



Pinewoods Wind Farm – Revised
Turbine Dimensions

Environmental Impact
Assessment Report /
Environmental Impact
Statement – Volume 2

Pinewood Wind Limited

Galetech Energy Services

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Chapter 1: Introduction

Laois County Council Planning Authority, Viewing Purposes Only

1.1 Introduction

This Environmental Impact Statement (EIS) has been prepared by Galetech Energy Services (GES) Limited to inform the Environmental Impact Assessment (EIA) to be carried out by the competent planning authorities in respect of their assessment of a planning application by Pinewoods Wind Limited (PWL) for the development of a wind farm project comprising 11 no. turbines and all associated site development and ancillary works on lands in the townlands of Knockardugar, Boleybawn, Garrintaggart, Ironmills (Kilrush) and Graiguenahown, County Laois and Crutt Co. Kilkenny.

EIA is a process to ensure that projects which are likely to have significant effects on the environment are subject to a comprehensive examination, analysis and evaluation of environmental effects prior to planning permission being granted. An EIS is a statement of the effects, if any, which the proposed development, if carried out, would have on the environment and provides information which competent authorities can use in undertaking EIA and in informing their decision. It consists of a systematic analysis of the proposed development in relation to the existing environment. The EIS is carried out at a stage in the project design process to allow for preventative action and where changes can still be made to the project which anticipate and avoid adverse impacts. The EIS can also be used by third parties as part of the public participation process to evaluate the proposed development and its likely impacts.

1.2 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 EIS. Schedule 5 of the Planning and Development Regulations 2001 (as amended) provides that the following class of development proposal shall be subject to EIA:

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

The project consists of 11 no. 3.2MW turbines with a total rated power output of 35.2MW and is therefore of a scale which exceeds the mandatory threshold for EIA and, consequently, an EIS has been prepared and submitted with the planning application.

1.3 Content of the EIS

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

A range of best-practice guidance documents were also consulted in preparing the content of this EIS, including:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of EIS (EPA, 2003);
- Wind Energy Development Guidelines for Planning Authorities (DoEHLG, 2006);
- Best Practise Guidelines for the Irish Wind Energy Industry (IWEA, 2012).

The impact classification and sensitivity terminology described in the EPA guidelines is used in this EIS. Further, specific guidance, legislation and standards pertinent to particular environmental topics is also described in each individual chapter of this EIS, where relevant.

1.4 Format of the EIS

This EIS follows a 'grouped format' structure where each environmental topic is assessed and presented as a separate chapter. In order to provide for a consistent approach, each chapter is systematically organised so as to follow a similar basic structure, describing:

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

This EIS is presented as two volumes as follows:

- Volume I: Main Report;
- Volume II: Photomontages;

A short, accessible non-technical summary has been prepared as a separate and self-contained document which can be distributed to the public who are likely to be affected by the proposed development. It also contains the details on how members of the public and other organisations can submit any observations. The non-technical summary is laid out in a similar, but condensed, format to the main EIS, i.e. describing the project, existing environment, impacts and mitigation measures, and avoids technical language.

1.5 EIS Project Team

GES has been appointed as agents by PWL to manage and co-ordinate the production of this EIS. GES is an Irish multi-disciplinary renewable energy consultancy that specialises in the delivery of advisory, project management, planning, environmental and technical engineering services from project feasibility through to delivery and operation. GES combines the expertise of some of the industry's leading experts in renewable energy.

EIA is critically dependent on the expertise, experience, independence and objectivity of environmental specialists. They characterise the existing environment and evaluate its significance and sensitivity. Individual specialist and technical consultants were also appointed in the preparation of this EIS in order to undertake assessments and prepare specific chapters, where necessary. Each specialist was selected having regard to their knowledge of relevant environmental legislation; familiarity with pertinent standards and criteria for the evaluation and classification of significance of impacts; the ability to interpret technical documents and to work with project designers to arrive at practical and reliable measures to mitigate and monitor impacts; and to clearly and comprehensively present their findings in a concise manner.

An overview of the specialist consultants involved in the preparation of each chapter of this EIS is provided in **Table 1.1** below.

<i>Chapter</i>	<i>Environmental Topic</i>	<i>Specialist Consultant</i>
1	Introduction	GES
2	Description of the Proposed Development	GES
3	Human Beings & Community	GES

4	Flora & Fauna	Ecofact Environmental Consultants
5	Soil & Geology	Hydro-Environmental Services
6	Water	Hydro-Environmental Services
7	Air & Climate	GES
8	Landscape & Visual Impact	MosArt Ltd
9	Archaeology & Cultural Heritage	Dermot Nelis Archaeology
10	Noise	Mike Simms, Acoustic Consultant
11	Shadow Flicker	GES
12	Infrastructure & Telecommunications	GES
13	Transport & Access	GES
14	Interaction of the Foregoing	GES

Table 1.1: Specialist Consultants involved in the preparation of this EIS

All photomontages were prepared by GES (Volume II). The non-technical summary was also prepared by GES.

