White Hill Wind Farm Electricity Substation & Electricity Line

Environmental Impact Assessment Report

Annex 1.1: Environmental Impact Assessment Scoping Report

White Hill Wind Limited

Galetech Energy Services

Clondargan, Stradone, Co. Cavan Ireland

Telephone +353 (0)49 555 5050

www.galetechenergyservices.com

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	Function	Name
Content	Planner	Steph Smart
Approval	Senior Planner	Simon Carleton

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2			
3			
Notes:			

Contents

1.0 Introduction

White Hill Wind Limited ('the Developer') intends to apply for planning permission for the construction and operation of an electricity substation and associated underground electricity line ('the project') to facilitate the connection of the permitted White Hill Wind Farm to the national electricity network. The project will be located approximately 11 kilometres (km) northeast of Kilkenny City.

The location of the project, in a regional context, is illustrated at **Figure 1** below.

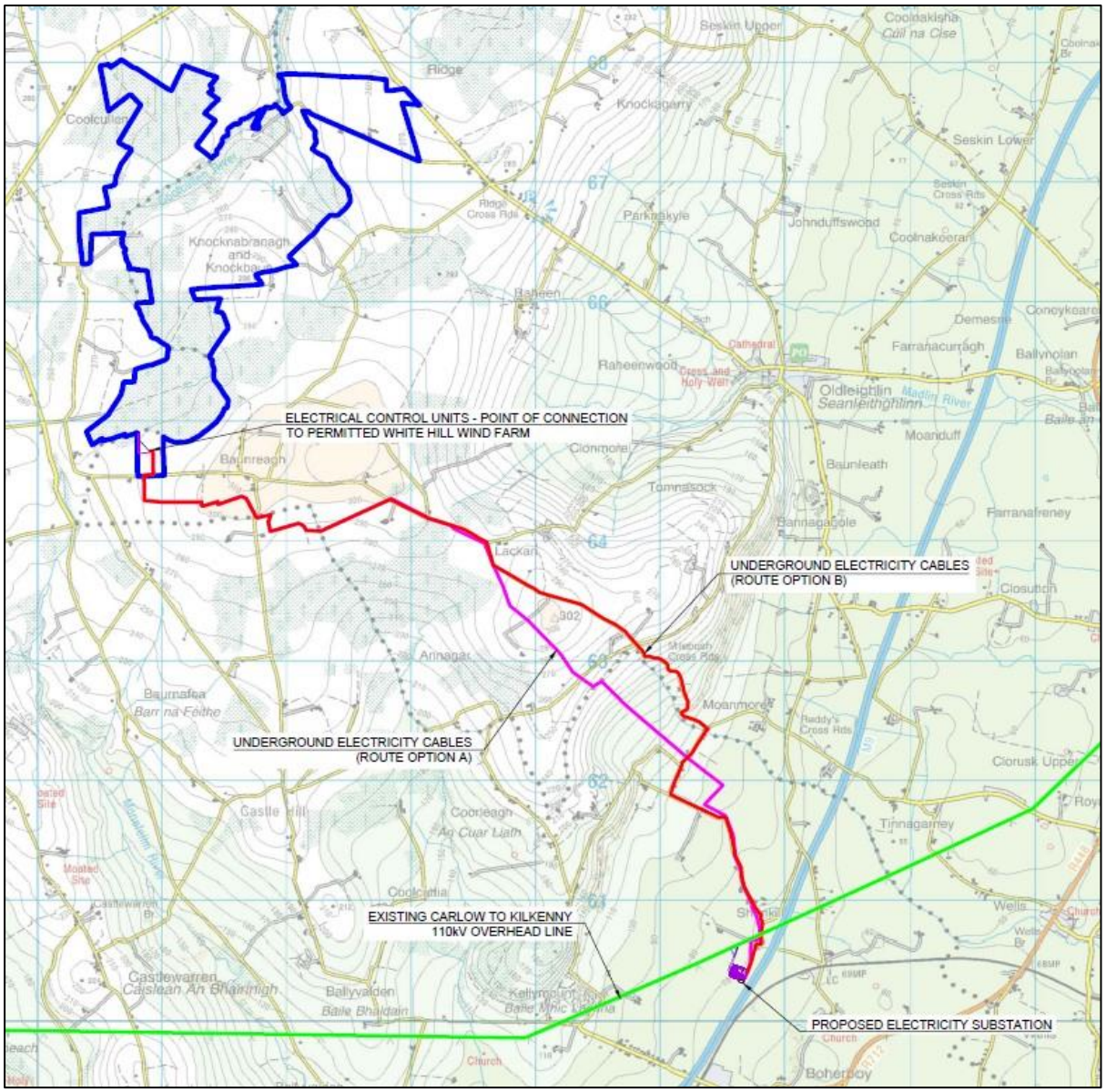


Figure 1: Site Location

1.1 The Developer

White Hill Wind Limited is a renewable energy development company with substantial experience in the renewable industry; the company principals owning and operating a number of permitted and operational wind farms both within Ireland and internationally.

1.1.1 The Agent

Galetech Energy Services (GES) has been engaged by the Developer to coordinate the preparation of an Environmental Impact Assessment Report (EIAR) including the environmental scoping process and constraints analysis. GES is an Irish multi-disciplinary renewable energy consultancy that specialises in the delivery of planning, environmental and project management services to renewable energy developments from project feasibility through the development cycle and onto the operational phase. GES combines the expertise of leading experts in renewable energy design, planning and environmental assessment and has extensive experience in managing and coordinating EIAR projects for wind energy and associated electricity grid and substation developments.

1.2 Purpose of this Report

The purpose of the Environmental Impact Assessment (EIA) scoping process is to identify key environmental elements which may be affected by the project thus requiring assessment in the EIA process and to eliminate those which are not likely to be affected 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 project.

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 project; 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 ('the 2014 EIA Directive'), 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. EIA provides for an assessment of all effects; including direct, indirect, secondary, cumulative, transboundary, short-term, medium-term, long-term, permanent, temporary, positive and negative; of as they may relate to the construction, operational and decommissioning phases of a project.

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 the classes of development proposals which shall be subject to EIA. The project is not, of itself, a category or type of development listed as requiring EIA. Therefore, there is no statutory requirement for the project to be accompanied by an EIAR.

Notwithstanding the above, a judgement of the High Court in respect of *O'Grianna & Ors. v. An Bord Pleanála ([2014] IEHC 632)* determined that a wind farm and its connection to the national grid are considered a single indivisible project for the purpose of the EIA Directive. As the project will form part of an overall development that was formerly subject to EIA (i.e. the White Hill Wind Farm), an EIAR will be prepared and submitted to allow An Bord Pleanála undertake a complete in-combination EIA of the overall development.

2.3 What is an EIAR?

An EIAR is a written statement of the likely significant effects, if any, which the project, if carried out, will have on the environment. The EIAR consists of a systematic analysis of the project, 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 consenting authorities can use, amongst other considerations, in independently undertaking EIA and informing a decision making process.

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 project 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) and the 2014 EIA Directive; each of which set out the information to be contained in an EIAR.

2.4 Purpose of the EIAR

The EIAR provides for a system of sharing information about the environment, within which a project 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

In May 2022, the Environmental Protection Agency (EPA) published the *Guidelines on the Information to be contained within an Environmental Impact Assessment Report* and these guidelines reflect the 2014 EIA Directive and the provisions contained therein. 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.

GES, and all experts involved in the preparation and production of the EIAR, will have regard to these guidelines; while best practice guidance related to each individual environmental discipline or topic addressed by the EIAR will also be adhered to.

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 project, 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 project;
- The likely significant effects of the project: The aspects of the construction, existence and operation of the project 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, mitigation measures and residual effects), 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 the competent authority in its independent EIA of the project.

2.7 Format of the EIAR

The EIAR will be set out in the following chapter format:-

- Introduction;
- Assessment of Project Alternatives;
- Description of the Project;
- Population and Human Health;
- Biodiversity;
- Land & Soil;
- Water;
- Air Quality & Climate;
- Landscape;
- Cultural Heritage;
- Noise & Vibration;
- 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 and receptors 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 to ensure that 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 supplemented by field surveys in order to verify the accuracy of the desktop study and/or to gather additional environmental information for incorporation into the EIAR.

The existing environment will be evaluated to determine its importance, significance and sensitivity. The significance and sensitivity of a specific environment will be derived from legislation, national policies, local plans and policies, guidelines and/or professional judgements.

2.7.4 Description of the Likely Effects

In this section, assessments will be made as to how the existing or receiving environment will interact with the project. The full extent of the project's effects prior to the implementation of mitigation measures are introduced will be assessed and described. Effects from the construction, operation and decommissioning phases of the project 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 EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (May 2022). 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 based on the assessor's professional judgement.

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. It is likely that mitigation measures will also be proposed even where predicted effects are not assessed to be significant which will ensure that environmental effects are minimised to the greatest possible extent.

Proposals to undertake pre- or post-construction monitoring, or monitoring during construction activities, may also be proposed to obtain additional information on the project 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, including the early anticipation of effects. In order to ensure that the information included in the EIAR is complete to a high level of objective quality, such competences include relevant prior experience and knowledge of the characteristics of the project type and sensitivities likely to be present in the receiving environment; an understanding of the legal context of the decision-making process, including relevant case law; and an appropriate range of specialist technical experts to address different environmental factors, and their interactions.

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 detailed at **Table 1** below.

Chapter	Environmental Factor/Topic	Specialist Consultant
1	Introduction	GES
2	Assessment of Project Alternatives	GES
3	Description of the Project	GES
4	Population & Human Health	GES
5	Biodiversity	SLR Consulting
6	Land & Soil	Hydro-Environmental Services
7	Water	Hydro-Environmental Services
8	Air Quality & Climate	GES

9	Landscape	Macro Works
10	Cultural Heritage	Horizon Archaeology
11	Noise & Vibration	AWN Consulting
		GES (noise monitoring)
12	Material Assets	GES
13	Interaction of the Foregoing	GES
Non-Technical Summary		GES

Table 1: Specialist Consultants involved in the preparation of this Scoping Report

3.0 Consultation

Consultation, to date, has predominately comprised engagement with organisations and authorities, key service providers (e.g. utilities and telecommunications) and other stakeholders to whom the project may be of interest or may be affected by the project; 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 project. 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:-

- An Garda Síochana;
- An Taisce;
- Bat Conservation Ireland;
- Birdwatch Ireland;
- Bord Gáis Energy
- Broadcasting Authority of Ireland (Coimisiún na Meán);
- BT Communications Ireland;
- Carlow County Council;
- 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;
- Eir;
- EirGrid;
- 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;
- Iarnród Éireann;
- Imagine Group;
- Inland Fisheries Ireland;
- Irish Aviation Authority;
- Irish Peatland Conservation Council;
- Irish Raptor Study Group;
- Irish Wildlife Trust;
- Kilkenny County Council;
- Magnet Plus;
- National Ambulance Service;
- National Federation of Group Water Schemes;
- National Parks & Wildlife Service;
- Office of Public Works;
- Open Eir;
- Radio Services & Building Limited;
- Southern Regional Assembly;
- Sport Ireland Outdoors;
- Sustainable Energy Authority of Ireland;
- Tetra Ireland Communications Limited;
- The Arts Council;
- The Heritage Council;
- Three (3) Ireland;
- Towercom;
- Transport Infrastructure Ireland;
- Údarás na Gaeltachta;
- Uisce Éireann;
- Virgin Media Ireland;
- Viatel Ireland;
- Vodafone Ireland;
- Waterways Ireland; and,
- 2rn (RTE Transmission Network Limited).

3.2 Community Consultation

The Developer carried out extensive public consultation throughout the project design and EIAR process. In August 2024, door-to-door visits were undertaken with local residents living within approximately 1km of the location of the proposed electricity substation. During these visits, the project was described in detail, queries from residents were fielded and an information leaflet was provided to the residents. The leaflet contained information relating to the project and provided contact details of the Community Liaison Officer who could be contacted should any further queries arise.

In addition, a public information event was held over the course of 28 and 29 August at the Lord Bagenal Inn in Leighlinbridge, Co. Carlow where members of the public and community groups were afforded the opportunity to discuss the project directly with the project team.

The public consultation was managed by a dedicated Community Liaison Officer (CLO) and expertly structured and managed to ensure clarity and consistency, and to maintain an objective and factual approach. A website was also established where members of the public concerned could view details of the project, receive

updates on public consultation and to contact the Developer via email or a freephone number (www.whitehillwindfarm.ie).

4.0 Description of the Project

The project will be located within County Carlow and County Kilkenny approximately 11 kilometres (km) northeast of Kilkenny City and will include a 110 kilovolt (kV) electricity substation and approximately 8.5km of underground electricity line. Site plans and drawings are provided at **Annex 1**.

4.1 Electricity Substation

The proposed electricity substation, and associated infrastructure, will be located in the townland of Shankill. The electricity substation shall comprise the following elements:-

- A compound with a hardcore surface enclosed by security fencing and gates containing electrical plant and equipment;
- An electrical control building containing electrical plant and equipment;
- 2 no. electrical control buildings containing electrical plant and equipment;
- 2 no. interface masts and underground electricity lines to facilitate connection to the existing Kellis-Kilkenny 110kV overhead transmission line;
- A containerised energy storage system; and
- Associated site development works including the site entrance, construction of an access track and installation of site drainage infrastructure.

The electricity substation is centred at the coordinates provided at **Table 1** below.

ID	Easting	Northing	Approximate Altitude (mAOD)
Substation	665583	660514	71

Table 1: Proposed Substation Location

Coordinates provided in Irish Transverse Mercator (ITM)

The electricity substation site is located in a relatively flat area of pastoral grassland; however, there will be a requirement to undertake minor modifications to ground levels in order to achieve a level platform for the control buildings and electrical equipment. In order to provide a level compound footing, a cut/fill exercise will be implemented where soil from higher elevations will be deposited at areas of lower elevations to avoid the importation of substantial volumes of aggregates. The compound surface will be finished with free-draining crushed stone, such that rainwater can percolate to ground, imported to the site.

The substation will contain 2 no. control buildings 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 transformers, busbars, line bays, surge arrestors, insulating and earthing equipment, circuit breakers, lighting stands, and lightning masts.

The footprint of the substation (overall compound area) measure approximately 10,600m^2 and will be surrounded by a palisade fence, with associated gates, of 2.6m in height for safety and security reasons. The substation will contain a control building 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 transformers, busbars, line bays, surge arrestors, insulating and earthing equipment, circuit breakers, lighting stands, and lightning masts.

The compound will also contain 2 no. control buildings from where the substation will be operated and maintained. The control buildings will be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors. The control buildings will contain control rooms to allow operatives monitor and manage the operation of the electrical apparatus and will also include storage and welfare facilities.

Underground electricity lines, c. 200m in length, will be installed between the proposed substation and the existing Kellis-Kilkenny 110kV overhead transmission line; while 2 no. interface masts of c. 15m in height will be installed to facilitate the connection of the overhead line and underground cables.

It is proposed to install an energy storage system adjacent to the electricity substation. The energy storage system will comprise battery infrastructure installed within containers and accompanied by associated electrical apparatus.

The electricity substation will be accessed via an existing agricultural site entrance which will be upgraded to accommodate construction traffic and heavy-goods vehicles (HGVs) and to provide sufficient vehicular visibility splays to ensure that public and road safety is maintained.

Approximately 680m of on-site access track will be required to access the proposed substation and interference masts for construction purposes and for site access during the operational phase. The access track proposed shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 4m.

4.2 Underground Electricity Line

Currently, 2 no. route options are being assessed to determine the presence of environmental constraints and to determine the technical suitability of each route to accommodate the electricity line.

Route Option A would be primarily located within agricultural/forestry lands with short sections located within the carriageways of local public roads. The electricity line would be located within the townlands of Baunreagh, Ballygorteen, Lackan, Annagar and Shankill.

Route Option B would be primarily located within the carriageways of local public roads with a short section within private agricultural/forestry lands. The electricity line would be located within the townlands of Baunreagh, Ballygorteen, Lackan, Moanmore and Shankill.

The electricity cables will be installed in ducts within a trench approximately 1.2m deep and c. 2m in width.

4.3 Construction Materials Haul Route

It is likely that the vast majority of construction materials for the proposed substation; for example, control building materials and electrical equipment, external electrical equipment and apparatus, and security fencing, etc.) will be delivered to the substation site via the M9 national primary road and the R912, R712, L6674, L6673 and L66732. The source of stone aggregates and concrete cannot be confirmed until the post-consent pre-construction procurement process has been completed and, as such, a number of routes may be utilised. However, all suppliers will be required to utilise nationally and regionally-classed routes insofar as possible to minimise the use of, and potential damage to, locally-classed roads.

Materials related to the underground electricity cables will be delivered to the

applicable works location and/or temporary storage location (e.g. an existing farmyard) which may be identified by the construction contractor. As above, all suppliers will be required to minimise the use of locally-classed roads insofar as possible.

5.0 Scope of the EIAR

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.

5.1 Project Alternatives

Prior to the selection of the development under consideration, the Developer 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 connecting to existing electricity substations, alternative proposed substation locations, alternative substation configurations and designs, and alternative electricity line route options (currently under assessment). This process has so far determined that the development subject to this scoping process represents the most solution, both environmentally and technically, having regard to all reasonable available alternatives.

However, the development in its current layout and design (at the time of writing) remains subject to further revision in line with continued project scoping and ongoing statutory and non-statutory consultation.

5.2 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 are likely to be primarily associated with traffic, noise, air quality and water impacts. Once the project becomes operational, effects will be primarily associated with visual and noise effects.

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

The potential effects identified above along with potential cumulative effects with other wind farms and infrastructure projects, will be considered within the 'Population and Human Health' chapter of the EIAR.

The project includes the construction and operation of electricity infrastructure. The provision of electricity infrastructure of 110kV capacity is common practice on similar projects throughout Ireland. The radiation emitted from this type of electrical infrastructure can give rise to the generation of electromagnetic fields (EMF) which has the potential to affect human health where high levels are experienced.

Potential operational effects are limited to EMF impacts on properties (residential or other uses) within close proximity to the electricity lines or substation compound. The assessment of EMF in the EIAR will focus on the predicted level of the EMF and an evaluation of the predicted level against health protection standards.

The EIAR chapter will also take into consideration the results of other assessments in the EIAR which have relevance to health. Recognised health evaluation criteria will

be used and accurate baseline data provided. The findings of these assessments will be cross referenced in order to avoid duplication of findings.

Employment effects and direct expenditure will be quantified using data provided by the Developer and, where necessary using standard industry data. Opportunities for local business and the local labour market to be involved in supply chain activities will be identified and, where possible, quantified.

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

5.2.1 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 project. 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 project. This study area will comprise counties Kilkenny and Carlow and will be referred to as the 'Wider Study Area'. Given the scale of the project, it is not intended to measure effects at a national or international level.

5.2.2 Description of 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);
- *Kilkenny City and County Development Plan 2021-2027;*
- *Carlow County Development Plan 2022-2028;*
- Pobal Profiling GIS Data;
- Fáilte Ireland;
- *Kilkenny County Council Tourism Development Strategy and Action Plan 2023-2028; and,*
- *County Carlow Tourism Strategy and Action Plan 2020-2025.*

5.2.3 Description of 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.

5.2.3.1 Receptor Sensitivity

There are no published standards that define receptor sensitivity relating to Population & 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.

5.2.3.2 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.

5.2.3.3 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 significance ratings of imperceptible, slight, moderate and significant will be used. 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.

5.2.4 Mitigation & Monitoring Measures

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

5.2.5 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.

Carlow County Council advised that potential impacts on residential properties and on existing adjoining land uses should be assessed. The assessment should also identify all residential properties on a map.

No other comments related to effects on Population & Human Health have been received.

5.3 Biodiversity

A detailed Biodiversity Scoping Report has been prepared and is enclosed at **Annex 2**. The report has identified environmental constraints in respect of the project which will require detailed consideration and also identifies effects which may occur as a result of the construction, operation and decommissioning of the project. Finally, the report describes the proposed approach in the preparation of the Biodiversity chapter of the EIAR.

5.3.1 Stakeholder Engagement

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

Consultation responses were received from Carlow County Council, Bat Conservation Ireland, and the Irish Wildlife Trust; however, Bat Conservation Ireland and the Irish Wildlife Trust advised that they did not have the capacity to provide a response. With regard to biodiversity and natural heritage, Carlow County Council made a number of recommendations including *inter alia* assessment of effects on Natura 2000 sites, the protection of hedgerows and trees, and the replanting of vegetation.

While not specifically related to Biodiversity, a consultation response was also received from the Department of Agriculture, Food and the Marine which advised on the procedures to be followed in the event of tree felling.

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

5.4 Land & Soil

A Land, Soil & Water Scoping Report has been prepared and is enclosed at **Annex 3**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been undertaken addressing each of these topics. The report describes the characteristics of the existing environment, identifies environmental receptors which may experience effects as a result of the construction, operation and decommissioning of the project, and describes the methodologies to be followed in the preparation of the Land & Soil chapter of the EIAR.

5.4.1 Stakeholder Engagement

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

A consultation response was received from Geological Survey Ireland (GSI) which, while not raising any particular concerns regarding the project, advised that the assessment be cognisant of GSI's publicly available databases particularly with

regard to geoheritage, groundwater and groundwater monitoring, groundwater vulnerability, geological mapping, geohazards, natural resources (minerals/aggregates), and the geochemistry of soils, surface waters and sediments.

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

5.5 Water

A Land, Soil and Water Scoping Report has been prepared by Hydro Environmental Services (HES) and is enclosed at **Annex 3**. Given the highly inter-related nature of the geological, hydrogeological and hydrological environments, a consolidated scoping assessment has been undertaken addressing each of these topics. The report describes the characteristics of the existing environment having regard to site investigations undertaken, identifies environmental receptors which may experience effects as a result of the construction, operation and decommissioning of the project, and describes the methodologies to be followed in the preparation of the Water chapter of the EIAR.

5.5.1 Stakeholder Engagement

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

Consultation responses were received from the Office of Public Works, Uisce Éireann, Inland Fisheries Ireland, Kilkenny County Council and Carlow County Council. The OPW noted that there are no arterial catchment drainage schemes within the project site; and advised that approval would be required, in accordance with Section 50 of the 1945 Arterial Drainage Act, where any works are to be undertaken to a new or existing bridging structure over a watercourse.

Uisce Éireann advised that there are no owned assets in the vicinity of the electricity substation and underground electricity line. Uisce Éireann identified privately owned water infrastructure located in proximity to the underground electricity line and an abstraction point downstream to the west of the underground electricity line. The EIAR must include and consider all direct, indirect and cumulative effects on the abstraction point. Uisce Éireann also noted that it does not have capacity to respond to specific scoping requirements but advised that matters related to effects on drinking supplies, water quality monitoring, effects on Uisce Éireann infrastructure, wastewater management, surface water management, and water supply be considered.

Inland Fisheries Ireland identified the surface water bodies with which the project interacts with and stated their hydrological connection to the River Barrow and River Nore SAC.

Kilkenny County Council advised that Geological Survey Ireland and Environmental Protection Agency databases should be examined to identify surface water and groundwater vulnerability.

Carlow County Council also identified the river waterbodies with which the project interacts and outlined that surveys of existing and proposed drainage should be provided along with a detailed drainage design.

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

5.6 Air Quality & Climate

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate the European Commission Directive 2008/50/EC (on ambient air quality and cleaner air for Europe). Council Directive 2008/50/EC (CAFÉ Directive) combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and also includes ambient limit values relating to Particulate Matter (as $PM_{2.5}$).

The limit values or 'Air Quality Standards' are health or environmental-based levels and 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.

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. 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-emissions trading system (ETS) greenhouse gas (GHG) emissions by 2030 relative to its 2005 levels.

Following Ireland's declaration of 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 published the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) ('the 2021 Climate Act') in July 2021. The 2021 Climate Act was prepared for the purposes of giving statutory footing to the core objectives stated within the Climate Action Plan.

In relation to carbon budgets, the 2021 Climate Act states *"A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')"*. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change.

In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications ('the Minister') shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors.

The 2023 Climate Action Plan 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 2023 Climate Action Plan 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.

The following sections set out the proposed approach to the preparation of the Air Quality & Climate chapter of the EIAR.

5.6.1 Methodology

The assessment methodology will include the following:-

- Detail the scoping and consultation process undertaken and describe the scope of the impact assessment;
- Identify the key legislation, policy and guidance with reference to the latest updates in guidance and approaches;
- Confirm the study area for the assessment;
- Describe and characterise the baseline environment established from desk studies, project survey data and consultation;
- Define the project design parameters for impact assessment and describe any embedded mitigation measures relevant to the assessment;
- Present the assessment of likely significant effects or benefits and identify any assumptions and limitations encountered in compiling the impact assessment; and,
- Detail any additional mitigation and/or monitoring necessary to prevent, minimise, reduce or offset potentially significant effects.

5.6.2 Description of Existing Environment

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

- Ambient Air Quality;
- Weather conditions; and,
- Long-term climactic monitoring.

5.6.3 Description of 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 arising from dust, vehicular emissions and the delivery of renewable energy to the national grid will be fully assessed.

5.6.3.1 Receptor Sensitivity

There are no definitive standards that define receptor sensitivity relating to Air Quality & Climate 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.

Based upon professional judgement, it is proposed that 3 no. levels of sensitivity will be used: high; medium and low.

5.6.3.2 Magnitude Criteria

The magnitude of effect will be evaluated based on the change that occurs to the baseline conditions relating to air quality and climate.

It is proposed that four degrees of magnitude will be used: high; medium; low and negligible.

5.6.3.3 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 significance ratings of imperceptible, slight, moderate and significant will be used. 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.

5.6.4 Mitigation & Monitoring Measures

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

5.6.5 Stakeholder Engagement

No specific comments regarding the assessment of effects on Air Quality & Climate have been received.

5.7 Landscape

A Landscape scoping report has been prepared 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. In addition, the Scoping Report identifies an initial set of potential locations from where photo-realistic images of the project may be prepared.

5.7.1 Stakeholder Engagement

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

Carlow County Council, in its response, identified a number of scenic viewpoints and scenic routes which are of relevance to the assessment of landscape and visual impacts. It should be noted, however, that the response of Carlow County Council would appear to be largely focussed on the effects of the permitted White Hill Wind Farm itself, as opposed to the proposed electricity substation and underground electricity line. Nonetheless, all relevant landscape and visual receptors will be appropriately assessed within the EIAR.

Kilkenny County Council advised that, having regard to the proximity of Protected View 13, a thorough assessment of potential impacts will be required.

No other comments regarding the assessment of effects on features of Cultural Heritage have been received.

5.8 Cultural Heritage

An Archaeological, Architectural and Cultural Heritage scoping report has been prepared 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 project may have on the archaeological, architectural and cultural heritage resource of the surrounding area. The report also provides details of the methodology to be followed in the preparation of the EIAR chapter and potential

mitigation measures which may be proposed.

