on the NIAH within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There is one structure recorded on the NIAH within proposed Grid Connection Option 3 (this structure is also recorded as a Protected Structure). There are no structures recorded on the NIAH within 100m either side of proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There are five structures recorded on the NIAH within 100m either side of proposed Grid Connection Option 3 (these structures are all recorded as Protected Structures). There are no historic gardens or designed landscapes recorded on the NIAH within the proposed wind farm. There are no historic gardens or designed landscapes recorded on the NIAH within proposed Grid Connection Option 1 or proposed Grid Connection Option 2. There is one historic garden or designed landscape recorded on the NIAH within proposed Grid Connection Option 3.



Several small structures are recorded on the line and in the vicinity of the access road between Turbine 4 and Turbine 6. These structures are recorded on later editions of the Ordnance Survey map but no longer appear to survive above-ground. There are no archaeological or additional architectural features recorded within the land take of the proposed turbines on historic cartographic sources. The historic maps all record the presence of vernacular structures, Ordnance Survey bench marks, springs, *etc.* in the general vicinity of the proposed three grid connection options. There was no evidence of archaeological or architectural features recorded on aerial photography within any areas of land take required for the proposed development.

## **4 ASSESSMENT OF POTENTIAL CONSTRUCTION IMPACTS**

### **4.1 Potential Construction Impacts**

As a result of carrying out this desk-based scoping report, the following potential archaeological, architectural and cultural heritage impacts have been identified and thus require detailed assessment, where relevant:

- There are no Recorded Monuments or any additional statutorily protected archaeological features within any areas of land take required for the proposed development. As a result, there is likely to be no direct construction impact on any previously recorded protected archaeological remains.
- There are six Recorded Monuments within 1km of the proposed wind farm. There is one Recorded Monument within 100m of proposed Grid Connection Option 1. There are no Recorded Monuments within 100m of proposed Grid Connection Option 2. There are three Recorded Monuments within 100m of proposed Grid Connection Option 3.
- The proposed development could potentially have a permanent imperceptible direct construction impact on any previously unrecorded archaeological remains that may exist within the development area.
- There are three Protected Structures within proposed Grid Connection Option 3 (one of which is also recorded on the National Inventory of Architectural Heritage). Further assessment will be undertaken to assess the level of impact, if any, on these 3 no. Protected Structures.

- There is one historic garden or designed landscape recorded on the NIAH within proposed Grid Connection Option 3. Further assessment is required.
- It is considered at this stage that there is unlikely to be a visual or noise construction impact on any archaeological, architectural or cultural heritage remains, however, further assessment is required.

#### **4.2 Potential Cumulative Construction Impacts**

- It is considered at this stage there is unlikely to be cumulative construction impacts on any archaeological, architectural or cultural heritage remains.

## **5 ASSESSMENT OF POTENTIAL OPERATIONAL IMPACTS**

### **5.1 Potential Operational Impacts**

- It is considered the proposed wind farm may have an operational visual impact on six Recorded Monuments located within the 1km study area and approximately 365 Protected Structures located within the 5km study area. Further assessment is required.
- It is not known at this stage if there will be an operational visual impact on Clonmacnoise, which is included in the Tentative List as consideration for nomination to the World Heritage List. Further assessment is required.
- It is not known at this stage if there will be an operational visual impact on one National Monument with a Preservation Order within 5km of the proposed wind farm. Further assessment is required.
- It is considered that the proposed 3 no. grid connection options, due to their underground nature, do not have the potential to result in operational visual impacts on archaeological, architectural or cultural heritage remains.

### **5.2 Potential Cumulative Operational Impacts**

- It is not known at this stage if there will be any cumulative operational impacts on archaeological, architectural or cultural heritage remains between the proposed wind farm and any existing, permitted or proposed developments. Further assessment is required.

- It is considered the proposed 3 no. grid connection options will not have any cumulative operational impacts on archaeological, architectural or cultural heritage remains.

## **6 PROPOSED ASSESSMENT & MITIGATION MEASURES**

- It is recommended that a detailed desktop analysis and appraisal of the existing cultural heritage environment be undertaken as part of the Environmental Impact Assessment Report (EIAR). This appraisal will allow for an evidence-based assessment of likely significant effects which may arise resulting from the construction, operation and decommissioning of the proposed development.
- A detailed site walkover will be necessary to further assess the presence and nature of heritage features and to ground-truth the findings of the desktop appraisal.
- It is recommended that detailed visual impact assessments be carried out to assess the extent of operational visual impacts the proposed wind farm may have on archaeological and architectural remains.
- It is likely that Licensed archaeological monitoring will be recommended for all excavation works associated with construction of the wind farm.
- It is likely that Licensed archaeological monitoring will be recommended for all excavation works associated with construction of the underground grid connection.
- It is recommended that consultation takes place with the Local Authority regarding any proposed works at Blackwater Bridge, Griffith Bridge and Park Brick Jack Arch Bridge. Mitigation in the form of Architectural Impact Assessments containing pre-development written, drawn and photographic records, carried out by a recognised historic building consultant, may be required at these locations.
- On the basis of the above scoping assessment it is assessed that no heritage elements can be “scoped out”, and thus a detailed impact assessment of the archaeological, architectural and cultural heritage resource must be provided within the EIAR.