1.6 Scoping

The scoping process identifies the issues that are likely to be important during EIA and eliminates those that are not. The prior determination of the nature and detail of the information to be contained in the EIS is one of the most important stages of EIA and may be conducted through a formal or informal process. Scoping helps ensure that the EIS remains focussed on issues that are environmentally based, likely to occur and may have significant and adverse effects.

In establishing the scope of this EIS, the statutory obligations as set out in Schedule 6 of the Regulations and a range of guidance documents were consulted, including the EPA *Advice Notes on Current Practice in the Preparation of EIS (2003) (Project Type 33)* and the *Wind Energy Development Guidelines for Planning Authorities (2006)*. The Laois County Development Plan 2011–2017 and the Kilkenny County Development Plan 2014–2020, and their associated Strategic Environmental Assessments (SEA), were also consulted. Other similar projects on the subject site and similar sites which were subject to a satisfactory EIS were furthermore examined. In addition, continuing scoping took place throughout the project design process in order to iteratively inform measures to avoid, reduce or remedy any likely significant environmental impacts. The scope of this EIS also includes an assessment of relevant 'off-site' developments including:

- The proposed connection to the national grid (In accordance with the judgement of the High Court in respect of *O'Grianna & Ors v An Bord Pleanála* judicial review proceedings);
- Indirect impacts in respect of the extraction of aggregates and material to be used in the construction phase;
- Transport and access considerations, including the haul route for turbine components.

A number of other third-party planning applications have been made in the environs of the subject site comprised mainly of residential and agricultural developments. The likely impact on these proposed developments is also addressed in this EIS.

A variety of statutory and non-statutory organisations were also consulted at an early stage in the process to gather their views on the scope of likely significant environmental impacts of the proposed development. The written consultation provided a brief description of the proposed development along with the site location and invited comments from each consultee. **Appendix 1.1** and **Appendix 1.2** details all of the organisations consulted, a sample copy of the consultation letter

issued and of the responses received. **Table 1.2** below lists the organisations consulted and whether or not a response was received.

<i>Body</i>	<i>Response</i>
2RN – RTE Transmission Network Ltd	No
3G Hutchinson	No
An Taisce	No
Birdwatch Ireland	Yes
BGN Asset Integrity	No
Commission for Energy Regulation	Yes
Communications & Information Services Corps	No
Department of Agriculture Food and the Marine (Climate Change & Biodiversity Policy Division)	Yes
Department of Agriculture, Fisheries & Food	No
Department of Communications, Energy & Natural Resources	No
Department of Defence	Yes
Department of Environment, Community and Local Government (Archaeological & Architectural Heritage)	No
Department of Environment, Community and Local Government (Nature Conservation)	Yes
Eircom (Radio Design)	Yes
Eirgrid	No
Faite Ireland	No
An Garda Siochana	No
Gas Networks Ireland	Yes
Geological Survey of Ireland	Yes
Irish Aviation Authority	No
Irish Wildlife Trust	No
Kilkenny County Council	Yes
Kilkenny Tourist Office	No
Laois County Council	No
Laois Tourism	No
Meteor Ireland Ltd	No
National Ambulance Services	No

<i>Body</i>	<i>Response</i>
National Parks & Wildlife Services	No
O2 Ireland Ltd	No
Transport Infrastructure Ireland (formerly The National Roads Authority)	Yes
Sustainable Energy Authority of Ireland	No
Southern Regional Fisheries Board	Yes
TETRA Ireland Communications Ireland Ltd	No
The Heritage Council	No
Vodafone	No

Table 1.2: Summary of Written Consultations

A public consultation event was also held at an early stage in the process in Spink Community Centre, Spink, Co. Laois between the 20th and 21st of July 2015. Interested parties were invited to meet representatives of the project design team and to discuss any queries in relation to the project. In addition, there was direct engagement with each property within a 2km radius of the proposed development site. For the most part these consultations were undertaken with homeowners but also included local businesses and clubs. This process further guided the scoping of the issues to be addressed by the EIS.

A comprehensive overview of all of the extensive consultation undertaken as part of this project is presented in a separately bound report.

1.7 Habitats Directive Appropriate Assessment

A separate Natura Impact Statement (NIS) to inform an 'Appropriate Assessment' to be carried out by competent authorities in accordance with the provisions of the Habitats Directive (Council Directive 92/43/EC) has been prepared by Ecofact Environmental Consultants and is submitted as a separate document.