5.8.1 Stakeholder Engagement

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

Matters relating to archaeology and cultural heritage were raised by Development Applications Unit (DAU), Kilkenny County Council and Carlow County Council. The DAU recommended that the archaeological impact assessment to be carried out is supported by desk-study, fieldwork, a geophysical survey, archaeological test excavations, underwater surveys and built heritage surveys.

Carlow County Council did not identify any archaeological, architectural or heritage features in the vicinity of the underground electricity line but noted the presence of a feature proximate to the permitted White Hill Wind Farm.

Kilkenny County Council recommended that, having regard to the proximity of national monuments and archaeology to the underground electricity line, a thorough assessment of potential impacts will be required.

No other comments regarding the assessment of effects on features of Cultural Heritage have been received.

5.9 Noise & Vibration

A Noise & Vibration scoping report has been prepared 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 project. The scoping report also describes the principal objectives, and the proposed methodologies, of the assessment.

5.9.1 Stakeholder Engagement

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

Carlow County Council advised that suitably scaled mapping should be provided identifying existing and proposed noise monitoring stations and the assessment of noise impacts must consider noise generated from construction activities and operational noise. Carlow County Council also recommended that construction hours should be restricted to prevent adverse noise effects at receptors.

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

5.10 Material Assets

5.10.1 Transport & Access

The assessment of traffic & access will include an examination of the existing road network surrounding the site, as well as reviewing the likely haul route for the delivery of the construction materials and electrical equipment to the project site.

The project is likely to have both construction, operational and decommissioning phase effects in terms of transport & access. Construction and decommissioning phase effects may include increased traffic flows, changes to the traffic composition,

traffic disruption, reduction in safety and degradation of road surfaces. Operational stage impacts on traffic are likely to be much less than that associated with the construction stage; however, the level of effect will be examined in line with the operational life span of the project.

The Transport & Access section will undertake a range of including the capacity of the haul route to accommodate construction traffic, an appraisal of any damage to road structures or surfaces, and a traffic impact assessment to determine the effects of construction and operational phase traffic movements. Given that the project will be constructed concurrently with the permitted White Hill Wind Farm, the cumulative effects of both developments will be assessed.

5.10.1.1 Methodology

A desktop review of the road network in the vicinity of the proposed substation location and along the electricity line route has been conducted and supplemented by a driven survey of the electricity line route. A walkover survey of the proposed access point to the substation location was also conducted; while key locations along the electricity line route and construction materials haul route were also walked and visually assessed.

A transport and access assessment will be conducted having regard to the Transport Infrastructure Ireland (TII) *Traffic and Transport Assessment (TTA) Guidelines*, May 2014. The methodology for the transport & access assessment will include a comprehensive assessment of the road network's ability to accommodate construction phase traffic, the suitability of the electricity line route to accommodate electrical infrastructure, a review of predicted traffic volumes and effects likely to be generated during the construction and operation of the project by the construction workforce and by the transport of materials and equipment. Future traffic volumes associated with maintenance-related activities will also be predicted. The potential disruption to the road network and local traffic movements during the construction phase and the availability of alternative routes (particularly in relation to the proposed electricity line route) will be assessed, where required.

Recommendations will be made to mitigate any potential traffic effects on the road network.

5.10.1.2 Description of Existing Environment

The road network in the vicinity of the project site includes the M9 motorway in addition to a number of regionally-classed roads (the R912, R448, R705 and R712) and locally classed roads. Road conditions are assessed to be of generally good quality; however, there is evidence of surface and structural deterioration along some of the lower-classed local roads.

It is anticipated that the most substantial volume of traffic will be generated by the construction of the electricity substation. It is likely that the vast majority of construction materials for the proposed substation; for example, control building materials and electrical equipment, external electrical equipment and apparatus, and security fencing, etc.) will be delivered to the substation site via the M9, R912, R712, R448, L6674, L6673, and L66732.

Based on anecdotal evidence and experience, the locally-classed road network in the vicinity of the substation site and along the electricity cables route 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.

5.10.1.3 Description of Likely Effects

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

- 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 due to traffic movements and construction activities (i.e. excavations).

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 project.

5.10.1.4 Mitigation & Monitoring Measures

A comprehensive suite of mitigation measures will be set out, as required, to reduce the likely effects of the project 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.

5.10.1.5 Stakeholder Engagement

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

A consultation response was received from Transport Infrastructure Ireland (TII) who noted the proximity of the proposed substation site to the existing M9 motorway national road and recommended sufficient setback from the motorway should be provided. A meeting was held with representatives from Kilkenny County Council's Roads Department on 8 May 2024 regarding the setback distance to the M9 motorway and the Developer was advised that the proposed separation between the carriageway and the electricity substation was deemed to be sufficient; but that Kilkenny County Council would engage with TII further and advise in due course.

TII also advised on various matters including consultation with the relevant local authorities; the assessment of effects on the national road network; assessment of visual effects from national roads; consideration of planned road schemes; that relevant TII publications are considered; that a road safety audit is conducted if required; that haul route and abnormal size/weight loads are assessed; that PPP companies, motorway maintenance contractors and local authorities be consulted; and that any damage to road surfaces shall be remediated by the Developer.

Carlow County Council that a detailed traffic impact assessment is required for the construction phase. This assessment should include anticipated traffic types and volumes, potential effects of heavy-goods vehicles, design details for site entrances, pre- and post-construction condition survey of the roads and proposals to upgrade a road or structure where it is structurally unsuitable (if applicable).

Kilkenny County Council advised that it had no specific comments in relation to the

electricity substation and electricity line; however, provided a copy of all comments made in respect of the now-permitted White Hill Wind Farm. Each of these comments has been reviewed and will be addressed in the EIAR as relevant.

5.10.2 Telecommunications

5.10.2.1 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 EIAR preparation process, will include:-

- Consultation with service providers, regulatory authorities and emergency services;
- Analyses of the effects of the project 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 if significant effects are likely to occur;
- Where necessary, mitigation measures to be agreed with operators.

5.10.2.2 Description of the Existing Environment

While the project site is not assessed to be a particularly important location for telecommunications links or infrastructure, a number of telecommunication masts/structures were identified within the surrounding landscape. However, no links were identified as traversing the subject site and/or have the potential to be affected.

5.10.2.3 Description of Likely Effects

Consultation responses were received from a number of organisations and service providers including Broadcasting Authority Ireland, 2rn, Three, Towercom and Virgin Media. No concerns with the project were identified.

5.10.2.4 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.

6.0 Cumulative Assessment

The assessment of cumulative effects arising from the project will take two forms, as follows:-

- The cumulative effects of the project with the permitted White Hill Wind Farm will be assessed to evaluate the effects of the project as a whole; and,
- The cumulative effects of the entire project with other existing, permitted or projects (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.

7.0 Assessment of Interactions

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.

8.0 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 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 project. Each relevant European site is evaluated to examine whether or not the project is likely to have a significant effect on the European site.

The project is not located within any designated nature conservation areas. However, there is one Natura 2000 site located within 10km of the project site; namely the River Barrow and River Nore Special Area of Conservation (SAC).

An Appropriate Assessment Screening Report found 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 and operation of the project, 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 project should proceed to be subject to a Stage 2 AA and that a Natura Impact Statement (NIS) should be prepared and submitted with the planning application alongside the EIAR. In the NIS, the effect of the project on the integrity of the European site(s), and their conservation objectives, will be assessed.

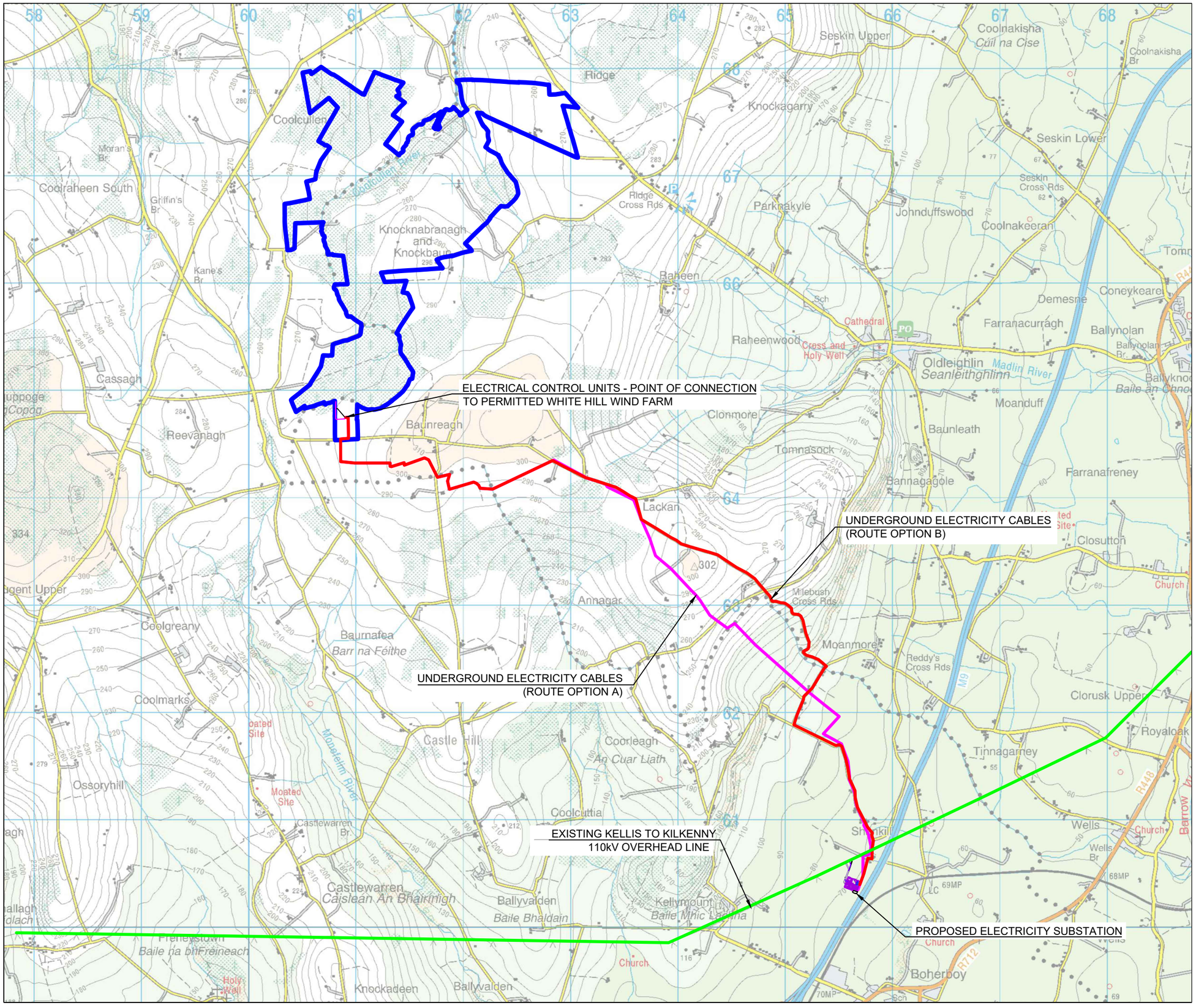
In the NIS, mitigation measures can be proposed to minimise effects on European sites to reduce the significance of any effects. Mitigation measures will follow the 'Avoidance–Reduction–Remedy' hierarchy. The mitigation measures will be described in detail, including in relation to their practical implementation, 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 Environmental Impact Assessment Reports* 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 –
Maps and Drawings



LEGEND:

WHITE HILL WIND FARM BOUNDARY

N

Date:	Rev:	Description:	Drawn By:

Prepared By:

Galetech Energy Services
Clondargan, Stradone
Co. Cavan, H12 NV06
info@galetechenergy.com
www.galetechenergy.com

Client:

WHITE HILL WIND LIMITED

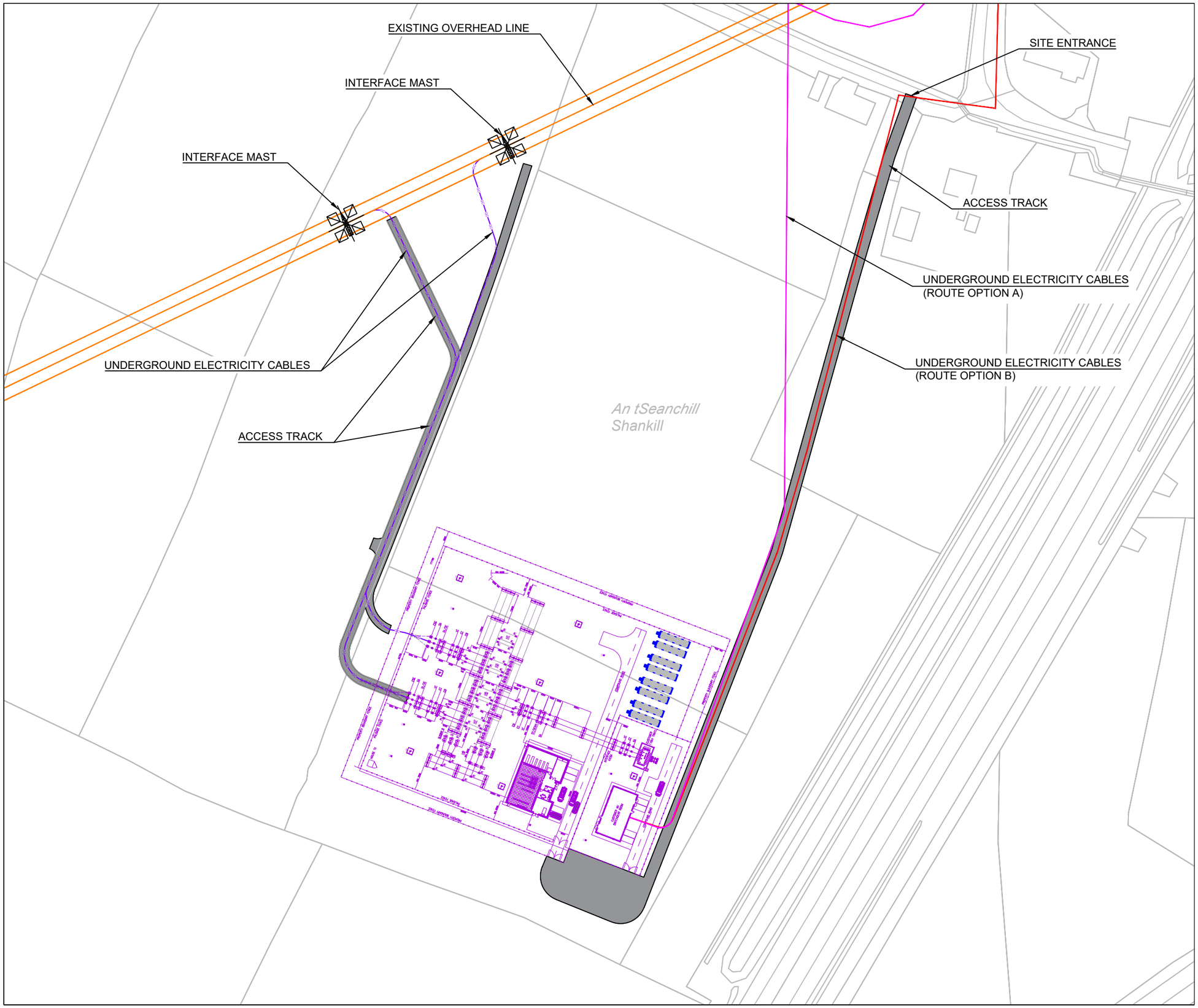
Job Title:

WHITE HILL WIND FARM ELECTRICITY SUBSTATION & GRID CONNECTION

Drawing Title:

FIGURE 1: OVERALL SITE LOCATION

Drawing No.:	Stage:	
WHI001SS_PAS_LOC-0.01	ENVIRONMENTAL SCOPING	
Scale:	Date:	Revision No.:
(A3) 1:35,000	21/03/2024	REV 0
Drawn By:	Checked By:	Confirmed By:
JB	SC	SC



Date:	Rev:	Description:	Drawn By:

Prepared By:

Galetech Energy Services
Clondargan, Stradone
Co. Cavan, H12 NV06

info@galetechenergy.com
www.galetechenergy.com

Client:

WHITE HILL WIND LIMITED

Job Title:

WHITE HILL WIND FARM ELECTRICITY SUBSTATION & GRID CONNECTION

Drawing Title:

FIGURE 2.01: INDICATIVE SUBSTATION LAYOUT AND LOOP IN / LOOP OUT CONNECTION

Drawing No.:	Stage:
WHI001SS_PAS_LAY-0.01	ENVIRONMENTAL SCOPING

Scale:	Date:	Revision No.:
(A3) 1:1,500	21/03/2024	REV 0

Drawn By:	Checked By:	Confirmed By:
JB	SC	SC

N

Date:	Rev:	Description:	Drawn By:

Prepared By:

Galetech Energy Services
Clondargan, Stradone
Co. Cavan, H12 NV06

info@galetechenergy.com
www.galetechenergy.com

Client:

WHITE HILL WIND LIMITED

Job Title:

WHITE HILL WIND FARM ELECTRICITY SUBSTATION & GRID CONNECTION

Drawing Title:

FIGURE 2.01: INDICATIVE SUBSTATION LAYOUT AND LOOP IN / LOOP OUT CONNECTION

Drawing No.:	Stage:	
WHI001SS_PAS_LAY-0.03	ENVIRONMENTAL SCOPING	
Scale: (A3) 1:1,500	Date: 21/03/2024	Revision No.: REV 0
Drawn By: JB	Checked By: SC	Confirmed By: SC

Annex 2 –
Biodiversity Scoping Report

Scoping & Constraints Report

White Hill Wind Farm Electricity Substation and Grid Connection

White Hill Wind Farm Ltd

Clondargan, Stradone, Cavan,

Prepared by:

SLR Environmental Consulting (Ireland) Ltd

City Gate, Mahon 1000, Cork, T12 W7CV

SLR Project No.: 501.065165.00001

Client Reference No: 065165

13 May 2024

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0	15 April 2024	Dr Jonathon Dunn		
1	13 May 2024	Dr Jonathon Dunn	Michael Bailey	Michael Bailey
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This document has been prepared by SLR Environmental Consulting (Ireland) Ltd (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with White Hill Wind Farm Ltd (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.

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Table of Contents

Appendices

1.0 Introduction

SLR Environmental Consulting (Ireland) Ltd (SLR) were commissioned by White Hill Wind Farm Ltd in March 2024 to carry out a desktop study and a scoping visit to identify ecological constraints present along the two route options associated with underground electricity lines, electrical control units and an electricity substation site (hereafter 'the Project', with the area itself 'the Project Site'; see Figure 1.1 to 1.7 in Appendix B). The Project will facilitate the connection of the White Hill Wind Farm to the national electricity network.

For the route of the electricity line, option 1 is largely located off-road (hereafter 'Off-Road Cable Route') and option 2 is largely within public roads (hereafter 'On-Road Cable Route'), although there are sections that are shared by both route options (hereafter 'Common Cable Route').

Surveys for breeding waders have commenced and will be carried out between April to June 2024 inclusive and an extended habitat survey will be carried out in the early summer of 2024.

A trail camera has also been deployed at a hedgerow in the substation location as part of a mammal survey between April to May 2024.

The aim of this report is to present the results of the scoping visit and desktop study with recommendations for additional field surveys and/or any likely mitigation.

2.0 Methodology

2.1 Desk-Based Study

The desk-based study collated information from the following:

- Satellite imagery[1];
- Environmental Protection Agency (EPA) viewer[2];
- Environmental Sensitivity Mapper (ESM) viewer[3];
- National Biodiversity Data Centre (NBDC) database[4]; and
- National Parks and Wildlife Service (NPWS) website[5].

NBDC species data are collated within grid squares from 100 m to 10 km in size. A 1 km grid square resolution was used for the electricity substation site (square S6560), electrical control units (square S6064) and where the electricity line route options intersect with the Paulstown stream (square S6264), Moanmore stream (square S6562) and Shankill stream (squares S6561 and S6560) watercourses.

A 100 m grid square was used for all other elements of the Off-Road Cable Route.

NBDC data were not examined for elements of the On-Road Cable Route.

[1] https://www.google.ie/maps Last accessed 14/05/2024
[2] https://gis.epa.ie/EPAMaps/ Last accessed 14/05/2024
[3] https://airomaps.geohive.ie/ESM/ Last accessed 14/05/2024
[4] https://maps.biodiversityireland.ie/Map Last accessed 14/05/2024
[5] https://www.npws.ie/protected-sites Last accessed 14/05/2024

As a starting point, all designated nature conservation sites within 15 km from the Project were identified. This included SACs, SPAs, Ramsar sites, NHAs, pNHAs and nature reserves.

2.2 Scoping Survey

A scoping survey was carried out on the 27th and 28th March 2024 to search for any habitats or species that are either protected by law or are otherwise subject to legal restrictions. Photographs, GPS coordinates and target notes were recorded. Conditions were suitable for survey.

2.3 Limitations

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 Project 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.

The scoping visit was carried out outside the optimal season for botanical surveys and so it is possible that certain plant species could have been missed.

No access to the riverbank along the Moanmore watercourse crossing was possible, as it was within third-party lands and the crossing was obscured by vegetation. Similarly, no access to any third-party lands adjacent to the On-Road Cable Route was possible, although binoculars were used to view areas visible from the road.

The site visit was high-level in nature and so should not be considered in lieu of more detailed ecological surveys.

3.0 Results

3.1 Designated Nature Conservation Sites

There are two SACs, one SPA, one NHA and eight pNHAs within 15 km of the Project Site, with details provided in Appendix A and shown in Figure 2. There are no Ramsar sites and nature reserves within this distance.

Those with potential connections to the Project include:

- Hydrogeological connections: none. There are no sites designated for *inter ali*a groundwater dependent terrestrial ecosystem (GWDTE) habitats such as turloughs and fens in the same groundwater body as the Project Site;
- Downstream hydrological connections: the electricity line route options (all elements) cross watercourses (Paulstown stream, Moanmore and Shankill streams) which each discharge to the River Barrow and River Nore SAC 000216; and
- Ecological connections: the River Barrow and River Nore SAC has mobile *ex situ* species, which could travel upstream to the Project Site.

3.2 Habitats

There are no previously mapped ancient woodlands, Annex I habitats or any groundwater dependent terrestrial ecosystems (GWDTEs) nearby the Project Site. What follows is a summary of the habitats recorded during the site visit for each Project element.

Higher value habitats for the Project are shown in Figure 3.1 to 3.7 in Appendix B.

3.2.1 Electrical Control Units

The location for the control units consists of improved agricultural grasslands (GA1) near 'gappy' hedgerows (WL1), just south of Sitka spruce conifer plantation (WD4). The fields are wet, containing patches of dense soft rush *Juncus effusus* and occasional European gorse *Ulex europaeus* scrub (WS1).

None of the habitats are of particularly high intrinsic value.

3.2.2 Common Cable Route

The Common Cable Route corridor is located within improved agricultural grasslands, some grazed wet grassland (GS4), gorse scrub, gravel forestry tracks, and roads (BL3). The corridor crosses eroding upland watercourses (FW1; Paulstown stream and the Shankill stream twice), drainage ditches (FW4), hedgerows, treelines (WL2) and roads.

Higher value habitats within the common cable route corridor include upland eroding watercourses, drainage ditches, wet grasslands, hedgerows and treelines.

3.2.3 Off-Road Cable Route

The Off-Road Cable Route corridor is located predominantly in heavily grazed improved agricultural grasslands, some of which contains gorse scrub and areas of soft rush. The corridor occasionally crosses hedgerows, treelines, roads and drainage ditches.

The Off-Road Cable Route does not cross any additional watercourses than those mentioned above for the Common Cable Route.

Higher value habitats include drainage ditches, hedgerows and treelines.

3.2.4 On-Road Cable Route

The On-Road Cable Route corridor is located predominantly within public roads, which are artificial in nature. Bounding habitats include drainage ditches, hedgerows and treelines.

The On-Road Cable Route has two additional watercourse crossings than described for the Common Cable Route: an additional crossing of the Shankill stream and a crossing of the Moanmore stream.

Higher value habitats include eroding upland watercourses and bounding drainage ditch, hedgerow and treeline habitats.

3.2.5 Substation

Most of the electricity substation will be located within lower value, heavily grazed improved agricultural grassland. These fields are wet with some patches of soft rush.

The field margins comprise some gappy treelines (trees are immature) and an extensive network of drainage ditches.

3.3 Species

3.3.1 Plants

There are no desktop records of rare, protected or invasive plants at the location of any element of the Project.

Plants recorded during the scoping visit are shown in Figure 3.1 to 3.7 in Appendix B.

3.3.1.1 Electrical Control Units, Off-Road Cable Route and Substation

No rare, protected or invasive / non-native species (INNS) were recorded at the control centre, Off-Road Cable Route corridor and substation.

3.3.1.2 Common Cable Route

No rare or protected plant species were recorded; however, salmonberry *Rubus spectabilis* and snowberry *Symphoricarpos albus* were recorded within a hedgerow and farm lane just south of the control units at Baunreagh. Box-leaved honeysuckle *Lonicera pileata* was present in a hedge alongside the L7117 local road.

Salmonberry is a 'medium impact invasive species' and is listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011). Neither snowberry nor box-leaved honeysuckle is listed under this schedule, but snowberry is a 'non-native species – low risk of impact' and the invasiveness of box-leaved honeysuckle has not been assessed.

3.3.1.3 On-Road Cable Route

No rare or protected plant species were recorded; however, montbretia *Crocosmia x crocosmiiflora* was present in a verge alongside the L7117 local road.

Montbretia is not listed on the Third Schedule (see above) but is a 'non-native species – low risk of impact'.

3.3.2 Birds

There are no desktop records of rare or protected birds at the Project Site.

Birds and important habitats for birds recorded during the scoping visit are shown in Figure 3.1 to 3.7 in Appendix B.

The scoping visit recorded meadow pipit *Anthus pratensis* in some of the scrubbier areas of the Common Cable Route and Off-Road Cable Route. These and other passerines could breed within these areas.

Some of the wet grassland and 'rushier' improved agricultural grassland habitats could afford foraging opportunities for waders, wildfowl and ground nesting birds.

Treelines and hedgerows at the substation and along all the electricity line route options could be used by nesting passerines and other birds. The same is true for conifer plantations.

Surveys for lowland waders and other birds are currently being carried out at the control units and substation location and at locations of suitable habitats within the Common Cable Route and Off-Road Cable Route corridors.

None of the watercourse crossings were assessed to be suitable for nesting kingfisher *Alcedo atthis*, lacking suitable vegetation-free banks and low levels of disturbance. Most of the watercourses were shallow and overgrown. The Shankill stream (nearest the substation) and Moanmore stream could be used by foraging kingfisher.