## **7 MICROSITING**

There are no Recorded Monuments or any additional statutorily protected archaeological, architectural or cultural heritage features within any areas of land take required for the proposed wind farm. As such, it is considered that micro-siting would not have an impact on the archaeological, architectural or cultural heritage resource.

## REFERENCES

Department of Arts, Heritage, Gaeltacht and the Islands. 1999. *Framework and Principles for the Protection of the Archaeological Heritage*. Dublin.

Department of Housing, Local Government and Heritage. *Record of Monuments and Places, County Offaly*. Unpublished.

Environmental Protection Agency. 2002. *Guidelines on the Information to be Contained in Environmental Impact Statements*. Wexford.

Environmental Protection Agency. 2022. *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*. Wexford.

Kelly, E.P. 2006. "Secrets of the Bog Bodies: The Enigma of the Iron Age Explained", in *Archaeology Ireland* Vol. 20, No. 1, Issue No. 75. Wicklow.

Offaly County Council. 2021. *Offaly County Development Plan 2021 - 2027*. Offaly.

Tipperary County Council. 2010. *North Tipperary County Development Plan 2010 – 2016*. Tipperary.

Tipperary County Council. 2022. *Draft Tipperary County Development Plan 2022 – 2028*. Tipperary.

Stout, M. 1997. *The Irish Ringfort*. Dublin.

### Cartographic Sources

Ordnance Survey Ireland

Map Editions 1840, 1910 and 1912

### Internet Sources

[www.archaeology.ie](http://www.archaeology.ie)

National Monuments Service

[www.bing.com/maps](http://www.bing.com/maps)

Bing aerial photography

[www.map.geohive.ie](http://www.map.geohive.ie)

Ordnance Survey Ireland aerial photographs

[www.offaly.ie](http://www.offaly.ie)

Offaly County Council

[www.tipperarycoco.ie](http://www.tipperarycoco.ie)

Westmeath County Council

**Annex 6 –  
Noise & Vibration Scoping Report**



# **CUSH WIND FARM SCOPING REPORT: NOISE AND VIBRATION**

---

Technical Report Prepared For

**Galetech Energy Services  
Clondargan  
Stradone  
Co. Cavan**

---

Technical Report Prepared By

**Mike Simms BE MEngSc MIOA MIET**

---

Our Reference

**227501.0035NR01**

---

Date Of Issue



**30 March 2022**

---

## Document History

Document Reference		Original Issue Date	
227501.0035NR01		30 March 2022	
Revision Level	Revision Date	Description	Sections Affected

## Record of Approval

Details	Written by	Approved by
Signature		
Name	Mike Simms	Alistair Maclaurin
Title	Senior Acoustic Consultant	Senior Acoustic Consultant
Date	30 March 2022	30 March 2022



## EXECUTIVE SUMMARY

This document summarises the scope of the noise study for EIAR Chapter for Cush Wind Farm under the following headings:

- The study area should be defined in line with the other chapters of the EIAR, which should at least contain the area within the 35dB L<sub>A90</sub> contour of the proposed and existing/permitted wind farms, which Awn will provide once the layout is confirmed;
- the description of the existing environment will be obtained by the analysis of the measured noise levels and wind speeds, at locations to be proposed by Awn;
- The description of likely effects for the construction, operational and demolition phases will be evaluated against the current relevant guidelines for the construction and operational phases; and
- Cumulative environmental noise effects i.e. those including the presence of other wind farms will be assessed in detail as is required by the guidance

---

<b>CONTENTS</b>		<b>Page</b>
	Executive Summary	3
1.0	Introduction	5
2.0	Study Area	5
3.0	Description Of Existing Environment	5
4.0	Description Of Likely Effects	6
	4.1 Construction Phase	6
	4.2 Operational Phase	6
5.0	Cumulative effects	7
	Appendix A - Cush Wind Farm Indicative 35 dB(A) Noise Contour	8

## 1.0 INTRODUCTION

The Noise and Vibration Chapter of the EIAR will assess the potential impacts of the proposed development to sensitive receptors in the surrounding environment. Information on the assessment of noise and vibration impacts on the environment during the construction, operational and decommissioning phases will be assessed. The principal objectives of the Noise and Vibration assessment will be to specify appropriate limit values and mitigation measures to ensure that the impact on the environment is minimised.