1.8 Difficulties Encountered in Compiling the EIS

No specific difficulties (technical deficiencies or lack of know-how) were encountered in compiling the information required as part of the EIS.

1.9 Note on Quotations

It is important to acknowledge that statutory obligations call for a comprehensive description of the existing environment as well as all likely impacts. The EIS therefore contains statements describing the positive and negative aspects of a proposed development. Selective quotation out of context may not be representative of the overall findings of the EIS. Where possible, therefore, quotations should be taken from the overall conclusions of each chapter.

Appendix 1.1: Sample Consultation Letter and Map

Laois County Council Planning Authority, Viewing Purposes Only



IWCM Ltd.
Clondargan
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Ireland

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info@iwcm.ie

3G Ireland
28/29 Sir John's Rogerson's Quay
Dublin 2

5th February 2015

Re: Proposed Wind Farm Development in North Kilkenny and South Co. Laois

Pinewood Wind Ltd. is proposing to erect 11 no. 2.85MW turbines in south Co. Laois and north Co. Kilkenny. The proposed site is to be known as "*Pinewoods Wind Farm*".

IWCM Ltd is currently carrying out a detailed project assessment on behalf of the applicant, in order to confirm the and suitability of the site for this development. As part of the site assessment and EIA feasibility process, IWCM Ltd endeavours to engage all stakeholders in the project at an early stage.

The proposed wind farm and ancillary development is located in the townlands of Graignahown, Knockardugar, Boleybawn, Ironmills/Kilrush, Co. Laois and Crutt Co. Kilkenny. The turbines proposed for the site are that of 11 no. 2.85MW Enercon E82 turbines giving a total output of 31.35MW. The typical dimensions of this turbine type are:

- Hub height: 85m
- Rotor Diameter: 103m
- Height not exceeding: 148m (ground to blade tip)

The location of the proposed turbines is as follows, please refer to attached map for further details:-

ID	Easting	Northing	Altitude
T1	251604	182460	260
T2	251693	182105	268
T3	251677	181752	275
T4	250937	181833	295
T5	251205	181628	298
T6	250756	181489	298
T7	250415	181184	280
T8	250700	180989	295
T9	250811	180698	292
T10	250926	180409	290
T11	250356	180406	269
Met Mast	250900	182093	290
Switchroom	251080	181800	288

The assessments to date indicate that this would be a very positive development for the area. The development would contribute to reducing CO2 production and assist with meeting our national obligations to reduce CO2 emissions.

To assist with the consultation process, I would be grateful if you would provide comment on this proposed development. Please note that the exact details of the proposed development maybe subject to change as the project progresses through the EIA process.

If you have any questions about the development, please do not hesitate to contact me. I look forward to your reply.