3.3.3 Mammals

There are desktop records of badger *Meles meles* recorded within the 1 km grid square overlapping the location of the electricity substation and electrical control units. Red squirrel *Sciurus vulgaris* were recorded in the 1 km grid square overlapping the location of the electrical control units.

Mammal observations and important habitats for mammals recorded during the scoping visit are shown in Figure 3.1 to 3.7 in Appendix B.

3.3.3.1 Electrical Control Units and Substation

No badger evidence was recorded during the scoping visit at the location of the control units; however, some mammal holes were present in hedgerows near the substation. These were not badger setts, as confirmed via trail camera survey.

Regarding bats, the habitats at the electrical control units and substation sites are of low-moderate importance for commuting and foraging bats. Most linear features such as hedgerows and treelines were truncated and 'gappy'. No potential bat roosts were identified.

3.3.3.2 Common Cable Route

Non-native rabbits *Oryctolagus cuniculus* were recorded within a hedgerow in Baunreagh.

No otter *Lutra lutra* holts were recorded within 150 m of any watercourse crossings accessible for survey (i.e. all but the Moanmore stream crossing). In general, watercourses were very shallow, overgrown and unsuitable for otter holts.

Regarding bats, the habitats along common elements of the electricity line route options are of low-moderate importance for commuting and foraging bats. Most linear features such as hedgerows and treelines were truncated and 'gappy'. No potential bat roosts were identified.

3.3.3.3 Off-Road Cable Route

No badger setts were recorded within 150 m of the off-road grid route option. A badger latrine was recorded c. 43 m west of the route, indicating the presence of badgers in the area.

No otter holts were recorded within 150 m of any watercourse crossings accessible for survey.

Regarding bats, there were some mature oak *Quercus* sp. and ash *Fraxinus excelsior* trees, with moderately suitable potential roost features (PRFs) within treelines and hedgerow field boundaries.

There was also a row of mature oak and ash trees of moderate roosting suitability and moderate-high foraging/commuting value towards the southern end of the Off-Road Cable corridor.

3.3.3.4 On-Road Cable Route

No badger setts were recorded adjacent to the on-road electricity line route option. There could be badger setts within third-party lands that were not accessible from the road.

There were also a small number of trees with moderate bat roosting potential within hedgerows adjacent to the road. It was not possible to view the underside of the crossing of the Moanmore stream and it is possible that the structure could act as a bat roost.

3.3.4 Amphibians and Reptiles

There are no desktop records of rare or protected amphibians and reptiles within any of the 1 km or 100 m grid squares overlapping the Project Site.

Common frog *Rana temporaria* were recorded during the scoping visit at the location of the control units. It is likely that they are also present in wet fields and drainage ditches along all other elements of the Project.

Smooth newt *Lissotriton vulgaris* could also be present in the same habitats. It is unlikely that common lizard *Zootoca vivipara* is present in the highly modified agricultural habitats that dominate the Project Site.

3.3.5 Invertebrates

There are no desktop records of rare or protected invertebrates (including Desmoulin's whorl snail *Vertigo moulinsiana* and marsh fritillary butterfly *Euphydryas aurinia*) and none were recorded during the scoping visit.

It is unlikely that the highly modified agricultural habitats within and bounding the Project Site are suitable for rare and protected invertebrate species.

3.3.6 Aquatic Ecology

There were no desktop records of aquatic receptors such as otter *Lutra lutra*, white-clawed crayfish *Austropotamobius pallipes*, Atlantic salmon *Salmo salar*, twaite shad *Allosa fallax fallax*, freshwater pearl mussel *Margaritifera* spp, and lamprey *Lampetra* spp and *Petromyzon marinus*.

In general, the watercourses were shallow, overgrown and had been affected by agriculture (e.g. evidence of cattle crossing / damage). Therefore, it is unlikely that the above aquatic receptors are present, but this cannot be confirmed in the absence of specialised aquatic surveys.

4.0 Summary and Recommendations

To facilitate a comparison, the ecological constraints present at the two cable route options is shown in Table 4-1 below. Constraints present at the Common Cable Route are not shown.

Table 4-1: Ecological Constraints Present at Off-Road vs. On-Road Cable Route

Ecological Receptor	Ecological Constraints for Each Cable Route Option	
	Off-Road	**On-Road**
Habitats	• Higher value habitats present include eroding upland watercourses, hedgerows, treelines and wet grassland	• Higher value habitats present include eroding upland watercourses, hedgerows, treelines and wet grassland • Two additional watercourse crossings present
Plants	• None	• Non-native montbretia present in verge
Birds	• Wetter fields with scrub could host breeding waders and passerines • Loss of hedgerows for nesting, foraging birds	• None • Loss of hedgerows for nesting, foraging birds
Mammals	• Mature trees could act as bat roosts • Row of mature trees highly suitable for commuting and foraging bats	• Moanmore stream crossing could act as a bat roost

Ecological Receptor	Ecological Constraints for Each Cable Route Option	
	Off-Road	**On-Road**
Amphibians and Reptiles	• Common frog and smooth newt could be present in wetter fields and drainage ditches	• None
Invertebrates	• None	• None
Aquatic Ecology	• While unlikely, QI aquatic species such as otter, white-clawed crayfish, salmonids, lamprey and pearl mussel could be downstream of watercourse crossings	• While unlikely, QI aquatic species such as otter, white-clawed crayfish, salmonids, lamprey and pearl mussel could be downstream of watercourse crossings

For the Project as a whole, summary text is provided for each ecological receptor below, with recommendations shown as bullet points.

4.1 Designated Nature Conservation Sites

There are unlikely to be any potential groundwater links to any nearby designated sites. Therefore, GWDTE QI habitats are unlikely to be affected by accidental spread of pollution from surface run-off of silt and/or fuel/oil leaks from construction machinery.

There is one downstream hydrological link to a designated nature conservation site: the River Barrow and River Nore SAC. Riparian QI habitats such as alluvial forests and wetlands could be affected by downstream pollution and accidental spread of invasive plant species. Pollution could also affect downstream aquatic QI species both directly and indirectly.

There are potential ecological connections to the same SAC, as mobile otter, salmonids and lamprey could travel along watercourses upstream to the Project Site. Any downstream pollution could affect ex-situ populations via depletion of prey species.

Direct disturbance to holts near the Moanmore stream could also affect breeding otters, if present.

It is unlikely there is any ecological connectivity to ex-situ kingfisher from the River Nore SPA, so it is very unlikely that they could be affected by disturbance or displacement if they are found to use the habitats at the Project Site.

Recommendations:

- Horizontal Directional Drilling (HDD) should be used to cross any watercourses.
- Appropriate mitigation should be outlined in the Water and Biodiversity EIAR chapters and AA as required. The required measures will be dependent on the results of the current and planned surveys, as well as the hydro- and hydrogeological assessment.
- Recommendations for otter, birds and invasive plants are outlined in relevant sections below.
- Given that there are clear hydrological, and potential ecological links to European sites, it is likely that preparation of an NIS will be required.

4.2 Habitats

Eroding / upland watercourses could be negatively affected by the Project should any accidental pollution occur.

Higher value terrestrial habitats such as hedgerows, treelines, drainage ditches and wet grasslands could be permanently or temporarily lost due to the Project.

Recommendations:

- Appropriate mitigation should be outlined in the Water and Biodiversity EIAR chapters as required to avoid damage to riparian habitats e.g. HDD should be employed for watercourse crossings.
- Land-take of higher value terrestrial habitats such as wet grassland, hedgerows and treelines should be minimised and reinstated after construction where possible.
- Hedgerows and treelines due to be lost will need to be replaced as part of compensatory planting / creation within the Project Site as recommended by the Kilkenny City and County Development Plan 2021-2027 and Carlow County Development Plan 2022-2028[6]. This could also include enhancing the electricity substation area via planting new hedgerows or enhancing existing 'gappy' treelines to provide screening.

4.3 Plants

Invasive salmonberry and non-native box-honeysuckle, montbretia and snowberry could be spread along the electricity line route, which could have ecological and biodiversity implications.

Recommendations:

- Invasive species should be searched for during the extended habitat survey, as some could have been missed because the scoping visit was undertaken outside the optimal botanical survey season.
- An invasive species management plan should be submitted as recommended by Kilkenny City and County Development Plan 2021-2027 and Carlow County Development Plan 2022-2028[6].

4.4 Birds

Nesting, roosting and foraging non-QI birds could be disturbed or displaced by the Project, with damp grasslands, hedgerows, treelines and conifer plantation representing the most important habitats for birds. Key groups with the most potential to be affected by the Project include waders using damp grassland habitats and passerines breeding in scrub, hedgerow and treelines.

Recommendations:

- The breeding wader surveys (which will also record any other birds of conservation concern) being currently undertaken will help provide the relevant ornithological baseline information for assessment within the EIAR biodiversity chapter and AA.

[6] https://www.kilkennycoco.ie/eng/services/planning/development-plans/city-and-county-development-plan/vol1-master-ccdp-2-11-2021.pdf and https://consult.carlow.ie/en/consultation/carlow-county-development-plan-2022-2028/chapter/chapter-10-natural-and-built-heritage Both last accessed 14/05/2024

- The extended habitat survey should search for any nests or nesting habitat for birds within the development footprint to be conducted during the bird nesting season 1st March to 31st August.
- No additional bird surveys are recommended.
- Appropriate mitigation measures should be outlined in the Biodiversity EIAR chapter as required.
- Enhancement measures should be considered such as swift towers and bird boxes within the Project Site.

4.5 Mammals

The only terrestrial mammal signs or sightings recorded by the scoping visit included non-native rabbit burrows, a badger latrine and mammal burrows (confirmed not to be badger).

There were also a small number of trees with moderate potential to act as bat roosts and a treeline with moderate-high potential for commuting / foraging bats. Thus, bat roosts and commuting / foraging features could be affected due to the Project.

Recommendations (note otters are considered under aquatic ecology):

- The extended habitat survey should search for signs of any mammals that could have moved into the Project Site in the interim period.
- An inspection of the bridge spanning the Moanmore stream should also be undertaken for bat roosting potential if 1) the On-Road Cable Route is chosen and 2) it is likely the bridge could be disturbed by construction works, with emergence surveys to be undertaken if required.
- The Off-Road Cable Route should be adjusted where possible to avoid damage to mature trees and treelines, which will prevent damage to potential bat roosting, commuting and foraging features.
- If this cannot be implemented, a full roost inspection of moderate to high potential bat roosts should be undertaken as part of the extended habitat survey and depending on these results, emergence surveys undertaken if required.
- Appropriate mitigation measures should be outlined in the Biodiversity EIAR chapter as required.
- Enhancement measures should be considered such as bat boxes within the Project Site.

4.6 Amphibians and Reptiles

Common frog were recorded in the vicinity of the electrical control units. No other amphibians or reptiles were recorded by the scoping visit but smooth newt could be present. If any amphibians breed within these wet habitats these could be lost or affected by the Project.

Recommendations:

- Amphibians and reptiles should be searched for during the extended habitat survey.
- Appropriate mitigation measures should be outlined in the Biodiversity EIAR chapter as required.
- Enhancement measures should be considered such as provision of amphibian hibernacula within the Project Site.

4.7 Invertebrates

No rare or protected invertebrates were recorded by the scoping visit and it is unlikely that any key habitats for this group will be affected by the Project.

Recommendations:

- Rare and protected invertebrates should be searched for during the extended habitat survey.
- Appropriate mitigation measures should be outlined in the Biodiversity EIAR chapter as required.
- Enhancement measures should be considered such as insect hotels and managing field margins for pollinators within the Project Site.

4.8 Aquatic Ecology

There are no desktop records of important aquatic receptors at any watercourse crossing intersected by the Project.

Recommendations:

- If the On-Road Cable Route is chosen, surveys should be undertaken 150 m either side of the Moanmore stream crossing to search for otter holts. This survey could be undertaken as part of the extended habitat survey.
- HDD should be used to cross watercourses to minimise the risk of any negative effects for aquatic receptors.
- If HDD cannot be used, a dedicated aquatic survey to search for white-clawed crayfish, freshwater pearl mussel, lamprey spp. and salmonids should be carried out by an aquatic ecologist at any time outside end-May to July. This should involve manual or eDNA searches within 100-200 m of the watercourse crossings[7]. While the results of this survey are unlikely to alter the mitigation measures likely to be proposed, it will provide a more accurate baseline and thus, impact assessment.
- Appropriate mitigation measures should be outlined in the Water and Biodiversity EIAR chapters as required.

[7] https://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf Last accessed 14/05/2024

Appendix A Designated Nature Conservation Sites

Scoping & Constraints Report

White Hill Wind Farm Electricity Substation and Grid Connection

White Hill Wind Farm Ltd

SLR Project No.: 501.065165.00001

13 May 2024

Table A-1 shows the designated nature conservation sites recorded within 15 km of the Project Site. An SAC or SPA supersedes that of a pNHA designation and so in cases where an SAC or SPA overlaps with a pNHA, details of the pNHA have not been reported.

Table A-1: Designated Nature Conservation Sites within 15 km of Project Site

Site Code	Site Name	Distance and Direction from Project Site	Qualifying Interests	Likely Connectivity
SACs				
002162	River Barrow and River Nore SAC	2.4 km east	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Reefs [1170] • *Salicornia* and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • European dry heaths [4030] • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] • Petrifying springs with tufa formation (Cratoneurion) [7220] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	• Downstream hydrological connection from Project to SAC via Paulstown stream (Common Cable Route), Moanmore 14 (On-Road Cable Route) and Shankill 14 (Common Cable Route and On-Road Cable Route) • Potential ecological connection via mobile ex situ otter, salmonids and lamprey spp

Site Code	Site Name	Distance and Direction from Project Site	Qualifying Interests	Likely Connectivity
			• Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] • *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Austropotamobius pallipes* (White-clawed Crayfish) [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Trichomanes speciosum* (Killarney Fern) [1421] • *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	
000770	Blackstairs Mountains SAC	14.8 km southeast	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030]	• No likely connectivity
SPAs				
004233	River Nore SPA	12 km west	• Kingfisher (*Alcedo atthis)* [A229]	• No likely connectivity
NHAs				

Site Code	Site Name	Distance and Direction from Project Site	Qualifying Interests	Likely Connectivity
002382	Coan Bogs NHA	7.4 km north	• Peatlands [4]	• No likely connectivity
pNHAs				
000855	Whitehall Quarries pNHA	438 m west	• Dry acidic habitats • Nesting raptors	• No likely connectivity
000408	Mothel Church, Coolcullen pNHA	4.2 km northwest	• Nursery colony of Natterer's bat *Myotis nattereri*	• No likely connectivity
000797	Ballymoon Esker pNHA	6.4 km east	• Esker habitats	• No likely connectivity
000401	Dunmore Cave pNHA	9.9 km west	• Fen and peat habitats	• No likely connectivity
000832	Esker Pits pNHA	10.7 km west	• Esker, acidic lake and wetland habitats	• No likely connectivity
001859	Red Bog, Dungarvan pNHA	10.9 km southwest	• Wetland habitats including fen	• No likely connectivity
000845	Newpark Marsh pNHA	11.7 km southwest	• Marsh habitats • Feeding site for Leisler's bat *Nyctalus leisleri*, brown long-eared bat *Plecotus auratus* and common pipistrelle *Pipistrellus pipistrellus*	• No likely connectivity
001914	Lough Macask pNHA	13.4 km west	• Wetland habitats	• No likely connectivity

Appendix B Figures

Scoping & Constraints Report

White Hill Wind Farm Electricity Substation and Grid Connection

White Hill Wind Farm Ltd

SLR Project No.: 501.065165.00001

13 May 2024

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664000
666000
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Baunreagh
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LEGEND

Proposed Wind Farm Site Boundary

Proposed Cable Route

Off-Road Option

Public Road Option

Proposed Control Centre

Proposed Substation Boundary

0 1 2
Kilometres

White Hill Wind Farm

SLR
7 DUNDRUM BUSINESS PARK
WINDY ARBOUR
DUBLIN D14 N2Y7
IRELAND
T: 0129 64667
www.slrconsulting.com

WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.1

Scale: 1:20,000 @ A3

Date: APRIL 2024

501.065427.00001.0004.0 Project Site Overview

Aerial Imagery (2022) Source: World Imagery: Maxar, Microsoft
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

660500
661000
661500
665000
664500
501.065427.00001.0001.0 Project Site

N

Baunreagh

0
250
500
Metres

LEGEND

Proposed Wind Farm Site Boundary

Proposed Cable Route

Off-Road Option

Public Road Option

Proposed Control Centre

White Hill Wind Farm

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7 DUNDRUM BUSINESS PARK
WINDY ARBOUR
DUBLIN D14 N2Y7
IRELAND
T: 0129 64667
www.slrconsulting.com

WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.2

Scale 1:5,000 @ A3

Date APRIL 2024

Aerial Imagery (2022) Source: World Imagery: Maxar, Microsoft
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

662000
662500
663000
665000
664500
664000
501.065427.00001.0001.0 Project Site

Baunreagh

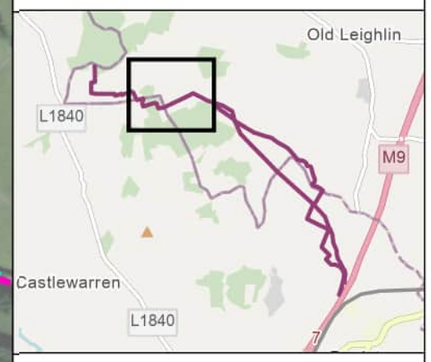
N

LEGEND

Proposed Cable Route

Off-Road Option

Public Road Option



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White Hill Wind Farm

SLR
7 DUNDRUM BUSINESS PARK
WINDY ARBOUR
DUBLIN D14 N2Y7
IRELAND
T: 0129 64667
www.slrconsulting.com

WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.3

Scale 1:5,000 @ A3

Date APRIL 2024

Aerial Imagery (2022) Source: World Imagery: Maxar, Microsoft
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

663000
663500
664000
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664000
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501.065427.00001.0001.0 Project Site

Lackan

N

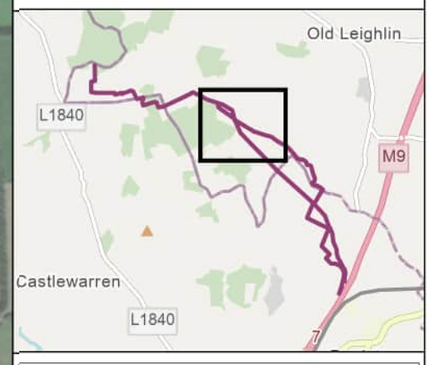
0
250
500
Metres

LEGEND

Proposed Cable Route

Off-Road Option

Public Road Option



White Hill Wind Farm

SLR
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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.4

Scale 1:5,000 @ A3

Date APRIL 2024

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664500
665000
665500
663500
663000
662500
501.065427.00001.0001.0 Project Site

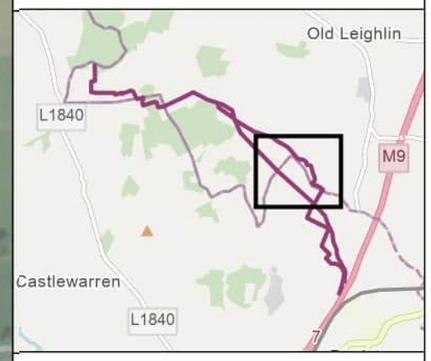
N

LEGEND

Proposed Cable Route

Off-Road Option

Public Road Option



Cranrue

0 250 500

Metres

White Hill Wind Farm

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.5

Scale 1:5,000 @ A3

Date APRIL 2024

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664500 665000 665500 666000

662000

661500

Cranrue

N

0 250 500

Metres

LEGEND

Proposed Cable Route

Off-Road Option

Public Road Option

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.6

Scale	Date
1:5,000 @ A3	APRIL 2024

501.065427.00001.0001.0 Project Site

Aerial Imagery (2022) Source: World Imagery: Maxar, Microsoft
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665000
665500
666000
661500
661000
660500
501.065427.00001.0001.0 Project Site

N

Shankill

M9

0
250
500
Metres

LEGEND

Proposed Cable Route
Off-Road Option
Public Road Option
Proposed Substation Boundary

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

PROJECT SITE

FIGURE 1.7

Scale: 1:5,000 @ A3

Date: APRIL 2024

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650000 660000 670000 680000

680000

670000

660000

501.065427.00001.0005.0 Designations

Lisbigney Bog pNHA
Lisbigney Bog SAC
Ballyouskill
Attanagh
River Nore/Abbeyleix Woods Complex pNHA
Ballyragget
Inchbeg pNHA
Ardaloo Fen pNHA
Esker Pits pNHA
Dunmore Cave pNHA
Ballyfoyle
Dunmore Complex pNHA
Lough Macask pNHA
Newpark Marsh pNHA
Kilkenny
Archersgrove pNHA
River Nore SPA
Ballykeefe Wood pNHA
Greatwood
Bennettsbridge
County Kilkenny
Dunbell
Gowran
Goresbridge
Red Bog, Dungarvan pNHA
Clohastia pNHA
Clashganny
Borris
Blackstairs Mountains pNHA
Blackstairs Mountains SAC
Ballymurphy
Fennagh
Ballymoon Esker pNHA
Myshall
Whitehall Quarries pNHA
Castlewarren
Paulstown
Muine Bheag
Old Leighlin
Leighlinbridge
Mothel Church, Coolcullen pNHA
River Barrow And River Nore SAC
Muckalee
Coan
Coan Bogs NHA
Coan Bogs NHA
Castlecomer
Glenmullen Wood
Clogh
Ballinabrannagh
Cloghristick Wood pNHA
Tinryland
Nurney
Carlow
Oakpark pNHA
Ardristan Fen pNHA
Slaney River Valley SAC
County Carlow
Ballon

0 5 10
Kilometres

LEGEND

- Proposed Control Centre Location
- Proposed Substation Location
- Proposed Cable Route
- Proposed Control Centre, Substation and Cable Route 15 km Buffer
- Special Area Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)
- Natural Heritage Area (NHA)

Leinster
Wicklow Mountains National Par
Kilkenny
Waterford

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

DESIGNATED NATURE CONSERVATION SITES

FIGURE 2

Scale 1:130,000 @ A3

Date APRIL 2024

660000 662000 664000 666000

664000

662000

Baunreagh

Lackan

M9

M9

Muine Bheag

M9

N

0 1 2

Kilometres

LEGEND

Proposed Wind Farm Site Boundary

Proposed Cable Route

Off-Road Option

Public Road Option

Proposed Control Centre

Proposed Substation Boundary

Survey Result

Amphibian

Bird Feature

Habitat

Non-bat Mammal Feature

Bat Feature

Bat Feature

Habitat

Invasive Plant

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.1

Scale 1:20,000 @ A3

Date APRIL 2024

501.065427.00001.0003.0 Survey Results Overview

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660500
661000
661500
665000
664500
501.065427.00001.0002.0 Survey Results

Frog Sighting
Salmonberry
Rabbit Burrows
Baunreagh

N

0
250
500
Metres

LEGEND

Proposed Wind Farm Site Boundary

Proposed Cable Route

Off-Road Option

Public Road Option

Proposed Control Centre

Survey Result

Amphibian

Non-bat Mammal Feature

Invasive plant

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.2

Scale 1:5,000 @ A3

Date APRIL 2024

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662000
662500
663000
665000
664500
664000
501.065427.00001.0002.0 Survey Results

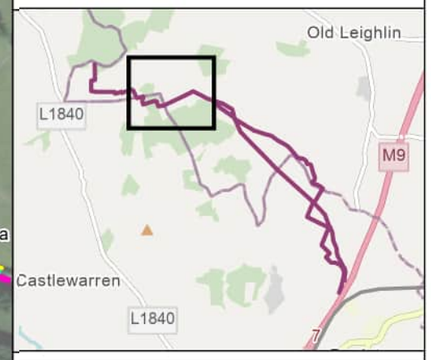
Baunreagh
Wet Grassland
Stream
Wet Grassland
Paulstown Stream Watercourse Crossing
Lonicera

N

0
250
500
Metres

LEGEND

Proposed Cable Route
Off-Road Option
Public Road Option
Survey Result
Habitat
Habitat
Invasive plant



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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.3

Scale 1:5,000 @ A3

Date APRIL 2024

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663000
663500
664000
664500
664000
663500

N

Lonicera

Lackan

Wet Fields

Wet Fields

Scrub

Wet Fields

Meadow Pipit

Wet Fields

0
250
500
Metres

LEGEND

Proposed Cable Route

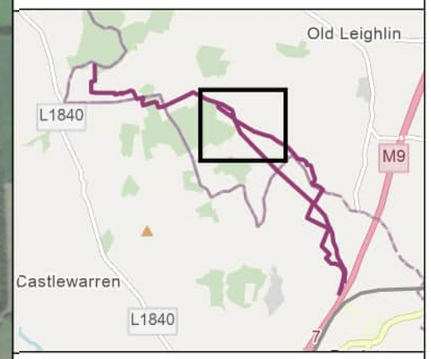
Off-Road Option

Public Road Option

Survey Result

Bird Feature

Invasive plant



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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.4

Scale 1:5,000 @ A3

Date APRIL 2024

501.065427.00001.0002.0 Survey Results

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664500
665000
665500
663500
663000
662500

N

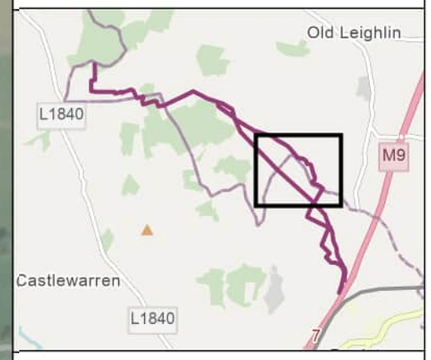
Meadow Pipit
Wet Fields
Mature Tree
Badger Latrine
Possible Roost In Bridge
Moanmore 14 Watercourse Crossing
Cranrue

0 250 500
Metres

LEGEND

Proposed Cable Route
- Off-Road Option
- Public Road Option

Survey Result
- Bird Feature
- Non-bat Mammal Feature
- Bat Feature
- Habitat
- Invasive plant



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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.5

Scale: 1:5,000 @ A3
Date: APRIL 2024

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664500 665000 665500 666000

662000

661500

501.065427.00001.0002.0 Survey Results

Badger Latrine

Possible Roost In Bridge

Moanmore 14 Watercourse Crossing

Cranrue

Montbretia

Mature Tree

Shankill 14 Watercourse Crossing

Mature Tree

Mature Tree

Mature Tree

Commuting and Foraging Habitat

N

0 250 500

Metres

LEGEND

Proposed Cable Route

Off-Road Option

Public Road Option

Survey Result

Non-bat Mammal Feature

Bat Feature

Bat Feature

Habitat

Invasive plant

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.6

Scale 1:5,000 @ A3

Date APRIL 2024

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665000
665500
666000
661500
661000
660500