## 2.0 STUDY AREA

The study area for the operational phase will cover at least the area where total turbine noise is predicted to exceed 35 dB  $L_{A90}$  when all existing and proposed turbines are at their maximum output noise level at all identified Noise Sensitive Locations (NSLs) that are within this area. In order to provide an indicative extent of the study area in relation to noise, contours are presented in Appendix A, based on the following information:

- the turbine layout issued on 22 October 2021;
- a turbine hub height of 110 m;
- a sound power level of 105 dB(A);
- flat topography – i.e. no land contours have been added to the model.

The 35 dB  $L_{A90}$  contour lies at a distance of up to 1.4 km from turbines in the current model, thus a house survey would need to include at least this area.

For the construction and decommissioning phases, all properties within 500 m of the proposed construction activities, or the nearest NSL if greater than 500 m, will be considered in the assessment.

Potential NSLs will include residential dwellings, commercial properties, derelict buildings, and proposed infrastructure (including houses submitted for planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development.

## 3.0 DESCRIPTION OF EXISTING ENVIRONMENT

Initial iterations of the noise model will be developed and expected noise levels predicted to the nearest NSLs. This initial exercise will be used to inform the selection of appropriate baseline noise monitoring locations in the vicinity of the site.

A background noise monitoring survey will be completed at several NSL's in the vicinity of the proposed development site. All measurements will be conducted in accordance with the IOA document *A Good Practice Guide to the Application of ETSU-R-97 for The Assessment and Rating of Wind Turbine Noise* (GPG) and the associated supplementary guidance notes.

The results of the background noise survey will be used to identify appropriate noise criteria for the various phases of the proposed development with reference to the appropriate guidance documents.

## 4.0 DESCRIPTION OF LIKELY EFFECTS

The baseline work will characterise the noise climate existing in the area and facilitate the quantification of potential noise impact which may arise from the proposed development. It is envisaged that the main noise impacts associated with the proposed development will be construction activity. The potential noise and vibration impacts will be considered for the following phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

### 4.1 Construction Phase

Construction (and decommissioning) noise levels associated with various elements of the proposed development will be predicted at the facades of the closest noise-sensitive locations in the vicinity of the development by developing detailed construction calculations. All predictions will be conducted in accordance with the guidance contained in ISO 9613:1996: *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO, 1996). Source noise levels will be obtained from BS 5228 2009 +A1 2014 *Code of practice for noise and vibration control on construction and open sites* (BSI, 2014). While it is noted that NSLs are generally well set back from construction activities, those works along the proposed grid connection route will take place in the immediate environs of a number of road-side dwellings and, therefore, a comprehensive assessment will be required. The likely noise levels at these dwellings, and the nearest dwellings to the proposed wind farm site (and haul route works), will be predicted using recognised noise prediction methodologies and the magnitude of effect will be quantified.

Vibration during construction will also be considered regarding the potential impact of residential amenity and structural damage to buildings. It is noted that the current proposed development layout generally provides for substantial separation distances between proposed infrastructure and NSLs; however, the proposed grid connection passes adjacent to a number of road-side dwellings and, therefore, a comprehensive assessment of likely vibration levels will be required.

### 4.2 Operational Phase

Noise levels at all the identified NSLs will be predicted using a proprietary noise modelling package. All predictions will be done in accordance with ISO 9613, using the recommended calculation settings outlined in the IOA GPG. The use of a computer-based noise model lends itself to ongoing evaluation of design changes and provides output that is detailed and extensive. Noise contour maps will be generated for the site noise models illustrating turbine noise levels in the study area.

The results obtained from the prediction calculations will be used to assess the likely noise impact of the operation of the proposed wind turbines. This will include appropriate downwind assessments at various NSLs. Where necessary and possible, noise control measures will be considered. Discussion of other issues will be included where appropriate (e.g. tonality, low frequency noise/Infrasound, amplitude modulation etc.).

The potential noise impact arising from operational-phase road traffic movements and other ancillary elements of the proposed development including the electricity

substation and any other permanent sources of noise will be assessed and included in the assessment.

## **5.0 CUMULATIVE EFFECTS**

An assessment of the potential cumulative noise effects with other existing, permitted and proposed developments; including other wind energy developments; will be undertaken if necessary.

Due to the distance of the proposed development from other permitted wind farm developments, at the present time, it is not anticipated that cumulative noise impacts will be an issue for the proposed development. This will be confirmed prior to commencing the assessment.

### APPENDIX A - CUSH WIND FARM INDICATIVE 35 dB(A) NOISE CONTOUR