Mature Tree
Mature Tree
Commuting and Foraging Habitat
Mature Trees
Shankill
Shankill 14 Watercourse Crossing
Shankill 14 Watercourse Crossing
Mammal Burrows
M9

N

0
250
500
Metres

LEGEND

Proposed Cable Route
- Off-Road Option
- Public Road Option
- Proposed Substation Boundary

Survey Result
- Non-bat Mammal Feature
- Bat Feature
- Bat Feature
- Habitat

White Hill Wind Farm

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WHITE HILL WIND FARM SUBSTATION AND GRID CONNECTION

CONSTRAINTS REPORT

SURVEY RESULTS

FIGURE 3.7

Scale	Date
1:5,000 @ A3	APRIL 2024

501.065427.00001.0002.0 Survey Results

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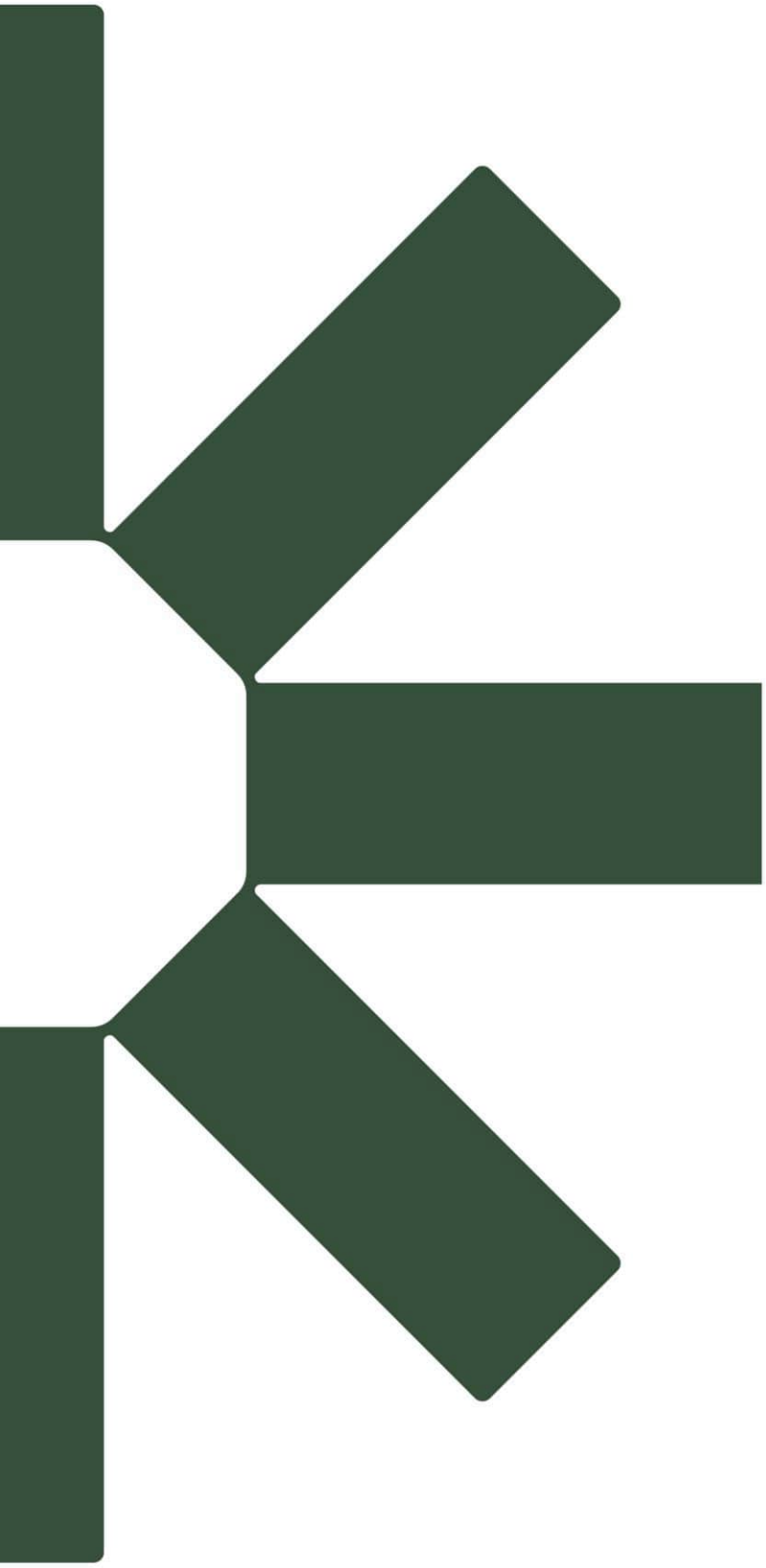


Making Sustainability Happen

Annex 3 –
Land, Soil & Water Scoping Report

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co.Waterford
Ireland

tel: +353 (0)58 44122
fax: +353 (0)58 44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

WHITE HILL WIND FARM ELECTRICITY SUBSTATION & GRID CONNECTION, COUNTY CARLOW/KILKENNY

Land, Soils and Water Scoping Assessment

FINAL REPORT

Prepared for:
WHITE HILL WIND LIMITED

Prepared by:
HYDRO-ENVIRONMENTAL SERVICES

REPORT NO.: P1547-2
REPORT DATE: 28th May 2024

DOCUMENT INFORMATION

DOCUMENT TITLE:	**WHITE HILL WIND FARM ELECTRICITY SUBSTATION & GRID CONNECTION, COUNTY CARLOW/KILKENNY – LAND, SOILS AND WATER SCOPING ASSESSMENT**
ISSUE DATE:	**28TH MAY 2024**
PROJECT NUMBER:	**P1547-2**
PROJECT REPORTING HISTORY:	**P1547-0** **P1547-1**
CURRENT REVISION NO:	**FINAL REV F0**
AUTHORS:	**DAVID BRODERICK** **JENNY LAW** **MICHAEL GILL**
SIGNED:	 _____ **MICHAEL GILL B.A., B.A.I., M.SC. DIP. GEOL, MIEI, MCIWEM** **MANAGING DIRECTOR – HYDRO-ENVIRONMENTAL SERVICES**

TABLE OF CONTENTS

FIGURES (IN TEXT)

TABLES

1. INTRODUCTION

1.1 OVERVIEW

Hydro-Environmental Services (HES) was commissioned by Galetech Energy Services (GES) on behalf of White Hill Wind Ltd to undertake a desktop Land, Soil and Water Scoping Assessment for the proposed White Hill Wind Farm Electricity Substation & Grid Connection ('the project').

The project will be located in west County Carlow and east County Kilkenny, c. 3km west of Bagenalstown, c. 15km southwest of Carlow and c. 15km east of Kilkenny City.

The purpose of this scoping assessment is to identify potential receptors in the local (and downstream) geological, hydrological and hydrogeological environments that could potentially be affected by the project. A brief overview of the potential receptors is 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 project;
- To identify any geological, hydrological and hydrogeological receptors/constraints that may affect the project 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 based on a desk study assessment. A site visit has not yet been undertaken to confirm the findings of this report.

1.2 PROJECT DESCRIPTION

The project will comprise the following elements:

- A 110kv electricity substation (including all associated electrical apparatus and a battery energy storage system) located in the townland of Shankill, Paulstown, Co. Kilkenny;
- Approximately 8.5km of underground electricity line between the 110kV electricity substation and the White Hill Wind Farm; and
- Electrical control units located to the immediate south of the White Hill Wind Farm.

2 no. separate routes for the underground electricity line are being considered; one of which is predominately located within private lands (Option A) with short sections located within public roads; while Option B is predominately located within the carriageway of public roads with short sections located within private lands.

The permitted wind farm site, proposed 2 no. underground electricity line routes and substation are shown below in **Figure A**.

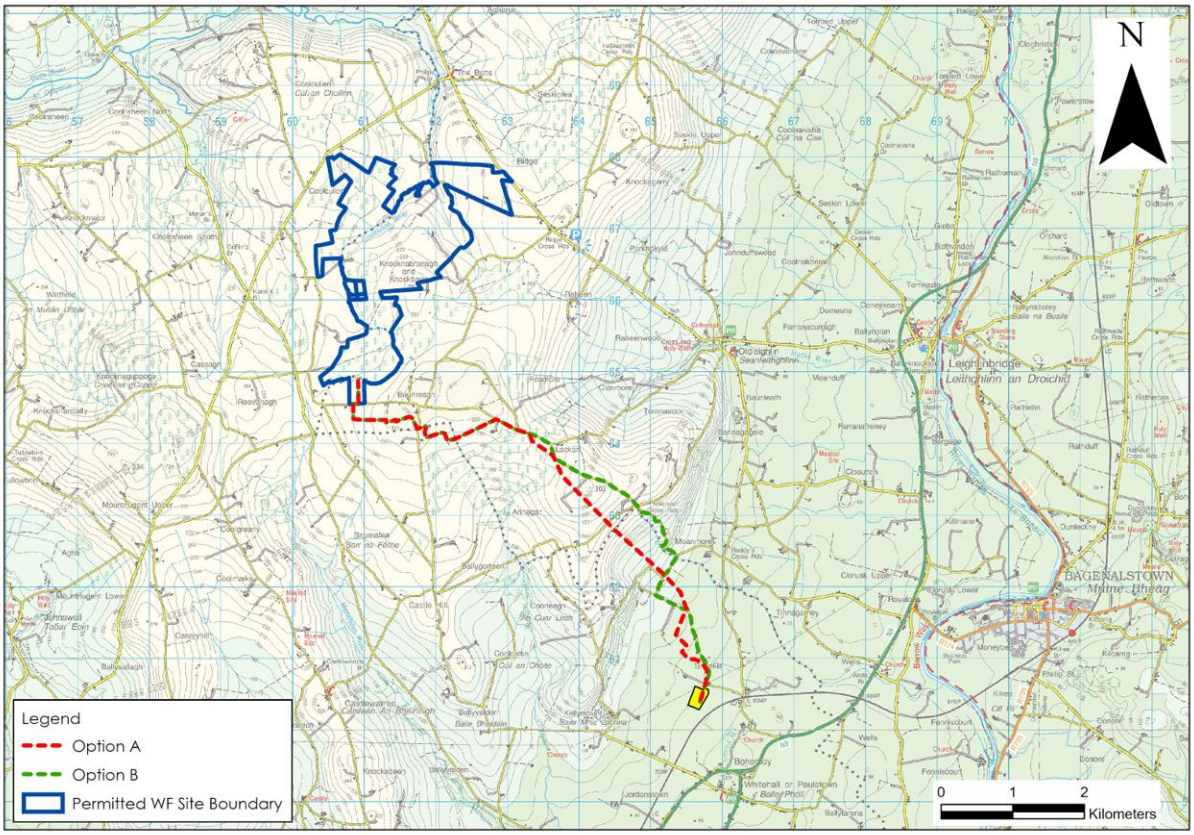


Figure A: Site Location Map

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 project location and the surrounding area was completed using the following data sources:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 19 (Geology of Carlow - Wexford); Geological Survey of Ireland (GSI, 1994);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow); Geological Survey of Ireland (GSI, 1994);
- Geological Survey of Ireland – Groundwater Bodies Initial Characterisation Report - Draft (2004); and,
- OPW Flood Maps (www.floodinfo.ie);

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 study area 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
Very High	• Attribute has a high quality, significance or value on a regional or national scale. • Degree or extent of soil contamination is significant on a national or regional scale. • Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	• Geological feature rare on a regional or national scale (NHA/SAC). • Large existing quarry or pit. • Proven economically extractable mineral resource.
High	• Attribute has a high quality, significance or value on a local scale. • Degree or extent of soil contamination is significant on a local scale. • Volume of peat and/or soft organic soil underlying site is significant on a local scale.	• Contaminated soil on site with previous heavy industrial usage. • Large recent landfill site for mixed wastes. • Geological feature of high value on a local scale (County Geological Site). • Well drained and/or high fertility soils. • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resource.
Medium	• Attribute has a medium quality, significance or value on a local scale. • Degree or extent of soil contamination is moderate on a local scale. • Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	• Contaminated soil on site with previous light industrial usage. • Small recent landfill site for mixed Wastes. • Moderately drained and/or moderate fertility soils. • Small existing quarry or pit. • Sub-economic extractable mineral resource.
Low	• Attribute has a low quality, significance or value on a local scale. • Degree or extent of soil contamination is minor on a local scale. • Volume of peat and/or soft organic soil underlying site is small on a local scale.	• Large historical and/or recent site for construction and demolition wastes. • Small historical and/or recent landfill site for construction and demolition wastes. • Poorly drained and/or low fertility soils. • Uneconomically extractable mineral resource.

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

Importance	Criteria	Typical Example
Extremely High	• Attribute has a high quality or value on an international scale.	• 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.
Very High	• Attribute has a high quality or value on a regional or national scale.	• River, wetland or surface water body ecosystem protected by national legislation – NHA status. • Regionally important potable water source supplying >2500 homes. • Quality Class A (Biotic Index Q4). • Flood plain protecting more than 50 residential or commercial properties from flooding. • Nationally important amenity site for wide range of leisure activities.
High	• Attribute quality or value on a local scale.	• Salmon fishery Locally important potable water source supplying >1000 homes. • Quality Class B (Biotic Index Q3-4). • Flood plain protecting between 5 and 50 residential or commercial properties from flooding. • Locally important amenity site for wide range of leisure activities.
Medium	• Attribute has a medium quality or value on a local scale.	• Coarse fishery. • Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3). • Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	• Attribute has a low quality or value on a local scale.	• Locally important amenity site for small range of leisure activities. • Local potable water source supplying <50 homes. • Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1residential or commercial property from flooding. • Amenity site used by small numbers of local people.

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

Importance	Criteria	Typical Example
Extremely High	• Attribute has a high quality or value on an international scale.	• Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	• Attribute has a high quality or value on a regional or national scale.	• Regionally Important Aquifer with multiple wellfields. • Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status. • Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	• Attribute quality or value on a local scale.	• Regionally Important Aquifer Groundwater • Provides large proportion of baseflow to local rivers. • Locally important potable water source supplying >1000 homes. • Outer source protection area for regionally. • important water source. • Inner source protection area for locally important water source.
Medium	• Attribute has a medium quality or value on a local scale.	• Locally Important Aquifer • Potable water source supplying >50 homes. • Outer source protection area for locally important water source.
Low	• Attribute has a low quality or value on a local scale.	• Poor Bedrock Aquifer Potable water source supplying <50 homes.

2. EXISTING ENVIRONMENT

2.1 SITE DESCRIPTION & TOPOGRAPHY

The proposed 110kV substation site is located in the townland of Shankill, Paulstown, Co. Kilkenny. The proposed location is situated within agricultural lands adjacent to the M9 motorway on its western side. Refer to **Figure A** above for location map.

Topography at the substation location is mapped as relatively flat, with lands sloping slightly eastwards. Overall site elevations range between approximately 69 and 73m OD (Ordnance Datum).

The electrical control units are located to the south of the permitted White Hill Wind Farm, within the townland of Baunreagh, Co. Carlow. The proposed location is situated in agricultural lands. Forest and semi-natural areas surround the proposed location to the north and east.

The electrical control units are in an upland setting where topography in the area is hilly. The elevation of the proposed location is approximately 280m OD.

Each of the 2 no. electricity line route options exit the permitted wind farm site and travel in a general southeasterly direction.

The main distinction between the routes is that one is mapped mostly off-road within private lands, Option A (refer to **Figure A**); whilst Option B is mainly within the public road corridor. Option A largely occupies lands that are depicted as agricultural pastures from Corine Land use mapping and aerial imagery.

The ground elevations along each of the route options generally decreases from ~280m OD at the electrical control units to ~70m OD at the electricity substation. However, due to the hilly nature of the topography along the routes, highest elevations along the routes reach ~310m OD.

2.2 SUPERFICIAL GEOLOGY

Based on the GSI/Teagasc soils mapping (www.gsi.ie) the substation location is overlain by poorly drained, mainly basic mineral soils (BminPD). The location of the electrical control units is mapped as shallow acid poorly drained mineral soils (AminSP).

The mapped soil types along each of the underground electricity line routes are much alike and chiefly consist of a mixture of acidic natured soils such as shallow well drained mineral soils (AminSW), poorly drained mineral soils (AminPD), deep well drained mineral soils (AminDW), Shallow, rocky, peaty/non-peaty mineral complexes (AminSRPT) and poorly drained mineral soils (AminSP). Alluvium soils are mapped briefly (~400m section) along Route Option B, where the Shankill 1st order stream nears the local road towards the southern section of the route.

GSI subsoils mapping (www.gsi.ie) show that Till derived from limestones (TLs) is mapped to underly the proposed substation. There is little subsoil coverage in the more upland areas underlying the electrical control building as Bedrock outcrop/subcrop (Rck) is mapped here by the GSI.

Similarly, there is little subsoil coverage mapped to underly much of the 2 no. routes as Bedrock outcrop/subcrop (Rck) is dominant throughout each. Any subsoils that are mapped along both of the routes are chiefly Till derived from Namurian sandstones and shales (TNSSs).

As the routes progress nearer to the substation location, the subsoils are mapped as Till derived from limestones (TLs).

Alluvium subsoils are also mapped briefly along Route Option B as described above for soils.

Based on criteria at **Table A** above, the local soils and subsoils have a Low to Medium Importance.

A GSI subsoil geology map is illustrated at **Figure B** below.

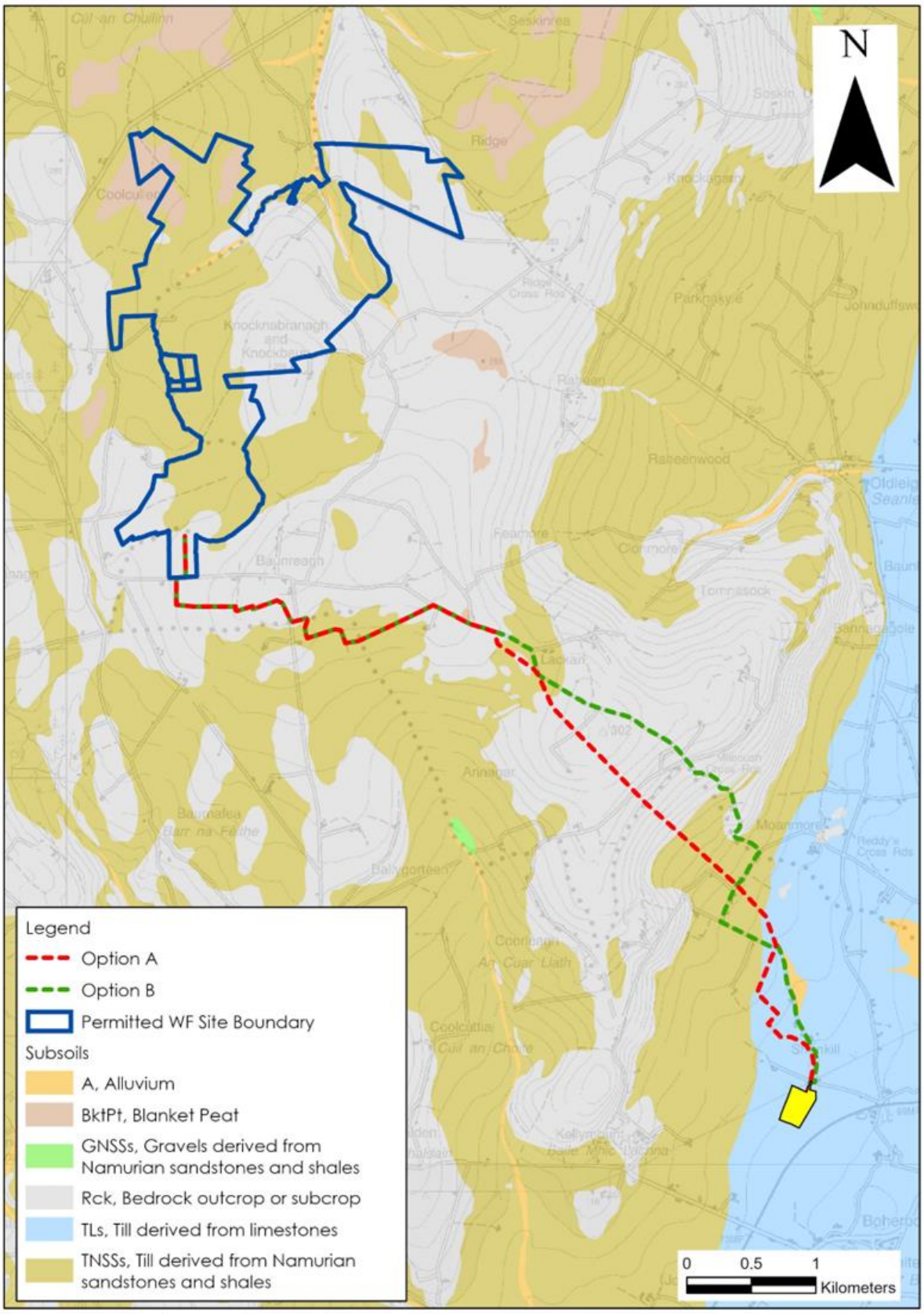


Figure B: GSI Local Subsoils Maps

2.3 BEDROCK GEOLOGY

Based on the GSI bedrock mapping (www.gsi.ie), the substation location is underlain by Dinantian aged Limestones, more specifically the Ballyadams Formation. The Ballyadams Formation is known to consist of crinoidal wackestone/packstone limestones.

The electrical control units are mapped to be underlain by Westphalian aged shales of the Coolbaun Formation, which is described by the GSI as consisting of shales and sandstone with thin coals.

Both electricity line route options cross a series of non-calcareous and then calcareous bedrock lithologies as they progress south-eastwards from the electrical control units towards the substation location as illustrated at **Figure C** below.

There are no mapped faults within the substation location or the location of the electrical control units. However, there is 1 no. fault that is mapped to intercept both electricity line route options. This fault line is likely to have no consequence for the project due to the shallow nature of the proposed works.

According to the GSI, natural resource mapping, both areas of the substation site and the electrical control units have a 'moderate' crushed aggregate potential and neither area is mapped as having any potential for granular aggregate.

The bedrock underlying the majority of the electricity line routes have similar aggregate potential as described above, however, there are smaller sections along each of the routes that are mapped to have 'high to very high' crushed aggregate potential.

Based on criteria at **Table A** above and the GSI aggregate potential, the local bedrock underlying the substation and the electrical control units is of Medium Importance. Meanwhile, the bedrock along the electricity line routes is of Low to Very High Importance.

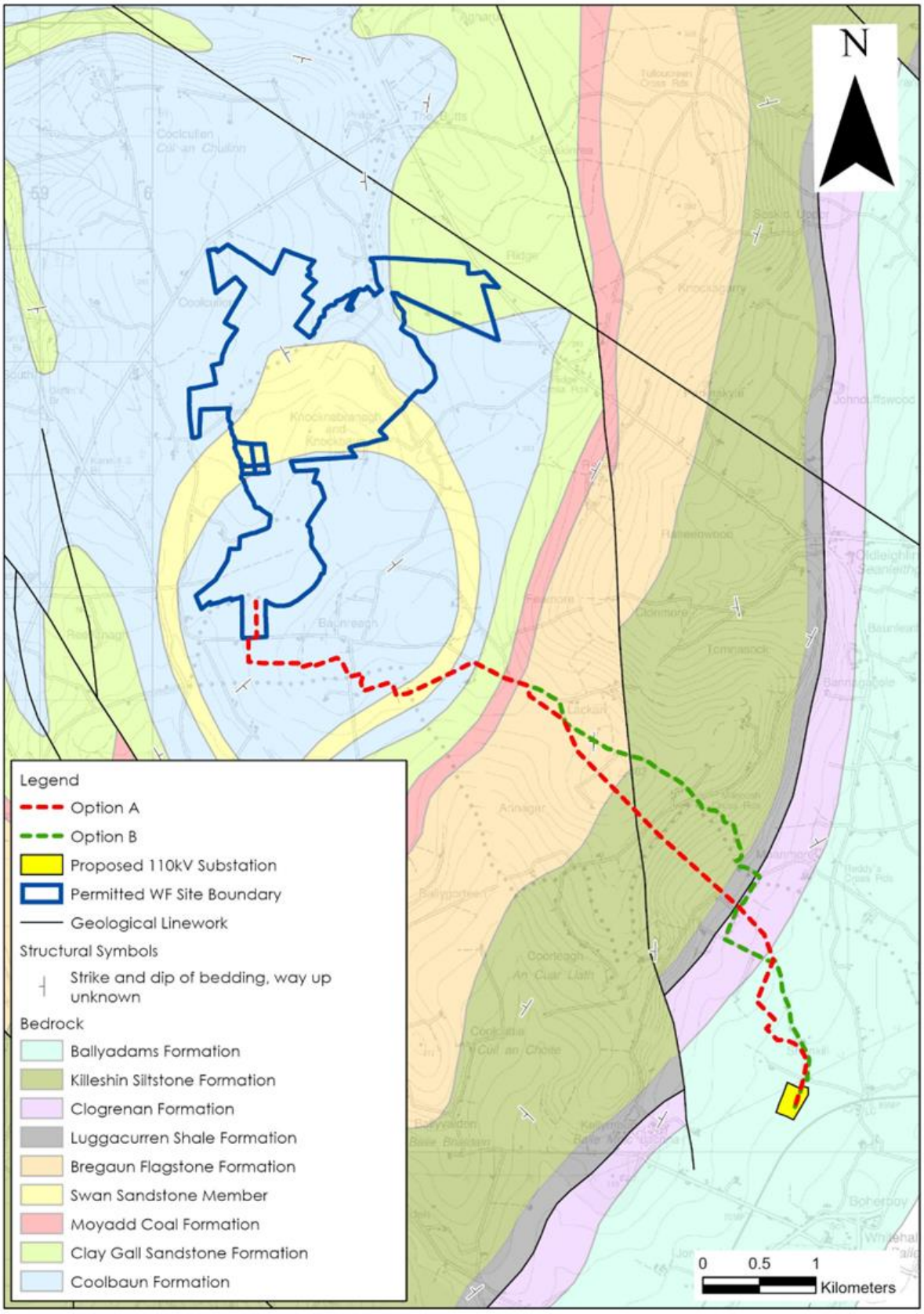


Figure C: Local Bedrock Geology Map

2.4 GEOLOGICAL HERITAGE SITES

No elements of the substation, the electrical control units or the electricity line route options are mapped within a geological heritage site.

The closest geological heritage site to the project is Bannagagole Quarry (Site Code CW004), a large and deep working quarry in the limestones of the Ballyadams Formation, which is located approximately 1.75km northeast of Route Option B, (at its nearest location to the site).

Ballyellin Quarry (Site Code: CW001), is a large working quarry located approximately 6.3km to the southeast of the substation location.

Another geological heritage site, Ballyfoyle Channels (Site Code: KK005), consisting of a series of deeply incised channels, is located approximately 7km to the west of the electrical control units.

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

2.5 HYDROLOGY & DRAINAGE

On a regional scale, the substation, electrical control units and Route Option A are located entirely within the River Barrow surface water catchment within Hydrometric Area 14.

For the most part, Route Option B is also mapped within the River Barrow surface water catchment, however a very small section of the route (~400m), on a local road within the town of Baunreagh, is mapped within the Nore surface water catchment within Hydrometric Area 15.

On a more local scale, the substation is located in the Barrow River sub - catchment (Barrow_SC_120) and the Moanmore_010 river sub basin. An unnamed tributary of the Moanmore River flows in an easterly direction, ~85m north of the substation location. The unnamed tributary confluences with the Shankill stream (EPA Code: 14S30), which in turn feeds into the Moanmore (EPA Code: 14M24). The Moanmore River discharges into the River Barrow ~3.3km east of the proposed substation.

The electrical control building is also mapped within the Barrow_SC_120 sub – catchment, whilst being situated in the Monefelim_010 river sub basin. The Monefelim River emerges ~740m to the southwest of the electrical control units. This watercourse flows to the southeast and discharges into the Barrow River approximately 12.5km from the proposed project.

Based on the EPA watercourse mapping, Route Option A will likely require 3 no. watercourse crossings on the following mapped watercourses:

- Paulstown stream (EPA Code: 14P06) within the Monefelim_030 river sub basin;
- Shankill 1st order stream (EPA Code: 14S30) within the Moanmore_010 river sub basin; and;
- The unnamed watercourse north of substation location within the Moanmore_010 river sub basin.

Based on the EPA watercourse mapping, Route Option B will likely require 3 no. watercourse crossings on the:

- Paulstown stream (EPA Code: 14P06) within the Monefelim_030 river sub basin;
- Moanmore 1st order stream (EPA Code: 14M24) within the Moanmore_010 river sub basin; and

- The unnamed watercourse north of substation location within the Moanmore_010 river sub basin

Additionally, Option B option runs alongside the Shankill 1st order stream (EPA Code: 14S30) within the Moanmore_010 river sub basin for ~1.3km.

The watercourse crossing numbers are estimated using the EPA mapping and additional crossings may be identified during the site walkover.

A local hydrology map is illustrated at **Figure D** below.

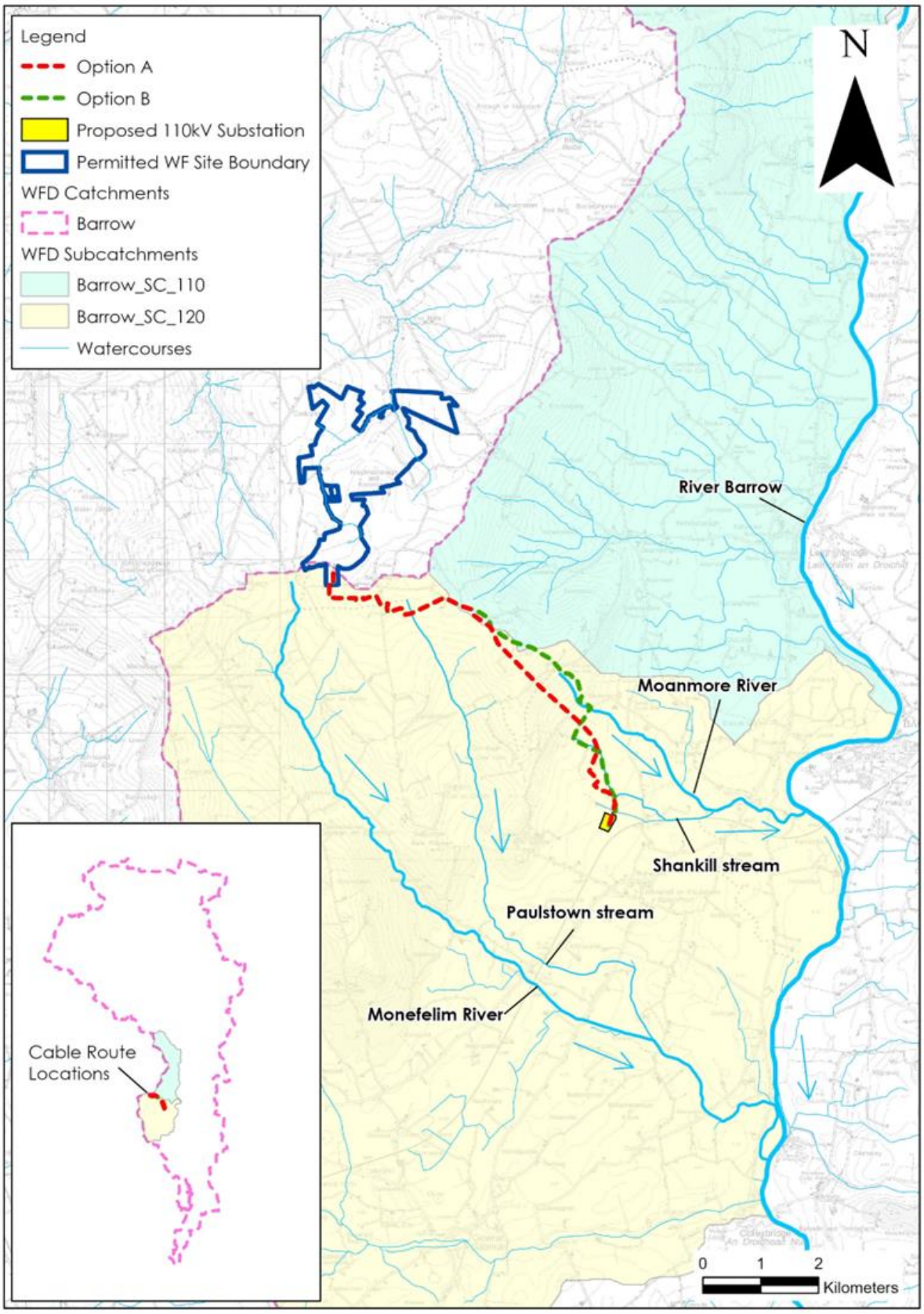


Figure D: Local Hydrology Map

2.6 WATERBODY QUALITY & STATUS

Biological Q-rating data for EPA monitoring points on nearby river water bodies are shown in **Table D** below.

Most recent data available (2023) show that the Q-rating ranges from 'Moderate' to 'High' in the vicinity of the electrical control units and electricity line route options. No Q-value monitoring stations are located within the Moanmore_010 river sub-basin, in the vicinity of the electricity substation.

Approximately 3.8km south of the electrical control units at Castlewarren Bridge, the Monefelim River achieves a Q-rating of 4-5 i.e. 'High Status'. The status of the Monefelim River deteriorates, with the Monefelim_030 river segment achieving a Q-rating of 3-4 i.e. 'Moderate' status.

Downstream of the Moanmore_010, in the vicinity of the substation location, the Barrow River achieved a Q-rating of Q3-4 'Moderate'.

Table D: EPA Biological Q-rating data

Station Name	River Waterbody	Year	Q-Value Score	Status
Castlewarren Br.	Monefelim_010	2023	Q4-5	High
Br SW of Garryduff Crossroads	Monefelim_020	2023	Q4	Good
Br u/s Barrow R confl (d/s side)	Monefelim_030	2023	Q3-4	Moderate
Goresbridge	Barrow_210	2023	Q3-4	Moderate

River Water Body status information is available for view from www.catchments.ie.

A summary of the status of surface water bodies (SWBs) immediately downstream of the proposed development is provided at **Table E** below.

Within the catchment areas of the substation and electrical control units, river water body status information is available for the Moanmore River and Monefelim River respectively. The Moanmore_010 SWB, which includes the unnamed tributary of the Moanmore River ~85m north of the substation location has been assigned an overall 'Good Status'. The Monefelim_010 achieved 'High Status' downstream of the electrical control units.

As both electricity line route options generally travel in a southeasterly direction towards the substation location, they are generally mapped to traverse over the same river sub basins, including the Monefelim_010 (as described above), the Monefelim_030, the Old Leighlin Stream_010 and the Moanmore_010 (as described above).

Route Option B is additionally mapped, for a brief distance (~400m) within the Dinin (South)_020 river sub basin in the Nore Catchment.

Along the route options, the Moanmore_010 and Monefelim_010 rivers achieved 'Good' and 'High' status as described above. The Monefelim_030 SWB has been assigned 'Moderate Status' whilst the Old Leighlin Stream_010 SWB achieved 'Good Status'.

While in the Nore River Catchment, Route Option B is briefly mapped within the Dinin (South)_020 river sub basin. The Dinin (South)_020 river has 'Good Status'.

Table E: Water Framework Directive (WFD) Summary Information for Surface Water Bodies

Regional Catchment	Water Body	Overall Status (2016-2021)	Development Infrastructure
Barrow	Monefelim_010	High	Electrical control units & Cable Route A and B
Nore	Dinin (South)_020	Good	Electricity Line Route Option B
Barrow	Monefelim_030	Moderate	Electricity Line Route Option A and B
Barrow	Old Leighlin Stream_010	Good	Electricity Line Route Option A and B
Barrow	Moanmore_010	Good	Electricity Substation and Electricity Line Route Option A and B

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

2.7 FLOOD RISK

To identify those areas as being at risk of flooding, the OPW's Past Flood Events Maps, the National Indicative Fluvial Mapping, CFRAM River Flood Extents, historical mapping (i.e. 6" and 25" base maps) and the GSI Groundwater Flood Maps were consulted. These flood maps are available to view at Flood Maps - Floodinfo.ie.

There are no areas on the historical 6" or 25" mapping in the area of the project that are identified as an area that is "*Liable to Floods*".

No recurring flood incidents were identified near the electricity substation or the electrical control units. A recurring flood event is however mapped along the electricity line route options at the L7117 local road in the townland of Lacken (Flood ID: 2959). The road is noted to be periodically impassable within the Bagenalstown Area Engineer Meeting – Minutes. The OPW's Flood Hazard Map for the area is illustrated at **Figure E** below.

There is no CFRAM mapping available for the area of the project. The nearest available CFRAM mapping is found along the main channel of the River Barrow downstream of the proposed project, as shown as **Figure F** below.

There is no National Indicative Fluvial Flood mapping for the Present-Day Scenario in the immediate vicinity of the project. Low and medium probability NIFM river flood zones are mapped along the Moanmore River approximately 1.8km east and downstream of the substation location, before its confluence with the Barrow River.

NIFM fluvial flood zones are also mapped along the Monefelim River, however these are at significant downstream distances from the project. For example, low and medium probability NIFM river flood zones are mapped along the Monefelim_010 River approximately 2.6km south and downstream of the electrical control units. Additionally, low and medium probability NIFM river flood zones are mapped along the Monefelim_030 River approximately 2.7km southeast and downstream of where the electricity line route options cross the Paulstown stream (EPA Code: 14P06).

The GSI's Winter 2015/2016 Surface Water Flood Map shows surface water flood extents for this winter flood event. This flood event is recognised as being the largest flood event on record in many areas. The flood map for this event does not record any flood zones in the area of the

project. The nearest mapped surface water flood zones are mapped along the main channel of the River Barrow further downstream of the project.

No modelled or historic groundwater flooding is mapped in the vicinity of the proposed project or surrounding lands.

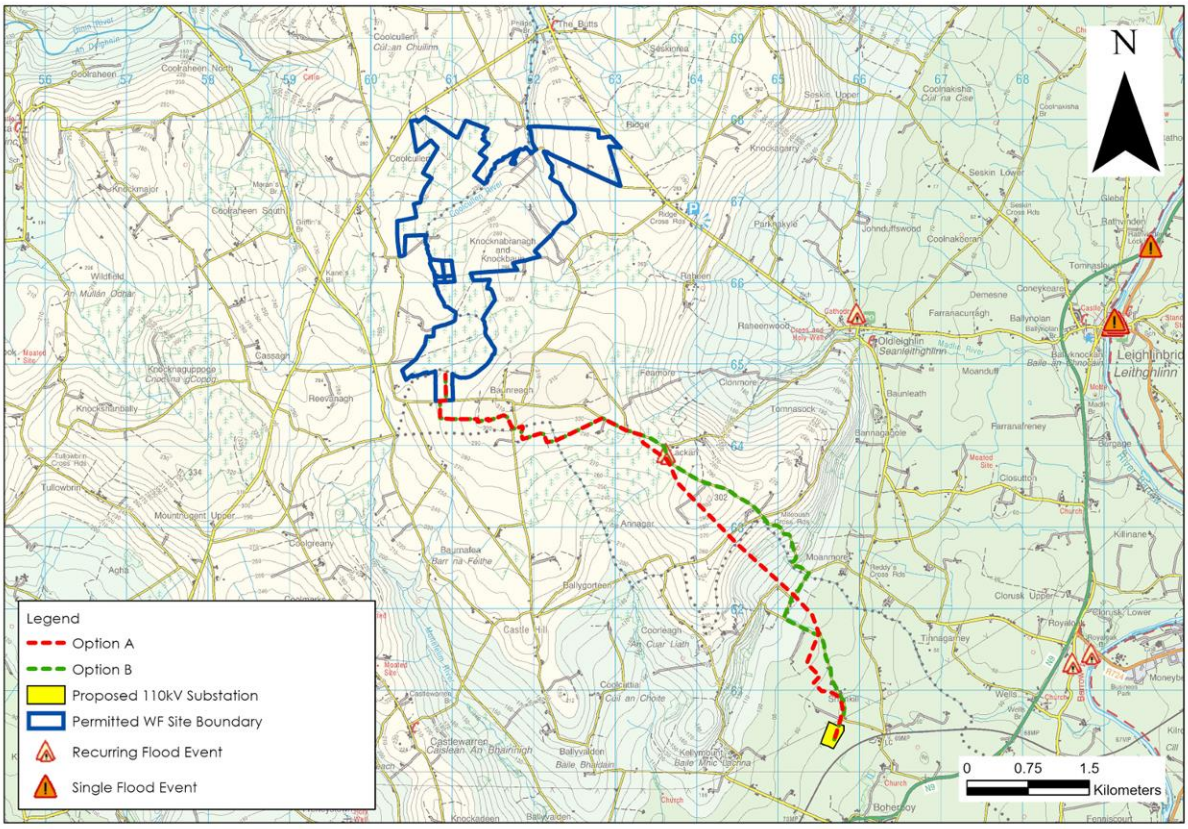


Figure E: OPW National Flood Hazard Mapping

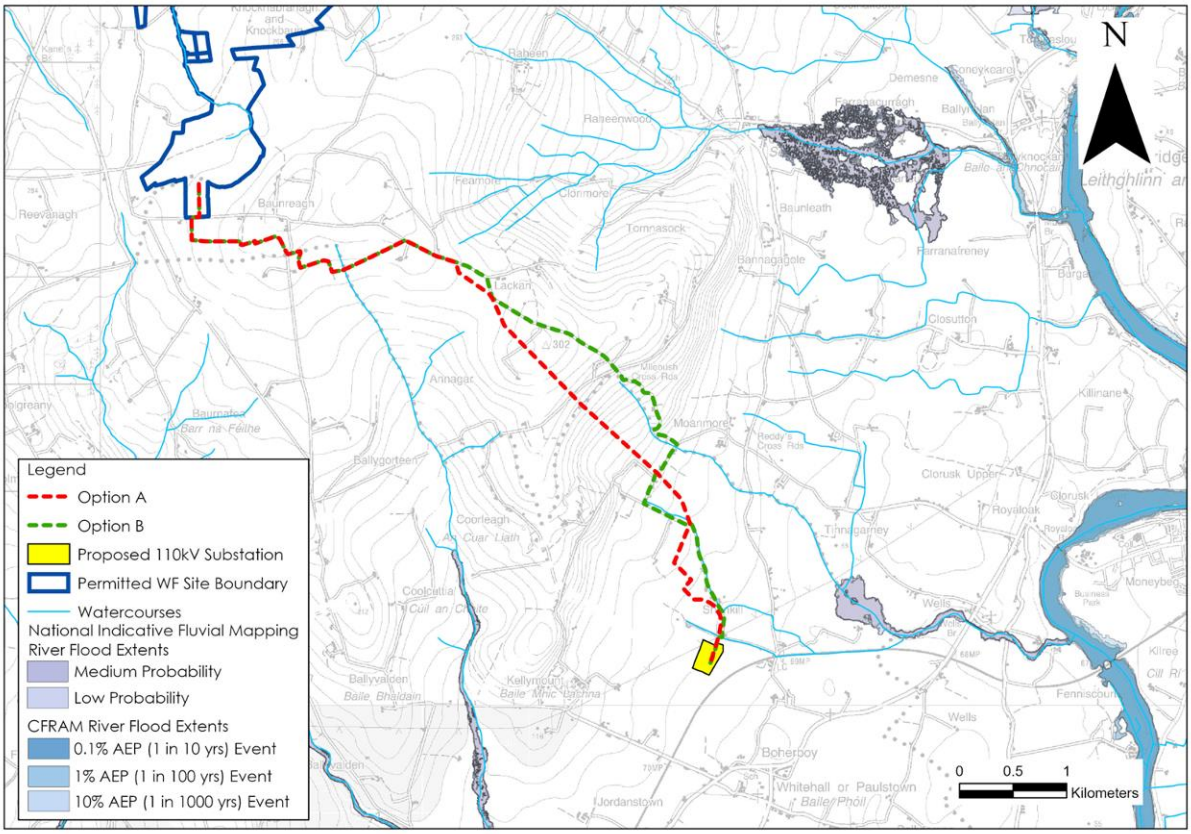


Figure F: OPW Flood Extent Mapping

2.8 HYDROGEOLOGY

The Dinantian limestones that underly the substation location and southernmost sections of the electricity line route options are classified by the GSI (www.gsi.ie) as a Regionally Important Aquifer – Karstified (diffuse) (Rkd).

The Westphalian Shales and Sandstones which underlie the electrical control units and the northern section of the electricity line route options are classified by the GSI (www.gsi.ie) as a Poor Aquifer - Bedrock which is Generally Unproductive (Pu) and Locally Important Aquifer – Bedrock which is Generally Moderately Productive (Lm).

Namurian Sandstones, Siltstones and mudstones which underlie the central section of the route options are classified as a Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones (Pl) and Bedrock which is Generally Unproductive (Pu).

In terms of local Groundwater Bodies (GWBs), the electrical control units and the northern section of the electricity line route options are located in the Castlecomer GWB (IE_SE_G_034). The central sections of the route options are mapped in the Shanragh GWB (IE_SE_G_124). The substation location and southernmost sections of the route options are mapped within the Bagenalstown Lower GWB (IE_SE_G_157).

Based on criteria at **Table C** above, the Regionally Important Aquifer at the substation location and southern end of the route options has a High Importance. The Poor bedrock aquifer and Locally Important aquifer in the area of the electrical control units and the northern section of the electricity line route options has a Low to Medium Importance. The

Poor Aquifers in the central section of the route options have a Low Importance. A local bedrock aquifer map is illustrated at **Figure** G below.

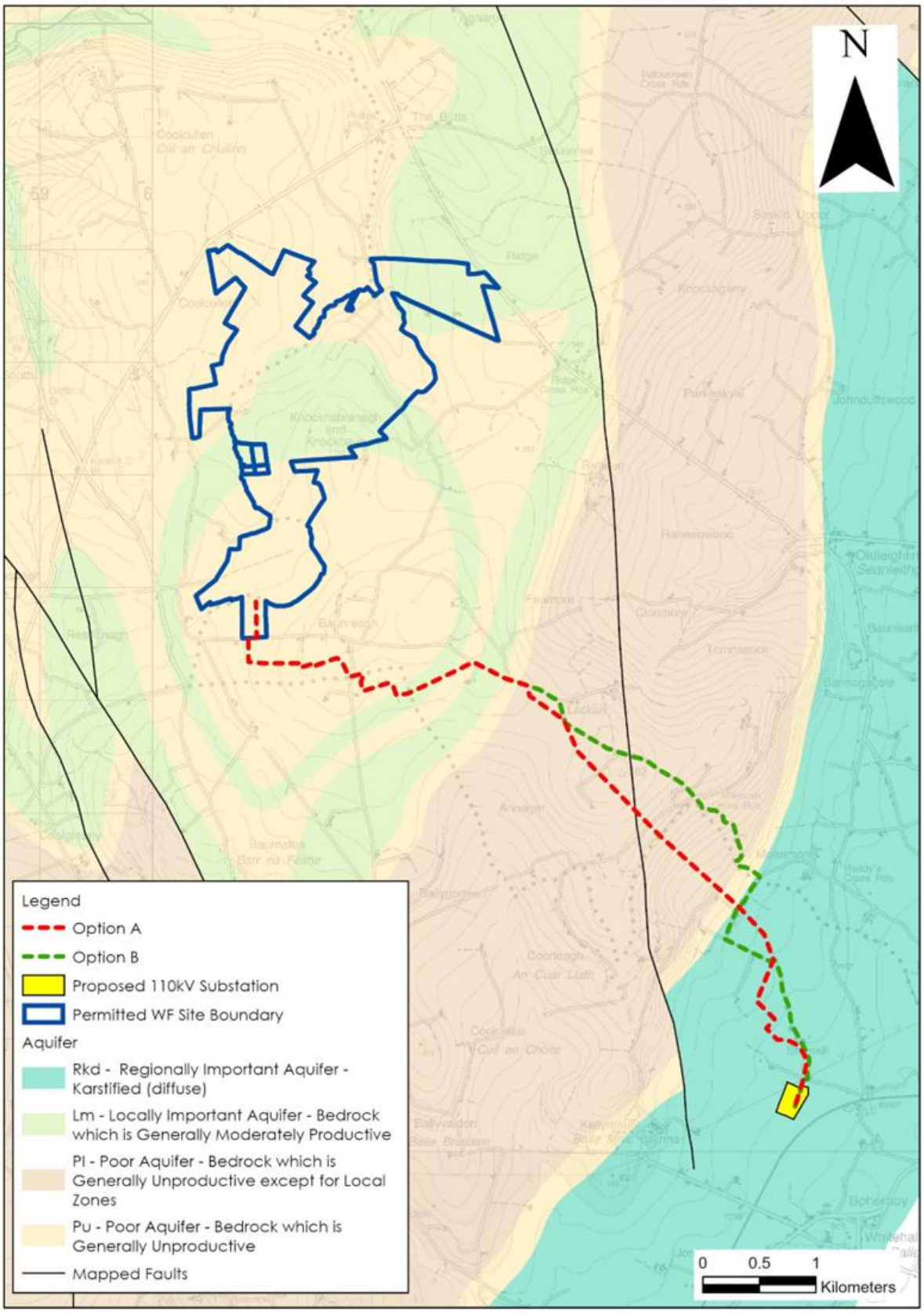


Figure G: Bedrock Aquifer Map

2.9 DESIGNATED SITES

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (cSAC), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs).

Local designated sites in the area and downstream of the project are shown at **Figure** H below. The project is not located within any designated conservation site.

All of the surface waterbodies, chiefly the Monefelim and Moanmore Rivers, draining the electricity substation, the electrical control units and the electricity line route options drain into the River Barrow and River Nore SAC (Site Code: 002162) to the southeast.

At its closest point, this designated site is located approximately 3.3km to the east (as crow flies) and downstream of the substation location.

The River Barrow and River Nore SAC is, therefore, considered to be Very Sensitive to the effects of water quality deterioration.

The Whitehall Quarries pNHA (Site Code: 000855) is situated ~300m to the southwest of Route Option B at its nearest and is ~1.7km northwest of the substation. There is no hydrological connectivity to this site.

As described in Section 2.5, a very small section of the Route Option B (~400m), on a local road within the town of Baunreagh, is mapped within the River Nore surface water catchment within Hydrometric Area 15.

This small section of the route is mapped within the Dinin (South)_020 river sub basin, where the nearest mapped watercourse is the Knocknabranagh and Knockbaun (EPA Code: 15K25) 1st order stream ~745m north. This stream ultimately drains to the River Nore and the River Nore SPA (Site Code: 004233) at a downstream distance of ~25km.

Due to the shallow nature of works associated with the project, the lack of direct hydrological connectivity and large downstream distance to the River Nore, the SPA is unlikely to be affected by the project through water quality effects.

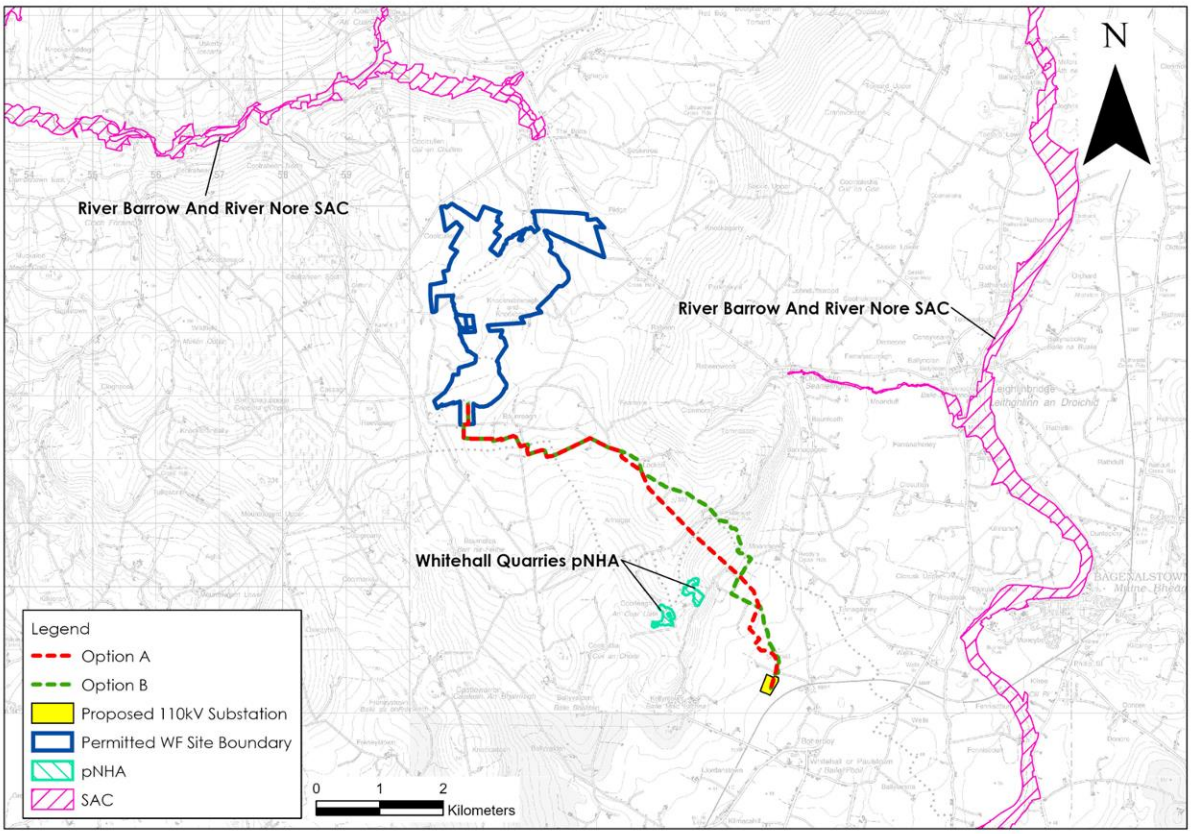


Figure H: Local Designated Site Map

2.10 DRINKING WATER SUPPLIES

According to EPA mapping, there is a National Federation Group Water Scheme (NFGWS) Source Protection Area (SPA) located ~550m to the west (at its nearest) and south of the electrical control units (i.e. the Castlewarren Group Water Scheme [GWS]).

Furthermore, both electricity line route options are mapped to traverse within the Castlewarren GWS SPA for approximately 900m.

In addition, Paulstown Public Water Supply (PWS) SPA, is mapped ~880m to the southwest of the substation location.

The SPA for this water supply extends northwards to less than 850m from the electrical control units. Furthermore, both electricity line route options are mapped to traverse within the SPA for the Paulstown PWS for approximately 900m.

The Monefelim River channel is included in the SPA for the Paulstown Public Water Supply. The electrical control units and sections of both electricity line route options are located in the Monefelim River catchment.

Based on the Paulstown PWS Source Protection Report (May 2002), the streams/rivers flowing off the Castlecomer Plateau indirectly recharge the limestone aquifer from which the spring source emerges. The proportion coming from the Monefelim River appears to be less important though:

> "*As the streams flow off the Castlecomer Plateau and onto the karstic aquifer, a proportion of streamflow will sink back down into groundwater before flowing to the springs. Most of this river recharge will occur from the Acore catchment to the north of the springs, rather than from the Monefelim catchment to the north west*".

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 at **Table C** local wells have Low Importance and the public supply has a Medium/High Importance.

3. IDENTIFICATION OF POTENTIAL EFFECTS

3.1 POTENTAL EFFECTS AND CONSTRAINTS

A summary of receptors, likelihood of Impact and potential constraints is shown at **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 drainage will require implementation.

However, the electricity substation and the electrical control units are located remote to watercourses thus reducing the likelihood of adverse effects.

The majority of both the electricity line route options are located away from watercourses, apart from watercourse crossings as described in Section 2.5, and where the Route Option B runs alongside the Shankill 1st order stream (EPA Code: 14S30) within the Moanmore_010 river sub basin for ~1.3km.

Sections of both route options are located inside the Castlewarren GWS SPA and the Paulstown PWS SPA. Furthermore, the electrical control units and sections of both the electricity line route options are located within the Monefelim River catchment which forms part of the Paulstown PWS SPA.

The potential for effects on drinking water supplies is relatively low due to the localised and shallow nature of the electricity line, the electrical control units and substation.

Downstream designated sites such as the River Barrow and River Nore SAC are sensitive receptors. The presence of Freshwater Pearl Mussel , and other protected features within the SAC, means that comprehensive surface water quality protection measures will require implementation.

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
Bedrock	High	Quantity & Quality	Yes	Unlikely
Surface Water	High	Quality/Quantity	Yes	Potentially
Flood Risk	Low	Quantity/Level	Yes	Unlikely
Groundwater	Low/Medium	Quality	Yes	Unlikely
River Nore and River Barrow SAC	Medium/High	Quality	Yes	Unlikely
River Nore SPA	Low	Quality	Yes	Unlikely
Castlewarren Group Scheme Supply/ Paulstown Public Water Supply	Low/Medium	Quantity & Quality	Yes	Unlikely
Local Private Wells	Low	Quantity & Quality	Yes	Unlikely

4. EIAR ASSESSMENT METHODOLOGY

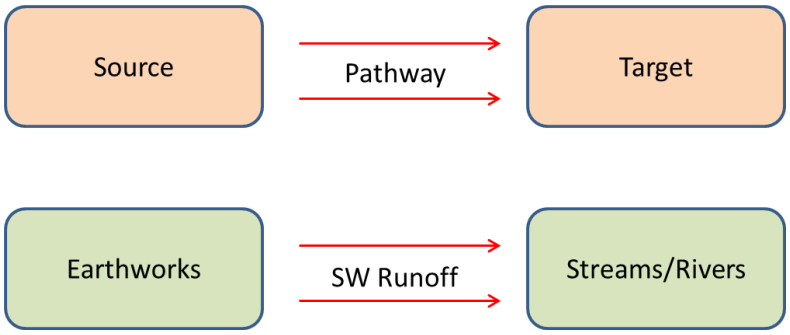
4.1 SITE SURVEYS AND INVESTIGATIONS

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

- Intrusive site investigations will be undertaken by means of trial pitting, peat probes (if required) and gouge cores to investigate soil and mineral subsoil lithology along with depth to bedrock;
- 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 project; and,
- 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).

4.2 IMPACT ASESSMENT 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 project.



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 proposed project 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	**Identification and Description of Potential Impact Source** 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	**Pathway / Mechanism:**	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	**Receptor:**	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	**Pre-mitigation Impact:**	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	**Proposed Mitigation Measures:**	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	**Post Mitigation Residual Impact:**	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	**Significance of Effects:**	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

5. SCOPING CONCLUSIONS

The conclusions of this scoping assessment are presented as follows:

- The project is located on the periphery of the Castlecomer Plateau and the landscape exhibits characteristics of an upland and lowland nature. The electricity substation, the electrical control units and electricity line route options are located in agricultural settings;
- The mapped geology in the area of the project comprises mainly subsoils (sandstone and shale tills and limestone tills) over shales, sandstone and limestone;
- The project predominately drains to the Barrow River, chiefly via the Moanmore and Monefelim Rivers;
- In terms of constraints imposed by watercourses, the current layout does not appear to be affected based on available online mapping;
- The main downstream receptors identified by this scoping assessment include the River Nore and River Barrow SAC, Castlewarren GWS source and Paulstown PWS source;
- The identified receptors will not likely constrain the layout of the project, 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.

* *

22 Lower Main Street, Dungarvan, Co. Waterford, X35 HK11
T: +353-(0)58-441 22 **F:** +353-(0)58-442 44 **E:** info@hydroenvironmental.ie

www.hydroenvironmental.ie

Annex 4 –
Landscape Scoping Report

macroworks

LANDSCAPE & VISUAL SCOPING REPORT

White Hill Wind Farm Electricity Substation and Underground Electricity Line

Co. Kilkenny & Co. Carlow.

Prepared by Macro Works Ltd

July 2024 I Draft

Registered Landscape Architect

macroworks APEM Group

1. LANDSCAPE AND VISUAL IMPACT ASSESSMENT - SCOPING

1.1 INTRODUCTION

The purpose of this Scoping Report is to describe the scoping methodology, present outcomes of initial desk study, and to establish the scope of work and methods applied in the identification and assessment of landscape and visual impacts of the proposed White Hill Wind Farm Electricity Substation and Underground Electricity Line ('the project'). 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 electricity substation is located in an area of pastoral farmland immediately west of the M9 in the townland of Shankill in County Kilkenny. The proposed underground electricity line crosses private lands and follows public road corridors in a north-westerly direction from the proposed substation and passes into County Carlow before culminating at the permitted White Hill Wind Farm some c. 6.5km northwest of the proposed substation.

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 20th October 2000 and came into force on the 1st 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 Kilkenny and County Carlow (contained within the County Development Plans) will be a key consideration. In all cases, these Landscape Character Assessments have also been integral to the development of policy contained within the CDP.

The Landscape and Visual Assessment of the project 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), commonly referred to as GLVIA3. 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)

Other relevant LVIA guidance that will be considered in relation to the preparation of photomontages includes;

- 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 project are contained with the County Development Plans for County Carlow and County Kilkenny.

1.2.1 Kilkenny City and County Development Plan

1.2.1.1 Landscape Character Assessment

A Landscape Character Assessment was completed for County Kilkenny and is incorporated within the current Kilkenny City & County Development Plan. This divides the landscape of County Kilkenny into four Landscape Character Types (LCTs) and 14 geographically specific Landscape Character Areas (LCAs). The proposed substation is contained within the Landscape Character Type (LCT) - Transition Zone and the subsequent Landscape Character Area (LCA) B1 - Castlecomer Southern Transition Zone. The CDP identifies 'landscape areas of highly scenic and significant visual amenity value'; however, the nearest of these designations are located outside of the central study area, some c. 10km south of the proposed substation site. In terms of the underground electricity line corridor within Kilkenny, this is also contained within the identical LCT and LCA.

Landscape sensitivity within County Kilkenny is addressed by 'areas of greater sensitivity'. These are "areas throughout the county that are highly sensitive to development and have a limited capacity for change…in general, areas of elevated topography, with low growing or spare vegetation and little existing development are landscapes of high sensitivity and have a low potential to absorb new development". The nearest of this is situated outside the study area to the northwest of the proposed substation and relates to the elevated lands and ridgelines.

1.2.1.2 Scenic Designations

Views and prospects to be protected in County Kilkenny are contained in Appendix H of the CDP and are shown on Figure 9.2 of the CDP. One scenic view is contained in the western extent of the study area and relates to;

- Scenic View 11 - View east and southeast into the Barrow Valley and lowland plains on the Castlecomer/Paulstown Road, the LP2625 and LT6675 (between the junctions of road nos. LP2625/LS6671 and LT6675/L2623). Also, the view on the L6671 from the county boundary to its junction with the L2625.

1.2.2 Carlow County Development Plan

1.2.2.1 Landscape Character Assessment

Whilst the proposed substation is entirely contained within County Kilkenny, sections of the underground electricity line and the wider study area are contained within County Carlow. Thus, it is important to consider landscape relates policy in County Carlow. A Landscape Character Assessment has been incorporated in the Carlow County Development Plan (CDP). This separates the county into four specific landscape character areas (LCAs). The underground electricity line corridor within County Carlow is contained within the 'Killeshin Hills' LCA which is described as "almost entirely a rural agricultural landscape with a moderate level of sensitivity and moderate potential capacity to absorb different types of development." In terms of landscape character types, the underground electricity line corridor is contained within the Uplands LCT, whilst the 'Farmed Ridges' and 'Farmed Lowlands' LCTs are also contained within the surrounding study area. The 'Uplands' LCT, which contains the proposed underground electricity line corridor is designated with a level '5 – Most Sensitive' classification.

1.2.2.2 Scenic Designations

Part 6 of the Carlow Landscape Assessment, which forms part of the CDP includes a schedule of views prospects and scenic routes. There are no scenic views or scenic routes within the 5km study area from the electricity substation. Thus, scenic views in County Carlow are proposed to be scoped out from further assessment in the EIAR.

1.3 STUDY AREA

The extent of this study area is influenced by height of the structures within the project as follows;

- Substation building (8.5m AGL);
- 110kV Interface Masts (16m AGL); and
- Lightning Masts (18m AGL).

From similar studies, it is anticipated that the proposed project is likely to be difficult to discern beyond approximately 5km due to the flat to low rolling nature of the study area and is not likely to give rise to significant landscape or visual impacts beyond approximately 1-2km. In the interests of a comprehensive appraisal, a 5km radius study area is used in this instance. However, there will be a particular focus on receptors contained within 1-2km (central study area), except where iconic or designated scenic viewpoints exist at greater distances out to 5km.

1.4 CONSULATION

It is recommended that consultation on the landscape and visual impact assessment will be undertaken with the Local Authorities – Kilkenny and Carlow County Councils.

1.5 SCOPING METHODOLOGY

Scoping for this LVIA will consist of a combination of a '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 precedes fieldwork as the latter is used to scope-in or scope-out potentially affected receptors that are identified as part of the desk study. The fieldwork will be undertaken as part of the preparation of the EIAR.

Establishing the landscape baseline includes consideration of the geographic location and landscape context of the project 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.

1.5.1 Desk Study

The desktop study will comprise the following:

- Review of the Zone of Theoretical Visibility (ZTV) map provided (refer to Figure 1.1 below), which indicates areas from which the project 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 representative assessment Viewpoints, that reflect views that may be obtained by key visual receptors, to be investigated during fieldwork for actual visibility and sensitivity.

1.5.2 Fieldwork

- Examination of the salient landscape character of the site and its surrounding 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 underground electricity line.
- Preparation of a viewpoint 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.

1.6 POTENTIAL IMPACTS

As described at Section 1.5, 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, the most notable impacts are likely to be generated by the electricity substation at surrounding local receptors to the north of the site. Local community receptors to the south of the site on the outskirts of the settlement of Paulstown also have the potential for some intermittent visibility of the project, whilst elevated views across the site also have the potential to be afforded from the western extents of the study area. Indeed, the elevated local roads to the west are also designated scenic routes and are susceptible to visual change. Nonetheless, electrical infrastructure developments, including substations are not uncommon built development types in this rural environment. Other receptors where visual impacts have the potential to be generated include;

- Major route receptors (the M9 motorway)
- Centres of Population (Paulstown)
- Amenity and Heritage Receptors (The Barrow Way and Shankill Castle)

1.6.1 Analysis of ZTV Maps

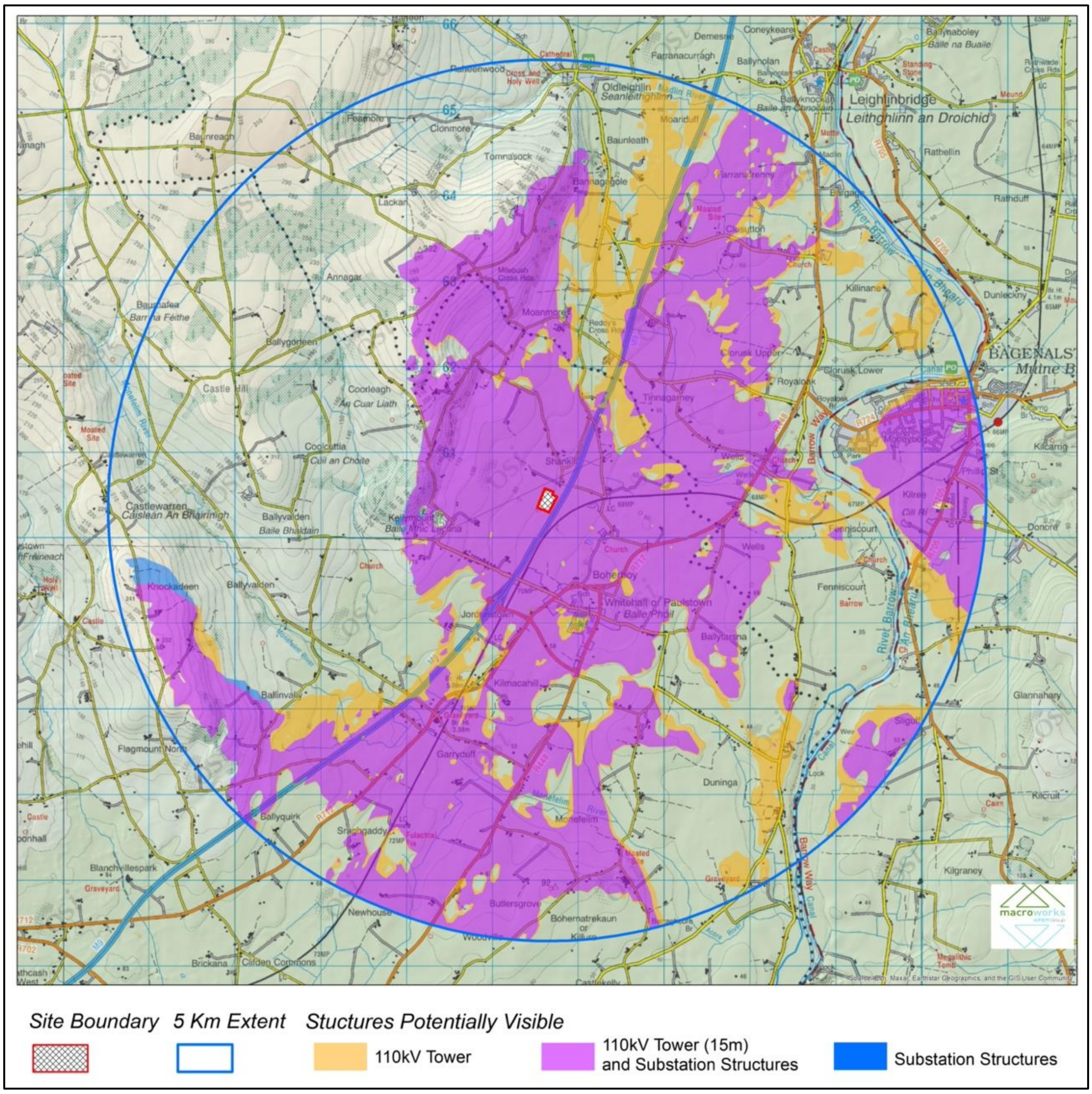


Figure 1.1 Bare-ground Zone of Theoretic Visibility (ZTV) Map

Key points summarising the Zone of Theoretical Visibility Map (refer to Figure 1.1) are outlined below;

- Comprehensive visibility of the electricity substation structures and the 110 kV masts occurs throughout much of the immediate surrounding context of the site due to the relatively even terrain that contains the site.
- The ZTV pattern becomes more sporadic in the wider study area, where small undulations in the surrounding terrain will partially screen and in some cases fully screen the substation and masts.
- The most notable area of no visibility occurs to the west of the site where the rolling foothills of the Castlecomer Plateau will entirely screen the project in the wider western extent of the study area.
- Similarly, low rolling terrain to the west of the River Barrow in the eastern extent of the study area results in a large area of no visibility in the wider eastern extent of the study area in the surrounds of the River Barrow.

1.6.2 Viewshed Reference Point (Viewpoint) Selection

Based on the ZTV map, analysis a preliminary viewpoint selection was generated. These viewpoints were investigated during fieldwork and resulted in the preparation of final selected Viewpoint Map (see Figure 1.2 below).

Figure 1.2 Map showing selected viewpoints

1.7 EIAR ASSESSMENT METHODOLOGY

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

1.7.1 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;

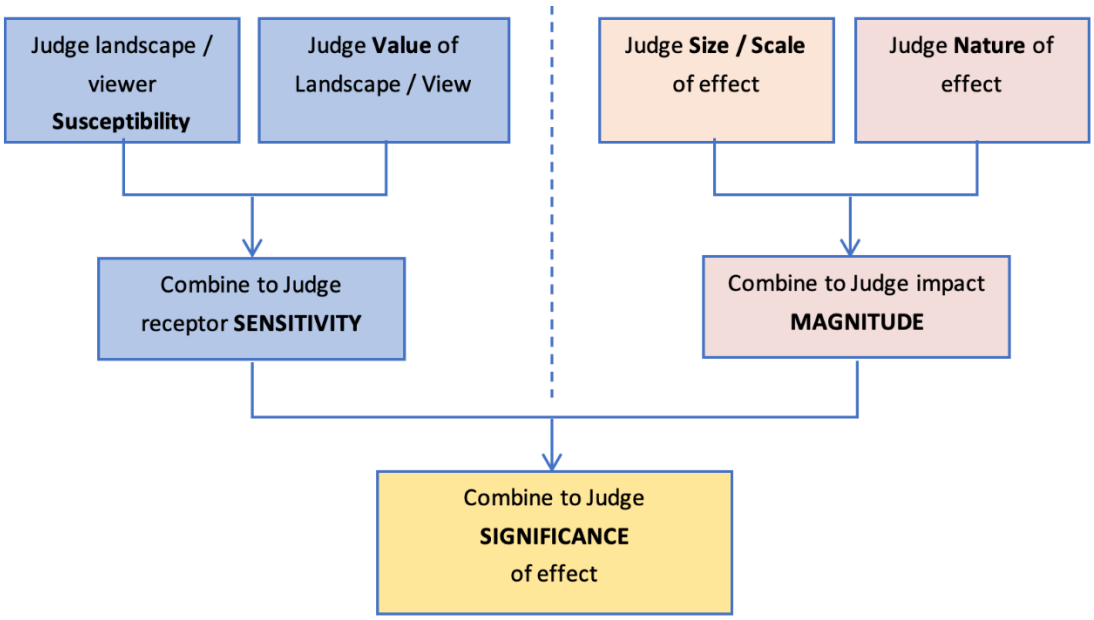


Figure 1.3 Method for assessing Landscape Impact Significance and Visual Impact Significance (based on GLVIA - 2013)

1.7.2 Landscape Impact Assessment

This part of the LVIA provides an assessment of how the introduction of the project will affect the physical features and fabric of the landscape, and then how the project influences landscape character with reference to published descriptions of character and an understanding of the contemporary character of the landscape as informed through desktop and site studies.

When assessing the potential landscape effects of the development, the value and sensitivity of the landscape receptor is weighed against the magnitude of impact to determine the significance of the landscape effect. Criteria outlined below are used to guide these judgements

1.7.2.1 Landscape Sensitivity

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;

Table 1.1 Landscape Value and Sensitivity

Sensitivity	Description
Very High	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.
High	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.
Medium	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.

Low	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.
Negligible	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.

1.7.2.2 Magnitude of Change - Landscape

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 project. 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.

Table 1.2 Magnitude of Change - Landscape Impacts

Criteria	Description
Very High	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 extensive change of the landscape in terms of character, value and quality.
High	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 a considerable change of the landscape in terms of character, value and quality.
Medium	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 noticeable changes in landscape character, and quality.
Low	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 that would lead to discernible changes in landscape character, and quality.
Negligible	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 leading to no material change to landscape character, and quality.

1.7.3 Visual Impact Assessment

This part of the LVIA provides an assessment of how the introduction of the project will affect views within the landscape. It therefore needs to consider:

- Direct impacts of the project upon views through intrusion or obstruction;
- The reaction of viewers who may be affected, e.g. residents, walkers, road users; and
- The overall impact on visual amenity.

It has been deemed appropriate to structure the assessment around a series of representative viewpoint locations. All viewpoints are located within the public domain and are representative of views available from main thoroughfares and pedestrian areas within the vicinity of the project. The selected viewpoints are considered to be comprehensive in communicating the variable nature of the visual effects.

When assessing the potential visual effects of the development, the sensitivity of the visual receptor is weighed against the magnitude of the visual impact to determine the significance of the visual effect. Criteria outlined below are used to guide these judgements.

1.7.3.1 Sensitivity of Visual Receptors

As with landscape sensitivity, the sensitivity of a visual receptor is categorised as Very High, High, Medium, Low, and Negligible. Unlike landscape sensitivity however, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity the viewer is engaged in and whether this heightens their awareness of the surrounding environment.

A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each viewpoint location

1.7.3.2 Susceptibility of Visual Receptors to Change

In accordance with GLVIA3, 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;
- 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;
- 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".

1.7.3.3 Value attached to Views

The value attached to a view is determined by considering the following:

- Recognised scenic value of the view (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 Developments Plans, for example, a public consultation process is required;
- Views from within highly sensitive landscape areas. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the County Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;

- Primary views from residential receptors. Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity;
- Intensity of use, popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;
- Viewer connection with the landscape. This considers whether or not receptors are likely to be highly attuned to views of the landscape i.e. commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the landscape;
- Provision of vast, 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. Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of 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 distinctly manmade features;
- Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle;
- Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may 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 the receptor could take in similar views anywhere in the broader region or the country;
- Integrity of the landscape character. This looks at 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 considers whether there is special sense of wholeness and harmony at the viewing location;
- Sense of awe. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity, and no relative importance is inferred by the order of listing.

It is recognised that a viewer's interpretation and experience of the landscape can have preferential and subjective components. Where relevant, judgements are made on those elements of the landscape that are considered to contribute more prominently and positively to the visual landscape resource as well as those elements that contribute negatively. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

1.7.3.4 Magnitude of Change - Visual

The magnitude of change is again a product of the scale, extent, or degree of change that is likely to be experienced as a result of the project. This is directly influenced by its 'visual presence / prominence', as experienced by visual receptors in the landscape. These terms are somewhat quantitative in nature, and essentially relate to how noticeable or 'dominant' the proposal is within a particular view. Aside from the obvious influence of scale and distance, a development's visual presence is influenced by the extent and complexity of the view, contextual movement in the landscape, the nature of its backdrop, and its relationship with other focal points or prominent features within the view. It is often, though not always, expressed using one of the following terms: Minimal; Sub-dominant; Co-dominant; Dominant; Highly dominant.

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.

Table 1.3 Magnitude of Change - Visual

Criteria	Description
Very High	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.
High	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.
Medium	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.
Low	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.
Negligible	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.

1.7.4 Significance of Effects

The significance of a landscape or visual effect is based on a balance between the sensitivity of the receptor and the magnitude of change, and is categorised as Profound, Substantial, Moderate, Slight, or Imperceptible. Intermediate judgements are also provided to enable an effect to be more accurately described where relevant. 'No Effect' may also be recorded as appropriate where the effect is so negligible it is not noteworthy.

The significance category judgement is arrived at using the Significance Matrix at Table 1.4 as a guide. This applies the principle of significance being a function of magnitude weighed against sensitivity, but employs slightly different terminology that avoids the potentially confusing use of the term 'significant' (GLVIA3 Statement of Clarification 1/13 (Landscape institute, 10th June 2013)). Indicative criteria descriptions used in relation to the significance of effect category are presented at Table 1.5

Table 1.4 Significance Matrix

	Sensitivity of Receptor				
Magnitude	**Very High**	**High**	**Medium**	**Low**	**Negligible**
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Table 1.5 significance of effect criteria descriptions

	Landscape	Visual
Profound	There are notable changes in landscape characteristics over an extensive area or a very intensive change over a more limited area.	The view is entirely altered, obscured or affected.
Substantial	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area or an intensive change over a more limited area.	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. There are minor changes over some of the area or moderate changes in a localised area.	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Slight	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Imperceptible	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.	An effect capable of measurement but without noticeable consequences. Although the development may be visible, it would be difficult to discern resulting in minimal change to views.

It is important that the likely effects of the proposals are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making a planning decision. As such, whilst the significance matrix and criteria provide a useful guide, the significance of an effect is ultimately determined by the landscape specialist using professional judgement, and also in the context of occasionally using hybrid judgements to account for nuance.

Effects assessed as 'Substantial' or greater (shaded cells) are considered to be the most notable in landscape and visual terms, and may be regarded as 'Significant' in EIA terms, albeit it is important to note that this is not a reflection on their acceptability in planning terms.

1.7.5 Quality Of Effects

In addition to assessing the significance of landscape and visual effects, the quality of the effects is also determined. Within this LVIA, effects are described as negative/adverse, neutral, or positive/beneficial, and the following criteria has been used to guide these judgements.

- Positive/beneficial - A change which improves the quality of the environment, enhancing the existing view/landscape;
- Neutral - No effects or effects that are imperceptible, within normal bounds of variation e.g. will neither detract from nor enhance the existing view/landscape;
- Negative/adverse - A change which reduces the quality of the environment, detracting from the existing view/landscape.

In the case of new energy / infrastructure developments within rural settings, the landscape and visual change brought about by an increased scale and intensity of built form is seldom considered to be positive / beneficial. Effects in these contexts are generally considered to be adverse in nature, or neutral, where the effect has little influence on the landscape/views.

1.8 CONCLUSION

Following the scoping stage desk study and initial viewpoint selection, it is considered that the 5km study area around the electricity substation is that of a typical working rural landscape influenced by some notable highly anthropogenic features such as an existing quarry and the M9 motorway corridor. Whilst large parts of the study area present with a notable degree of enclosure due to tall mature vegetation throughout the study area, some sense of scenic amenity is also evident in the wider western extent of the study area due to the elevated terrain here, which is further highlighted by the presence of a scenic designation in the current Kilkenny City and County Development Plan.

Notwithstanding the generally robust landscape character of the site and its immediate surroundings, there is potential for some visual effects at local community receptors (local roads and residents) to the north and south of the site and from the elevated lands in the western extent of the site. The potential for any significant landscape and visual effects generated from the electricity line during the operational stage of the development has been scoped out due to its underground nature, albeit, there will be potential for some minor localised construction stage effects.

Landscape and visual effects are scoped out for further assessment beyond the 5km study area due to the very limited potential for visibility beyond this distance, even from some of the more elevated scenic views and routes located in wider County Carlow. From these distances, the electricity substation is unlikely to be discernible, and therefore it is considered that there is no potential for significant effects to occur. Visual effects at receptors that are not contained within the ZTV pattern have also been scoped-out on the basis there will be no potential visibility of the project.

1.8.1 Recommended Mitigation Strategy

It is recommended to include a landscape plan showing all existing hedgerows within and along the perimeter of the site boundary to be bolstered with a native whip planting mix. New sections of hedgerow should also be proposed to limit the potential visibility of the electricity substation from the nearest surrounding residential receptors and to anchor the substation into the existing landscape context. Along the electricity line, care should also be taken in the vicinity of existing mature trees and areas of mature vegetation so as not to damage their root structures.

Annex 5 –

Archaeological, Architectural & Cultural Heritage Scoping Report

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE SCOPING REPORT

WHITE HILL WIND FARM

ELECTRICITY SUBSTATION AND GRID CONNECTION,

COUNTIES CARLOW AND KILKENNY

PREPARED BY

HORIZON ARCHAEOLOGY

FOR

GALETECH ENERGY SERVICES

10th MAY 2024

CONTENTS

Figures

1 INTRODUCTION

1.1 General

This desk-based scoping report has been prepared on behalf of Galetech Energy Services by Horizon Archaeology to assess and define any effects which the construction, operation and decommissioning of the proposed White Hill Wind Farm Electricity Substation and Grid Connection ("project") may have on the archaeological, architectural and cultural heritage resource. 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.

The proposed development will be located in west County Carlow and east County Kilkenny, approximately 3km west of Bagenalstown, approximately 15km south west of Carlow and approximately 15km east of Kilkenny City (Figure 1).

The development will comprise the following elements:

- A 110 kilovolt (kV) electricity substation (including all associated electrical apparatus and an energy storage system) located in the townland of Shankill, Paulstown, County Kilkenny;

- Approximately 8km of underground electricity line between the 110kV electricity substation and the permitted White Hill Wind Farm; and

- Electrical control units located to the immediate south of the permitted White Hill Wind Farm.

Two no. separate routes for the underground electricity line are currently the subject of a technical/constructability evaluation. As such, these route options, one largely off-road within private lands (Route Option A) and one largely within the public road corridor (Route Option B) have been assessed as part of this Scoping Report. Route Option A measures approximately 8.52km in length, and Route Option B measures approximately 7.73km in length.

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 or effects the project may have on the

archaeological, architectural and cultural heritage resource. The following key issues are addressed:

- Direct and indirect effects of the construction of the project on the archaeological, architectural and cultural heritage resource;

- Direct and indirect effects of the operation of the project on the archaeological, architectural and cultural heritage resource; and

- Cumulative effects of the construction and operation of the project on the archaeological, architectural and cultural heritage resource with other existing, permitted or proposed developments or projects.

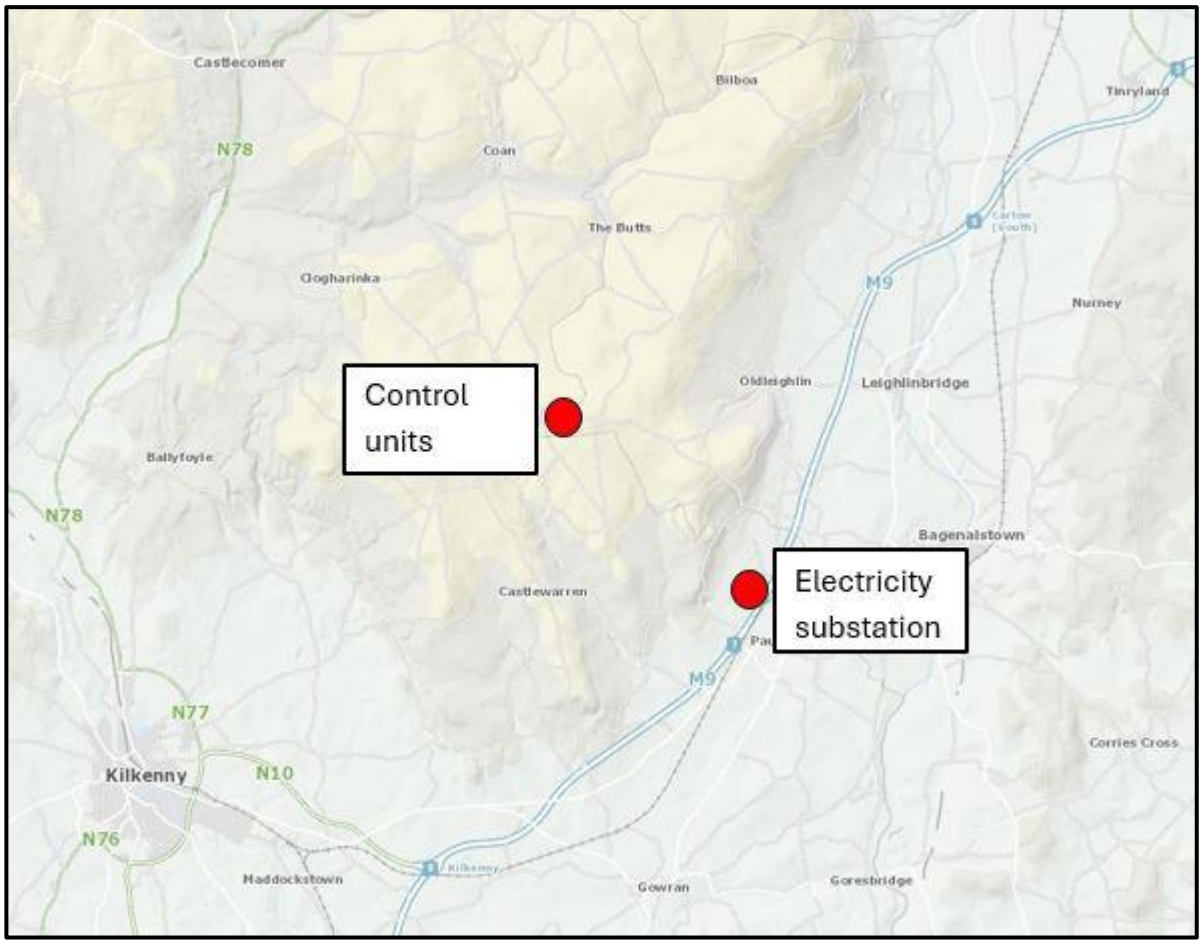


Figure 1: Location of electricity substation and control units

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 Assessment Reports.

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 electricity substation and control units to assess the presence of statutorily protected archaeological remains (RMP sites). In addition, a 2km study area has been applied around the electricity substation and control units 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, or structures recorded on the National Inventory of Architectural Heritage (NIAH).

Two no. below-ground electricity line options (Route Option A and Route Option B) have been assessed as part of this Scoping Report. It is not yet known which of the grid connection routes will be selected as the preferred option, but it has been confirmed that the selected option will be underground. A 100m study area either side of each of the route options has been applied to look for the presence of statutorily protected archaeological, architectural or cultural heritage features.

An assessment has been made of any historic gardens or designed landscapes as recorded on the NIAH that may exist within the site of the proposed substation or control units.

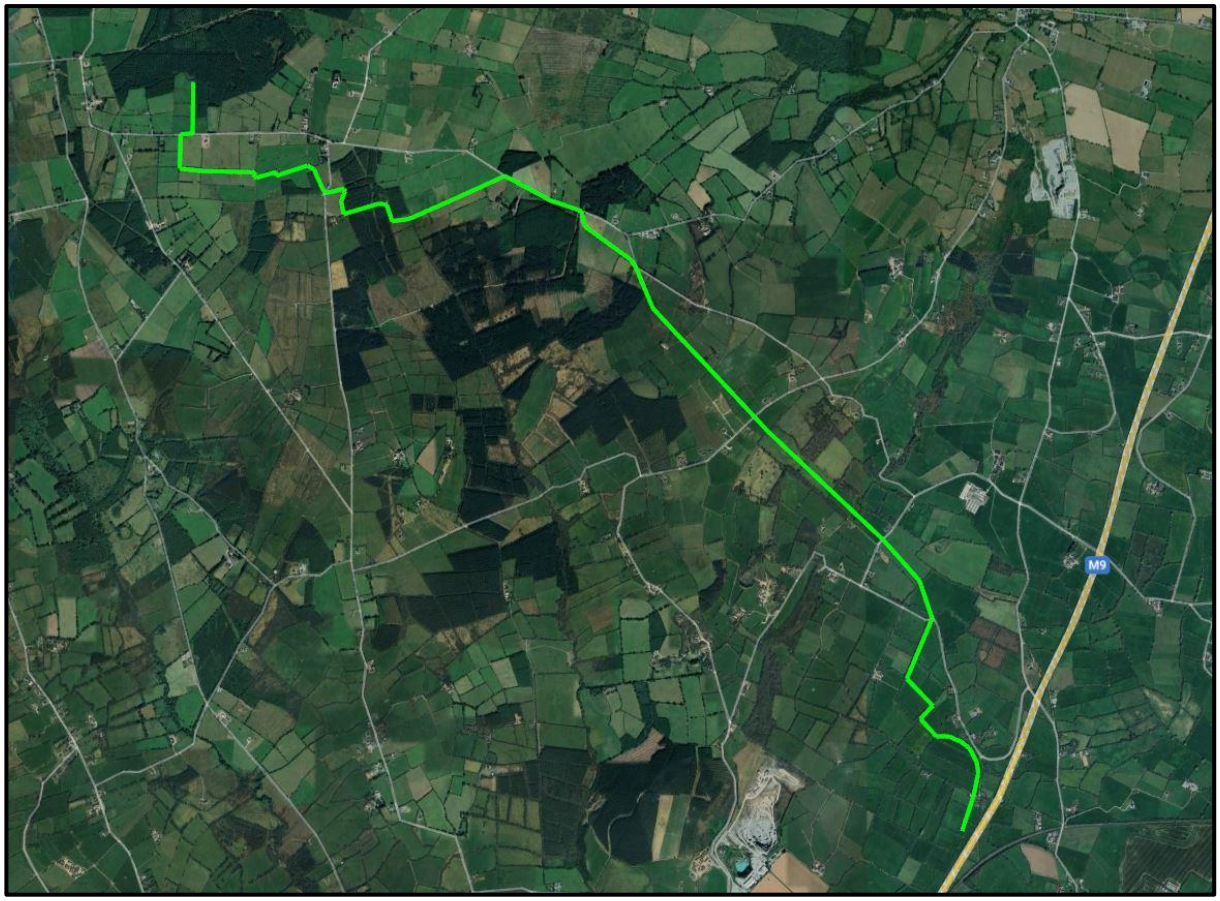


Figure 2: Aerial photograph showing Electricity Line Route Option A

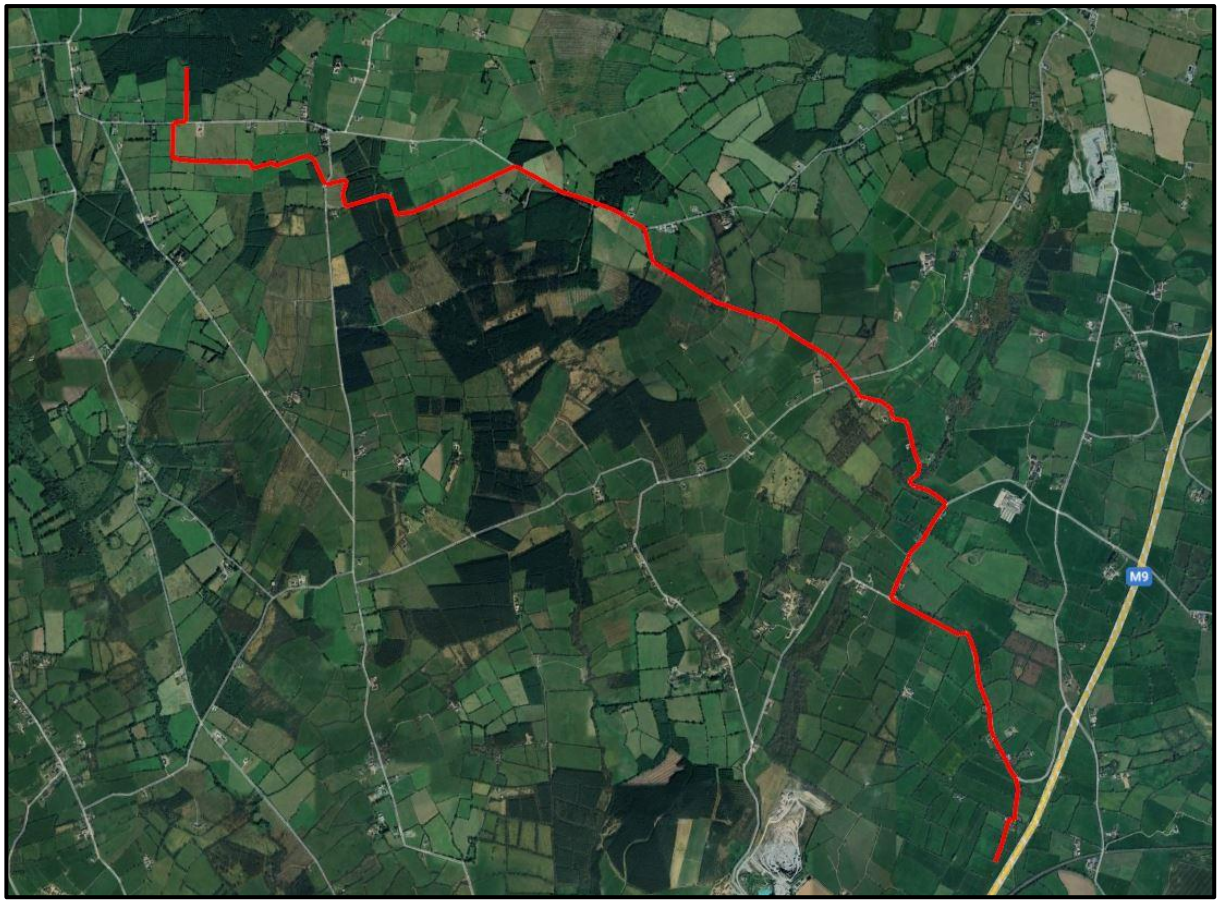


Figure 3: Aerial photograph showing Electricity Line Route Option B

Figure 4: Aerial photograph showing electricity substation

Figure 5: Aerial photograph showing control units

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 Counties Carlow and Kilkenny;
- Cartographic and documentary sources relating to the study area;
- Aerial photographs of Ordnance Survey Ireland and Bing aerial photography;
- *Carlow County Development Plan 2022 – 2028* and the *Kilkenny City and County Development Plan 2021 – 2027*; 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.

Carlow County Development Plan 2022 – 2028 and the **Kilkenny City and County Development Plan** 2021 – 2027 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.

3 BASELINE CONDITIONS

3.1 Site-Specific Archaeological Background

There are no Recorded Monuments within the electricity substation.

There is one Recorded Monument located south of the southern boundary of the electricity substation (Figure 6).

RMP KK016-006: linear earthwork

RMP KK016-006 is recorded (www.archaeology.ie) as a linear boundary extending for approximately 5km from Kellymount Hill, on the south east edge of the Castlecomer Plateau,

south eastward to the River Barrow. The boundary, known as the "Rathduff Trench", is indicated on an early 17th century barony map of Idrone published by Gerard Mercator (1606 - 1641). The linear earthwork formed part of the north west boundary of the Carlow barony, which at that stage extended into what has become part of the modern county of Kilkenny. The Ordnance Survey Letters of 1839 refer to this trench as having similar traditions as those associated with the Black Pig's Dyke and that though, "*it is nearly blotted off the face of the land; but if the fragment of it which remains and the forts which were on it be marked [on the OS map], its outline will be well preserved*". The Ordnance Survey Letters record that the earthwork was known locally as "*the Gripe of the Pig*", and according to local legend "*a poor widow living here in olde times had a pig which ran away from her into a subterraneous passage and that all the neighbours came to dig her out, but that they did not catch her until they had dug down to the Barrow. The "Gripe" they cut on this occasion and the stuff they threw up were visible about six generations ago, but the progress of cultivation has effaced both except a small part at Kellymount, where the trench (gripe) is still faintly traceable*" (www.archaeology.ie).

A portion of this earthwork (RMP KK016-006) in Shankill townland was excavated as part of archaeological excavations on the Cork-Dublin gas pipeline (1981 - 1982) (O'Flaherty 1987). Pre-excavation the earthwork was visible as a low bank (H 0.7m) with a fosse (Wth 1.1m; D 1.2m) to the south. However, excavation revealed that the bank had been disturbed when the fosse was recut in 1954 by the Land Commission as part of a modern drainage scheme. The original fosse had been 5m wide and 0.9m deep. There was no dating evidence from the excavation. Other portions of this possible linear earthwork (RMP KK016-006001 and RMP KK016-006002), though not following the same axis, were identified east of the railway line in Shankill Castle demesne.

Figure 6: Location of RMP KK016-006 (linear earthwork) south of electricity substation showing SMR Zone

There are an additional 14 no. Recorded Monuments within 1km of the electricity substation.

There are no Recorded Monuments within site of the control units or within 1km of the control units.

There are no Recorded Monuments within Route Option A or within 100m either side of Route Option A.

There are no Recorded Monuments within Route Option B. There are 3 no. Recorded Monuments within 100m either side of Route Option B, one of which is located immediately east of the underground electricity line.

3.2 Cartographic Analysis

Ordnance Survey Maps: First Edition 1:10,560 (1839, 1842)*; First Edition 1:2,500* (1899 – 1902*,* 1905 -1906) and *Third Edition 1:10,560* (1902 – 1903, 1905 – 1906)

All roads along which Route Option B will be located are recorded on the First Edition 1:10,560 Ordnance Survey maps. Both Route Option A and Grid Connection Route Option B will cross a number of townland boundaries, as well as a parish boundary and a barony boundary. Route Option A and Route Option B will also cross the county boundary between Carlow and Kilkenny on three separate occasions. The control units will be located immediately south of a townland, parish, barony and county 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).

RMP KK016-006 (linear earthwork), which is located south of the southern boundary of the electricity substation, is shown as a north west/south east oriented field boundary on historic cartographic sources and is not annotated as an antiquity.

There are no archaeological or architectural features recorded within the land take of the electricity substation or control units on the Ordnance Survey maps.

The historic maps all record the presence of vernacular structures, Ordnance Survey bench marks, quarries, *etc*. in the general vicinity of Route Option A and Route Option B.

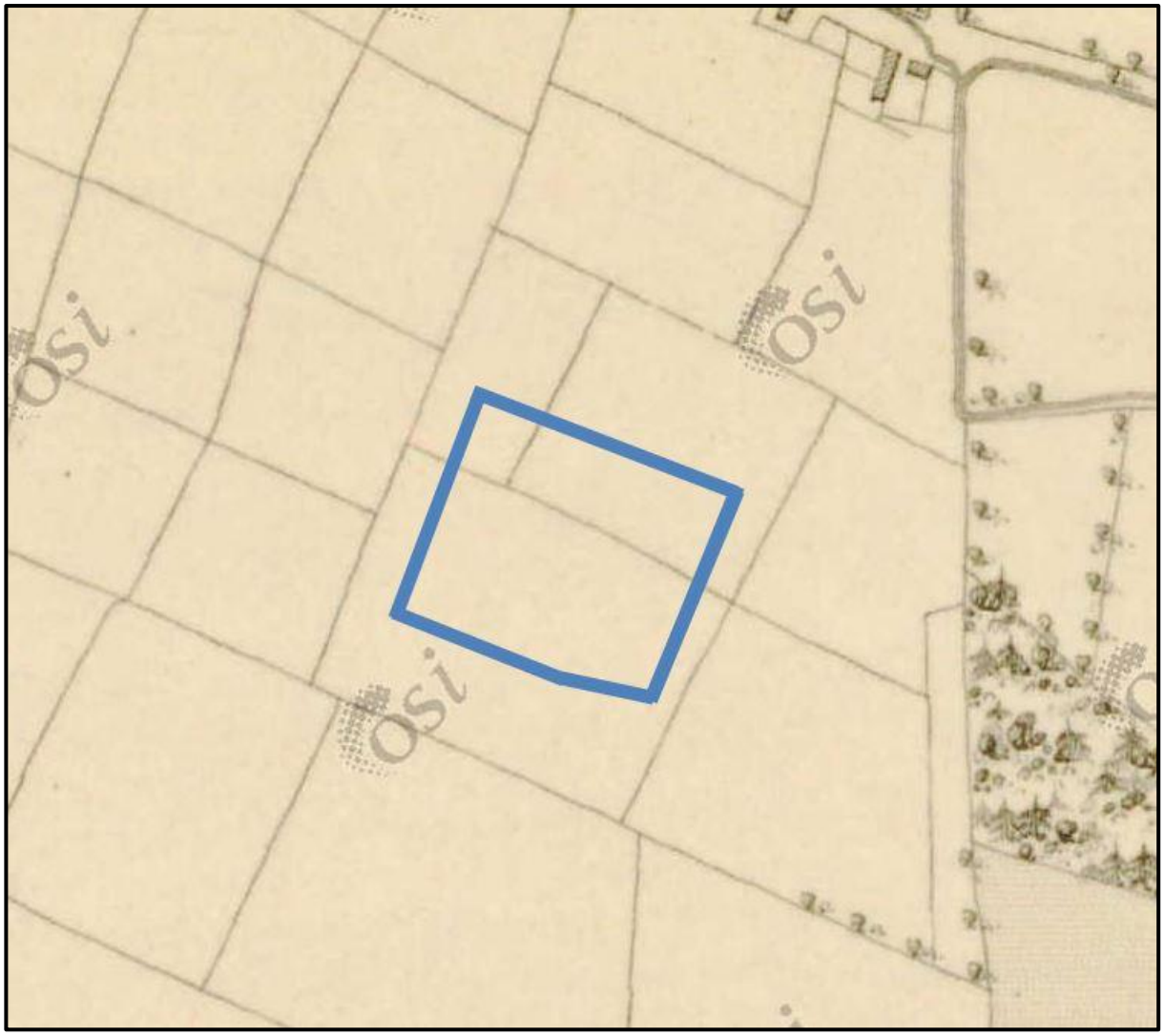


Figure 7: Extract from First Edition Ordnance Survey map 1:10,560, showing general location of electricity substation

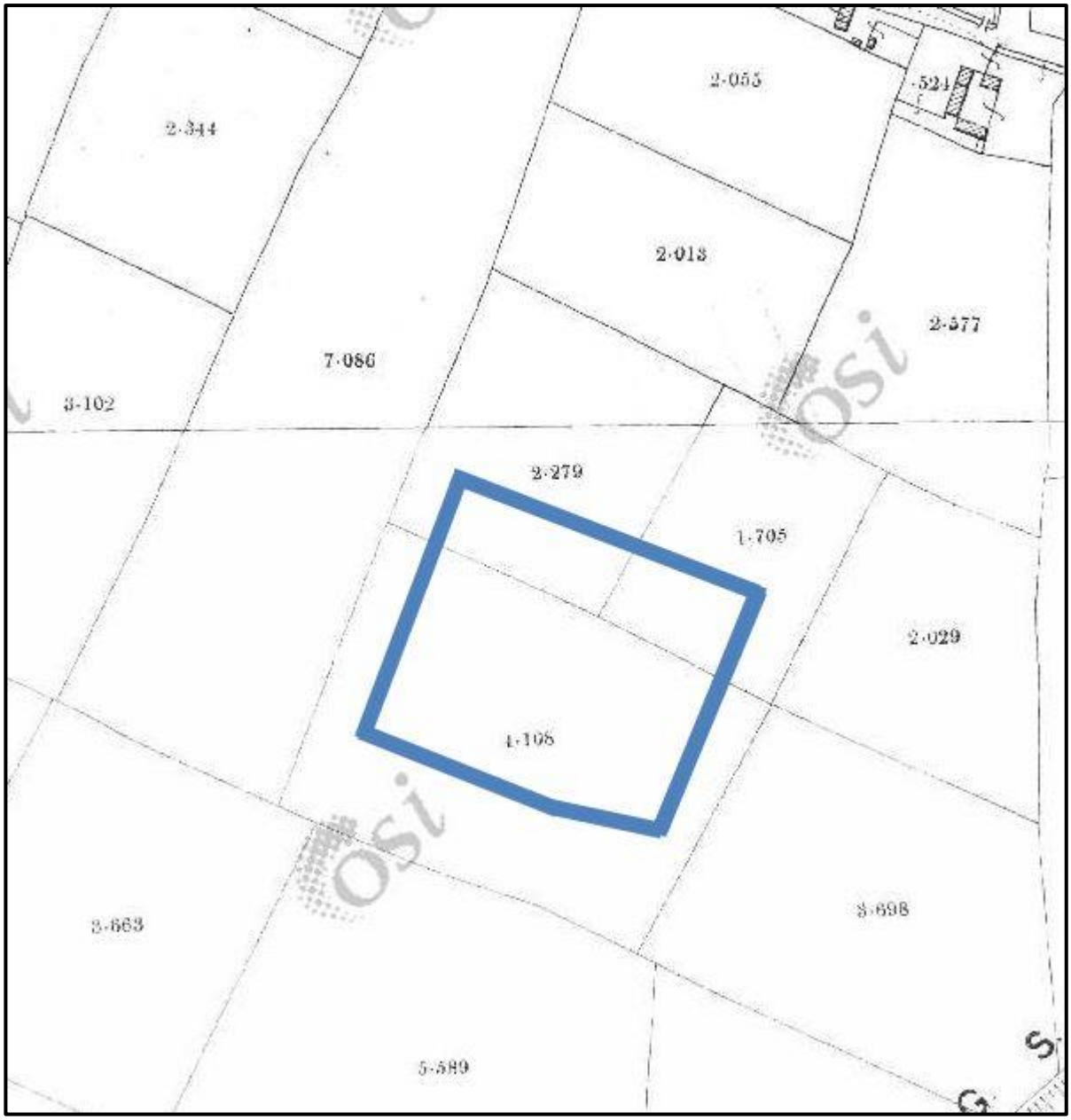


Figure 8: Extract from First Edition Ordnance Survey map 1:2,500, showing general location of electricity substation

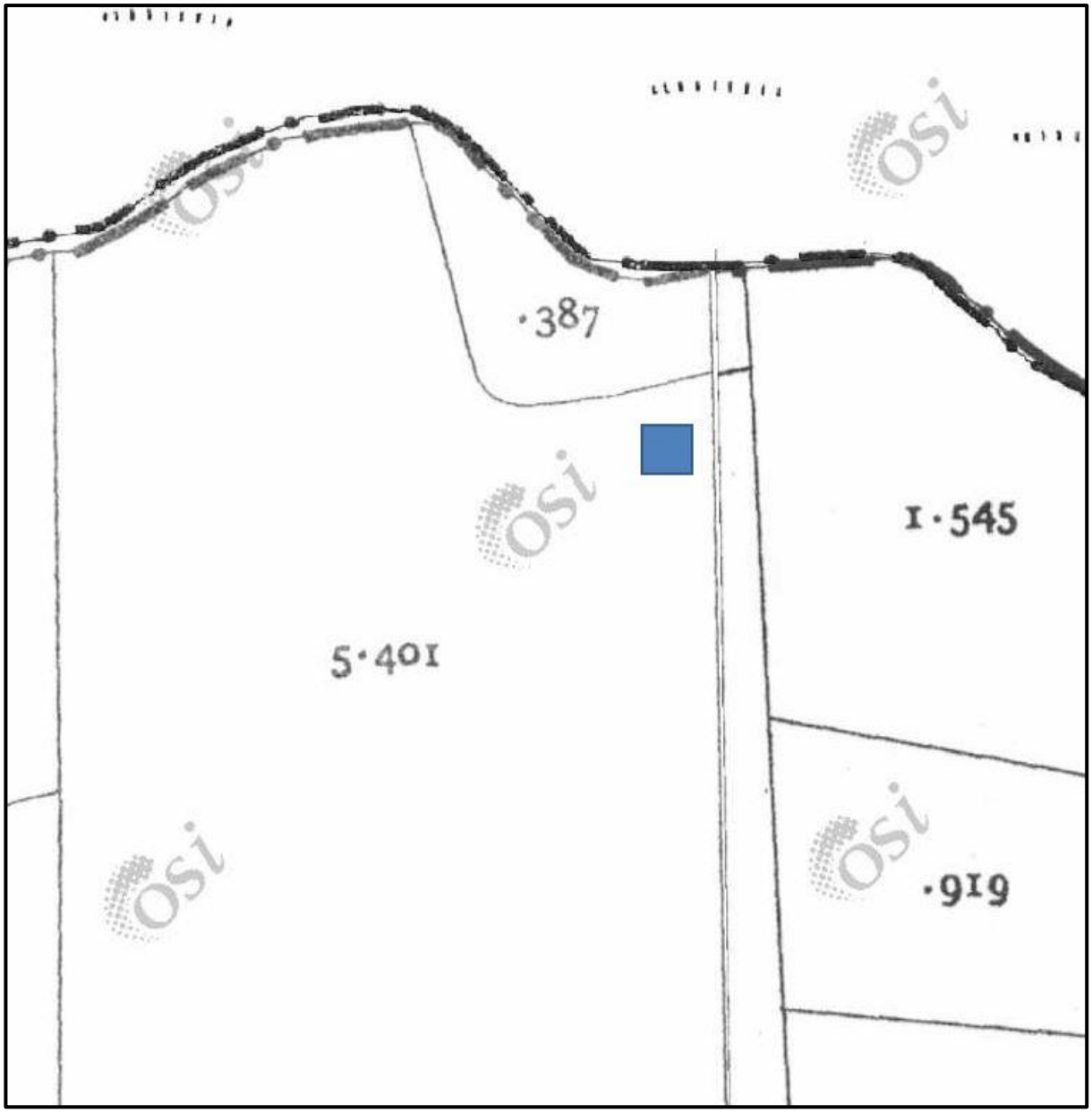


Figure 9: Extract from First Edition Ordnance Survey map 1:2,500, showing general location of control units

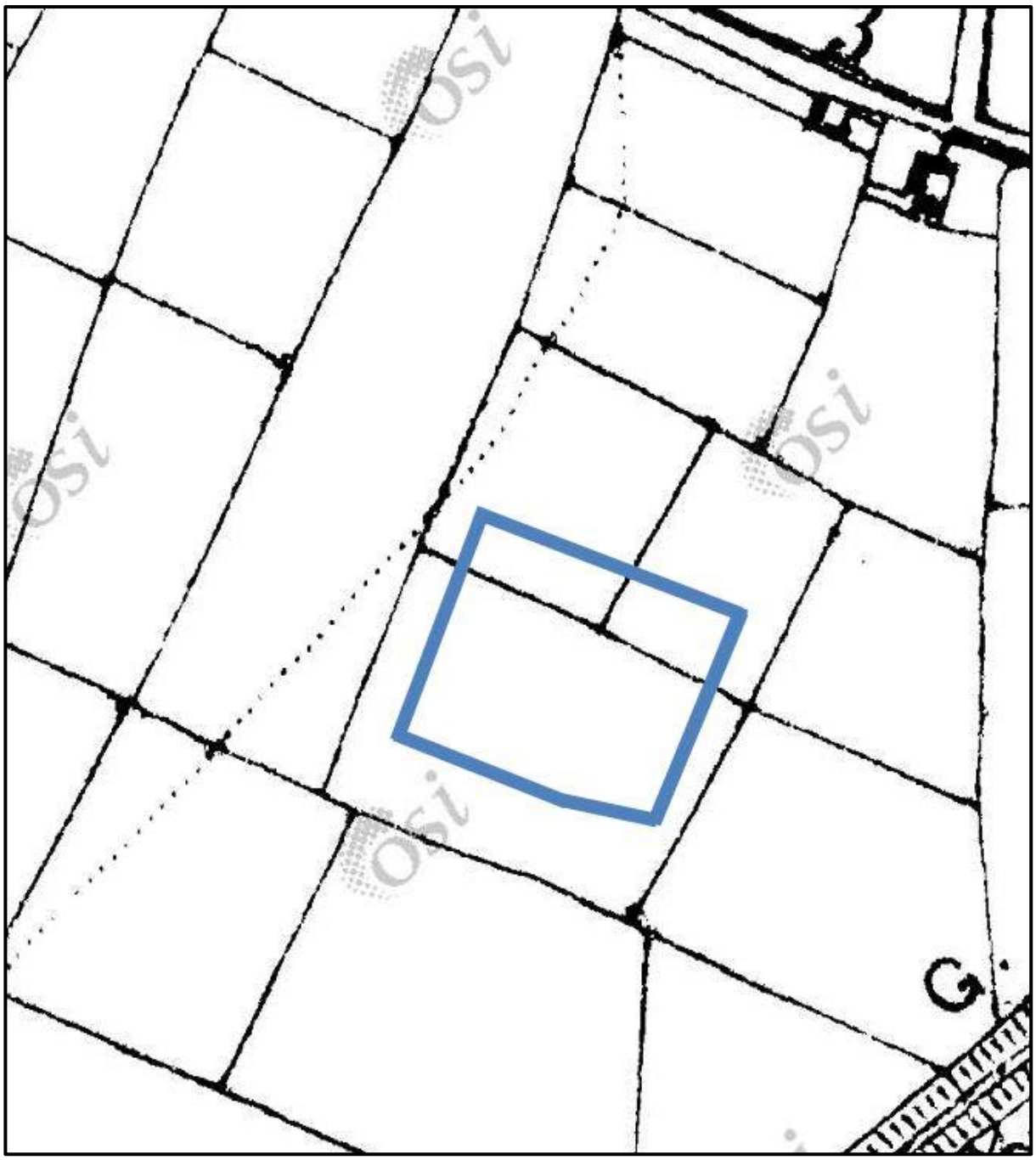


Figure 10: Extract from Third Edition Ordnance Survey map 1:10,560, showing general location of electricity substation

3.3 Aerial Photographs

Aerial photographs held by Ordnance Survey Ireland (www.map.geohive.ie) and Bing aerial photography (www.bing.com/maps) were consulted to look for the presence of archaeological or architectural remains within the land take of the project.

There was no evidence of any archaeological or architectural features recorded on aerial photography within any areas of land take required for the project.

3.4 County Development Plans

Carlow County Development Plan 2022 - 2028

3.4.1 Archaeological Heritage

It is a Policy (AH. P1) of Carlow County Council (Carlow County Development Plan 2022 - 2028, 261) to:

> "*Secure the preservation (either in situ or by record) of all archaeological monuments included in the Record of Monuments and Places (RMP) and their settings, and of all sites and features of significant archaeological or historical interest, including potential and previously unknown sites or features, in consultation with the National Monuments Service in the Department of Housing, Local Government and Heritage*."

It is also a Policy (AH. P3) of Carlow County Council (*ibid*.) to:

> "*Protect, conserve and enhance the archaeological heritage of the County, and to manage development in a manner that avoids adverse impacts on sites, monuments, features or objects of significant archaeological or historical interest, including areas and sites of archaeological potential. There will be a presumption in favour of the 'preservation in situ' of archaeological heritage in accordance with the 'Framework and Principles for the Protection of Archaeological Heritage (DAGHI 1999) or any superseding national policy document*."

Table 10.3 of the *Carlow County Development Plan* (*ibid*., 263) is a list of *Monuments in the Ownership of the State* within the county. There are no Monuments in the Ownership of the State within the site of the electricity substation or the control units or within 2km of the electricity substation or the control building.

There are no Monuments in the Ownership of the State within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Table 10.4 of the *Carlow County Development Plan* (*ibid*.) is a list of *Monuments in the Guardianship of the State* within the county. There are no Monuments in the Guardianship of

the State within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Monuments in the Guardianship of the State within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Table 10.5 of the *Carlow County Development Plan* (*ibid*.) is a list of *Monuments to which Preservation Orders apply* within the county. There are no Monuments with Preservation Orders within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Monuments with Preservation Orders within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

3.4.2 Architectural Heritage

It is a Policy (PS. P1) of Carlow County Council (*ibid*., 265) to:

> "*Ensure the protection of the architectural heritage of County Carlow, through the identification of Protected Structures, the designation of Architectural Conservation Areas, and the recognition of structures and features in the County that make a positive contribution to vernacular and industrial heritage.*"

It is also a Policy (PS. P2) of Carlow County Council (*ibid*.) to:

> "*Ensure the protection and conservation of the character, setting and special interest of all buildings, structures (or parts of structures) and sites, listed in the Record of Protected Structures, including their curtilage, attendant grounds, and fixtures and fittings*."

Appendix VIII of the Carlow County Development Plan (*ibid*.) contains the *Record of Protected Structures* for the county. There are no Protected Structures within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Protected Structures within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Section 10.15 of the Carlow County Development Plan (*ibid*., 267) contains a list of *Architectural Conservation Areas* within the county. There are no Architectural Conservation Areas within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Architectural Conservation Areas within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

3.4.3 Cultural Heritage

The *Carlow County Development Plan* (2022 – 2028) does not contain any specific designated lists or sites of cultural heritage importance or significance.

Kilkenny City and County Development Plan 2021 - 2027

3.4.4 Archaeological Heritage

It is an Objective (9C) of Kilkenny County Council (Kilkenny County Council 2021, 143) to:

> "*Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains*."

It is a Development Management Requirement of Kilkenny County Council (*ibid*.) to:

> "*Endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on archaeological heritage*."

Section 9.3.1.1 of the Kilkenny City and County Development Plan (*ibid*., 141) contains a list of *Archaeological Landscapes* within the county. There are no Archaeological Landscapes within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Archaeological Landscapes within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Section 9.3.1.3 of the Kilkenny City and County Development Plan (*ibid*., 142) makes reference to *Walled Towns* within the county. There are no Walled Towns within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Walled Towns within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Section 9.3.1.4 of the Kilkenny City and County Development Plan (*ibid*.) makes reference to the *Industrial Heritage* within the county. There are no Industrial Heritage features within the site of the electricity substation or the control units; or within Route Option A or Route Option B or within 100m of Route Option A or Route Option B.

Section 9.3.1.5 of the Kilkenny City and County Development Plan (*ibid*., 144) makes reference to *Conservation Plans* within the county. There are no areas for which Conservation Plans have been prepared within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no areas for which Conservation Plans have been prepared within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Section 9.3.1.6 of the Kilkenny City and County Development Plan (*ibid*.) makes reference to *Historic Graveyards* within the county. There are no Historic Graveyards within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Historic Graveyards within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

3.4.5 Architectural Heritage

It is an Objective (9G) of Kilkenny County Council (Kilkenny County Council 2021, 146) to:

> "*Respond to the Ministerial recommendation to include in the RPS, structures which have been identified as being of regional, national or international significance in the National Inventory of Architectural Heritage survey and to consider for inclusion those rated as being of local significance*."

It is also an Objective (9H) of Kilkenny County Council (*ibid*.) to:

> "*Continue to review the Record of Protected Structures and add or delete structures as appropriate*."

Appendix I of the Kilkenny City and County Development Plan (*ibid*.) contains the Record of Protected Structures for the county. There are no Protected Structures within the site of the electricity substation or the control units. There are 9 no. Protected Structures within 2km of the electricity substation (all of which are recorded on the National Inventory of Architectural Heritage). There are no Protected Structures within 2km of the control units.

There are no Protected Structures within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Section 9.3.3.1/Table 9.2 of the Kilkenny City and County Development Plan (*ibid*., 149) contain a list of *Architectural Conservation Areas* within the county. There are no Architectural Conservation Areas within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no Architectural Conservation Areas within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

3.4.6 Cultural Heritage

The *Kilkenny City and County Development Plan* (2021 – 2027) does not contain any specific designated lists or sites of cultural heritage importance or significance.

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).

There are no National Monuments in State Care within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no National Monuments in State Care within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

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 site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no National Monuments with Preservation Orders or Temporary Preservation Orders within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the site of the electricity substation or the control units or within 2km of the electricity substation or the control units.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

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 site of the electricity substation or control units. There are 16 no. structures recorded on the National Inventory of Architectural Heritage within 2km of the electricity substation (9 no. of which are also recorded as Protected Structures). There is 1 no. structure recorded on the National Inventory of Architectural Heritage within 2km of the control units.

There are no structures recorded on the National Inventory of Architectural Heritage within Route Option A or Route Option B or within 100m either side of Route Option A or Route Option B.

Garden Survey

There are no historic gardens or designed landscapes recorded on the National Inventory of Architectural Heritage within the site of the electricity substation or control units.

3.7 Previous Archaeological Fieldwork

RMP KK016-006 (linear earthwork) is located south of the southern boundary of the electricity substation (Figure 6). Fieldwork was carried out on this monument in October 2007 as part of archaeological works for the N9/N10 Kilcullen to Waterford Road Scheme, Phase 4 – Knocktopher to Powerstown (Irish Archaeological Consultancy 2012).

The site, known as Shankill 1, was identified as the "Rathduff Dyke" by Jeremy Milin, who researched linear earthworks in Ireland (O'Flaherty 1987). The earthwork was inspected during the testing phase of the N9/N10 and appeared no different from the normal field boundaries in the area. It consisted of a bank and a ditch and was linear in extent. It extended for 2km from the slope of the hills to the north to the modern railway line. It is not traceable on the ground beyond the railway line to the south east, nor is it marked on any editions of the Ordnance Survey maps of the area.

An area measuring approximately 10m wide was opened and assessed on either side of the possible linear earthwork, but it revealed nothing except for a number of plough marks and gullies running towards the ditch. Features recorded on either side of the boundary were interpreted as being associated with drainage and are not of archaeological significance. The ditch portion of the boundary was identified as having a maximum width of 2.25m and was 1.0m deep. It contained one shallow deposit suggesting it had been regularly cleaned to assist drainage. The bank was located on the south side of the ditch and was constructed of upcast material from the original bank. It was heavily overgrown with mixed species of trees and hedgerow. It had maximum dimensions of 3.0m wide at the base and was 1.0m high. The ditch had a concave profile and the bank was convex with no evidence for revetting.

The excavation at Shankill 1 confirmed the presence of a linear boundary formed by a ditch and bank. No features of archaeological significance were recorded on either side of the boundary, and nothing was identified within the components of the boundary that would have

provided an accurate date for its construction. The excavation did not provide any evidence to support or contradict the interpretation that it forms part of a linear earthwork possibly dating to the later Iron Age.

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 is one Recorded Monument (a linear earthwork) located south of the southern boundary of the electricity substation.

- There are an additional 14 no. Recorded Monuments within 1km of the electricity substation. There are no Recorded Monuments within the site of the control units or within 1km of the control units. There are no Recorded Monuments within Route Option A or within 100m either side of Route Option A. There are no Recorded Monuments within Route Option B. There are 3 no. Recorded Monuments within 100m either side of Route Option B, one of which is located immediately east of the route.

- The project could potentially have a permanent imperceptible direct construction impact on any previously unrecorded archaeological remains that may exist within the development area.

- It is considered that there could potentially be a visual and noise construction impact on a Recorded Monument (linear earthwork) located south of the southern boundary of the electricity substation.

- It is considered at this stage that there is unlikely to be a visual or noise construction impact on any additional archaeological remains, however, further assessment is required.

- It is considered at this stage that there is unlikely to be a visual or noise construction impact on any architectural or cultural heritage remains, however, further assessment is required.

4.2 Potential Cumulative Construction Impacts

- It is considered at this stage that 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 that the electricity substation may have an operational visual and noise impact on a Recorded Monument (linear earthwork). Further assessment is required.

- It is not known at this stage if there will be an operational visual impact on an additional 14 no. Recorded Monuments within 1km of the electricity substation. Further assessment is required

- It is not known at this stage if there will be an operational visual impact on 9 no. Protected Structures (all of which are recorded on the National Inventory of Architectural Heritage), and 16 no. structures recorded on the National Inventory of Architectural Heritage (9 no. of which are recorded as Protected Structures) located within 2km of the electricity substation. Further assessment is required.

- It is considered that the electricity line, due to its underground nature, does not have the potential to result in operational visual or noise 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 electricity substation and any existing, permitted or proposed developments. Further assessment is required.

- It is considered the underground electricity line 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 from the construction, operation and decommissioning of the project.

- It is recommended that a pre-development archaeological geophysical survey be carried out in all areas of land take associated with the electricity substation. The results of the geophysical survey will be submitted as part of the EIAR and used to inform the assessment to be undertaken in the EIAR.

- It is likely that licensed post-consent pre-development test trenching will be recommended in all areas of land take associated with the electricity substation.

- It is likely that licensed archaeological monitoring will be recommended for all excavation works associated with construction of the substation and control units.

- It is likely that licensed archaeological monitoring will be recommended for all excavation works associated with construction of Route Option A or Route Option B.

- It is recommended that detailed visual and noise impact assessments be carried out to assess the extent of construction and operational visual and noise impacts which the electricity substation may have on archaeological and architectural remains.

- 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

Given its proximity to a Recorded Monument (linear earthwork), it is recommended that micrositing should not be considered at the site of the electricity substation should it result in infrastructure moving closer to the Recorded Monument.

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www.consult.carlow.ie	Carlow County Council
www.kilkennycoco.ie	Kilkenny County Council
www.map.geohive.ie	Ordnance Survey Ireland aerial photographs

Annex 6 –
Noise & Vibration Scoping Report

awnconsulting
A Trinity Consultants Company

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

WHITE HILL WIND FARM ELECTRICITY SUBSTATION AND ELECTRICITY LINE

SCOPING REPORT: NOISE AND VIBRATION

Technical Report Prepared For

Galetech Energy Services
Clondargan
Stradone
Co. Cavan
H12 NV06

Technical Report Prepared By

Robert Holohan BA (Hons) MSc

Our Reference

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Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

AWN Consulting Limited
Registered in Ireland No. 319812

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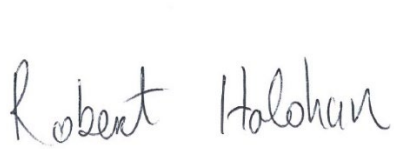
Signature		
Name	Robert Holohan	Mike Simms
Title	Acoustic Consultant	Principal Acoustic Consultant
Date	24 May 2024	24 May 2024

EXECUTIVE SUMMARY

This document summarises the scope of the noise and vibration study for the EIAR Chapter for the White Hill Wind Farm Electricity Substation and Electricity Line under the following headings:

- The ***study area*** will be defined;
- the ***description of the existing environment*** will be obtained by the analysis of the measured noise levels, at locations monitored 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****:* Cumulative noise and vibration effects with the White Hill Wind Farm are screened out of the assessment. The potential for cumulative noise and vibration due to other nearby developments in general can be assessed if required.

Constraints on the proposed development have also been considered. There are noise-sensitive locations (typically residential houses) at intervals all along the route and in the wider environs of the proposed electricity substation. No schools or places of worship were identified.

CONTENTS

1.0 INTRODUCTION

The noise and vibration chapter of the EIAR will assess the potential impacts of the project to sensitive receptors in the surrounding environment. The principal phase with potential for noise and vibration impacts is the construction phase, given that the underground electricity cables do not generate noise. The only element of the project with the potential for operational noise impacts is the substation.

The principal objectives of the noise and vibration assessment are 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 covers the substation area where the noise is predicted to exceed 35dB $L_{Aeq,15min}$. Based on typical noise levels of substations the area will be in the order of 350 m from the substation boundary.

For the construction phase all properties within 250 m of the proposed construction activities or the nearest noise sensitive location (NSL) if greater than 250m will be considered in the assessment.

Potential NSLs include residential dwellings, commercial properties, derelict buildings (which may be brought back into use), and pre-planning infrastructure (including that submitted for planning permission associated with houses). All properties will then be reviewed by ground-truthing and further desktop assessment to identify potential sensitive receptors in the vicinity of the development.

3.0 DESCRIPTION OF EXISTING ENVIRONMENT

A background noise monitoring survey will be completed at several NSLs in the vicinity of the project. All measurements will be conducted in accordance with the ISO 1996: 2017*: Acoustics – Description, measurement, and assessment of environmental noise* (ISO, 2017).

The results of the background noise survey will be used to identify appropriate noise criteria for the various phases of the project with reference to the appropriate guidance documents.

3.1 Unattended Noise Survey Location

In order to address the potential impact of the substation noise, an unattended noise monitor will be installed for up to 48 to 72 hours at the location shown in Figure 1. The survey will be carried out in calm conditions. The findings of the noise survey will be used to develop noise criteria using the methodology in (EPA) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities NG4* (EPA, 2016) and the British Standard BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

3.2 Proposed Attended Noise Survey Locations

It is understood that the construction activities will take place during daytime periods (07:00hrs to 19:00 hrs). In order to describe the existing noise environment along the route, noise levels at six locations will be monitored. The findings of the noise survey will be used to develop construction noise criteria using the methodology in the British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites Part 1: Noise*.

The proposed locations of the noise surveys are presented in Figures 1 and 2 below. Coordinates for the proposed locations are provided in Tables 1 and 2. These survey locations may be relocated if necessary due to factors such as safety and accessibility.

Figure 1 Proposed Unattended Noise Survey Location at Proposed Substation

Figure 2 Proposed Attended Noise Survey Locations

Table 1 Coordinates for proposed unattended survey locations

Location Reference	Coordinates (ITM)	
	Easting	Northing
AT1	265667	160516

Table 2 Coordinates for proposed attended survey locations

Location Reference	Coordinates (ITM)	
	Easting	Northing
AT1	260734	164544
AT2	263323	164152
AT3	264212	163520
AT4	264912	163040
AT5	665037	662013
AT6	265804	160878

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 project. It is envisaged that the main noise and vibration impacts associated with the project will be construction activity. The potential noise and vibration impacts will be considered for the following phases:

- Construction Phase, and;
- Operational Phase.

It is understood that there will be no decommissioning phase in this instance, as the infrastructure will be left *in situ*.

4.1 Construction Phase

Construction noise levels associated with various element 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. 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*. All predictions will be conducted in accordance with the guidance contained also within BS 5228.

Vibration during construction will also be considered regarding the potential impact of residential amenity and structural damage to buildings.

4.2 Operational Phase

We will predict noise levels at all the identified noise sensitive locations in the substation study area using a proprietary noise modelling package. All predictions will be done in accordance with ISO 9613: *Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation*, (ISO, 1996). 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 can be generated for the site noise models illustrating 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 substation. Where necessary and possible, noise control measures will be considered. Discussion of other issues will be included where appropriate, e.g. tonality.

The potential noise impact road traffic movements to and from the substation and any other permanent source of noise will be assessed and included as part of the noise chapter.

5.0 CUMULATIVE EFFECTS

Due to the 8km distance from proposed substation to White Hill Wind Farm, cumulative assessment considering the wind farm is not included in the scope of the environmental noise assessment.

However, if desired, discussion of cumulative construction noise due to other development, whether they be renewable energy, quarries, infrastructure or

residential, can be included. In this instance, the specific list of developments for consideration will be provided by the client.

6.0 CONSTRAINTS

The main constraint on the project from a noise point of view is the distance to NSLs. in this context, the definition supplied in Environmental Protection Agency (EPA) NG4 Appendix I is adopted:

> *NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.*

The majority of NSLs at the substation and along the electricity cable route are residential houses. Using information available on-line, no schools or places of worship were identified in the study area.

6.1 Construction Phase

The construction works associated with electricity line will necessarily pass close to NSLs.This is mitigated by the fact that the construction works will proceed in a linear fashion and will not be close to any individual NSL for more than a number of days.

A set of general construction noise and vibration mitigation measures will be included in the EIAR. Construction compounds, if applicable, should not be located with 100 m of an NSL.

6.2 Operational Phase

The operational phase noise of the project is confined to the substation. No sources of vibration are associated with the operational phase of the project. Using data to be provided by the client, the potential for noise impact at the nearest NSL will be assessed against the criteria derived from EPA NG4 / BS 4142:2014+A1:2019 guidance. If required, noise mitigation measures in the form of acoustic screening via berms or solid walls will be proposed.