Yours Sincerely,

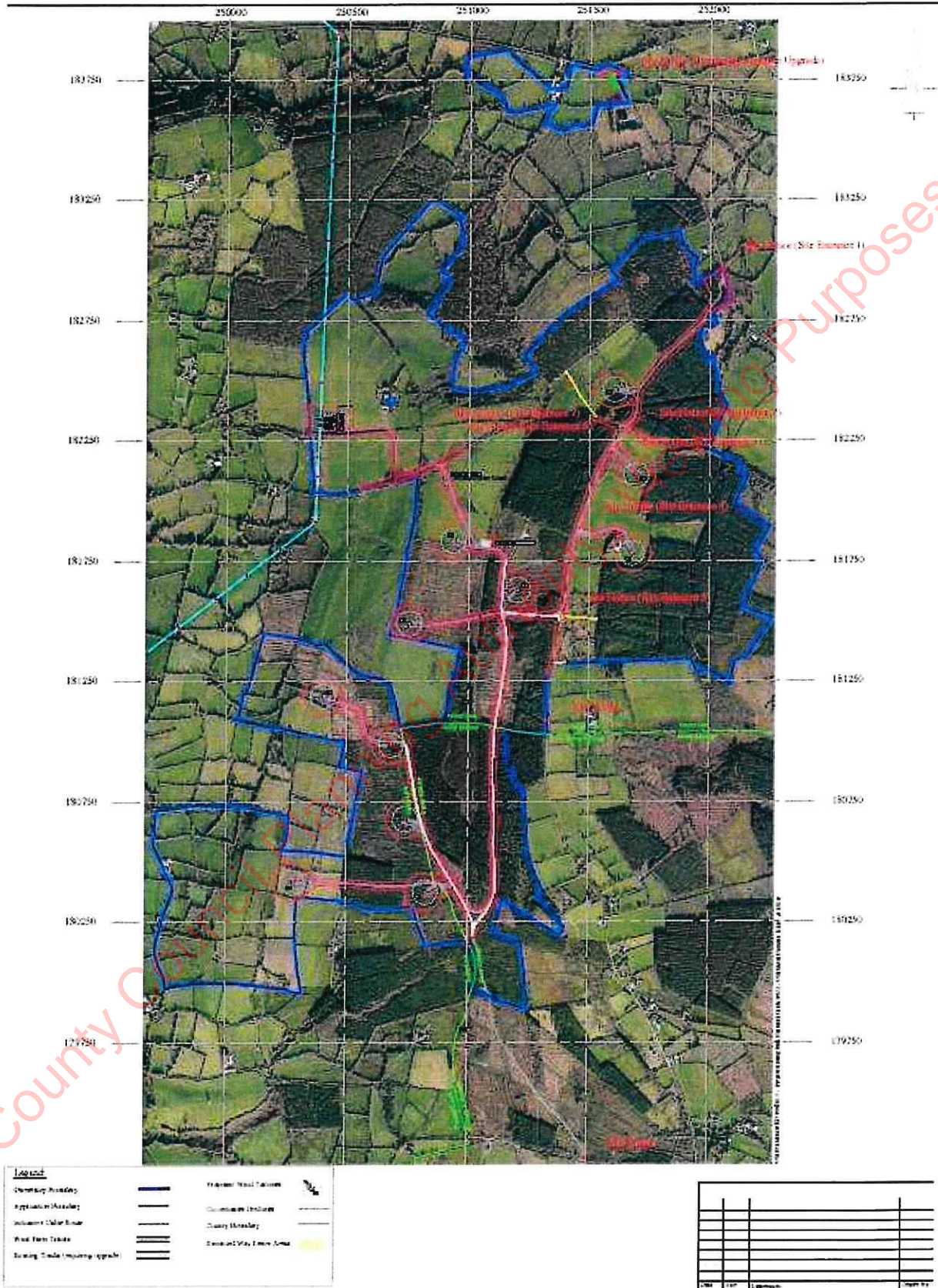


Catherine Keogan

Project Planner for and on behalf of IWCM Ltd

email: ck@iwcm.ie

Laois County Council Planning & Development Department



For Purposes Only

Appendix 1.2: Consultation Responses

Laois County Council Planning Authority, Viewing Purposes Only



BirdWatch Ireland
protecting birds and biodiversity

Unit 20 Block D
Bullford Business
Campus
Kilcoole

t: +353 1 281 9878
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w: birdwatchireland.ie

Patron
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Higgins
President of

Éarlamh
Micheál D Ó hUigín
Uachtarán Na
hÉireann

Catherine Keogan,
IWCM Ltd.,
Clondargan,
Stradone,
Co. Cavan

Your Ref:

Our Ref: 28.01.15LS

13-03-15

Re: Proposed Wind Farm Development in North Kilkenny and South Co. Laois

Dear Ms. Keogan,

Thank you for your consultation regarding this proposed wind farm development. BirdWatch Ireland is supportive of the development of low carbon energy sources in Ireland, in particular wind energy and is working in a proactive way in order to ensure energy targets can be met, in addition to obligations to protect and enhance important areas for wildlife under the EU Nature Directives¹. Given the potential for wind farms to have direct, indirect and cumulative impacts on bird populations, BirdWatch Ireland would have concerns over any developments which were not ecologically sustainable, specifically developments with potential for significant impacts on bird populations within designated sites and in the wider countryside. We would have particular concern for priority species².

We have significant concerns regarding the construction of a wind farm at the location indicated in your scoping letter, as recent records show the possible presence of breeding Curlew within this area. Curlew are a red listed species in the Birds of Conservation Concern in Ireland 2014-2019 report and the breeding Curlew population in Ireland has suffered serious declines (82%) since 1987². Curlew are known to be particularly sensitive to disturbance and displacement from wind infrastructure³, in addition Curlew densities have been shown to decrease significantly during wind farm construction with populations showing no recovery post-construction⁴.

¹ EU Nature Directives [Birds Directive (79/409/EEC) & Habitats Directive (92/43/EEC), Environmental Impact Assessment (EIA) Directive (85/337/EEC as amended by 97/11/EC), and Strategic Environmental Assessment (SEA) Directive (Directive 2001/42/EC)].

² Colhoun K. & Cummins, S. 2013 Birds of Conservation Concern in Ireland 2014-19. *Irish Birds* 9:523-544

³ Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. & Bullman, R. (2009) The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*, 46, 1323-1331.

⁴ Pearce-Higgins, J.W., Stephen, L., Douse, A. & Langston, R.H.W. (2012) Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology*, 49, 386 – 394



Directors: K O'Byrne (Chairman), B Lavery, JB Peart, Seamus Bridgeman, Gerry Lyons, Margaret Stephens, David Fay. Registered charity no. 5703. BirdWatch Ireland is the trading name of the



BirdWatchIreland
protecting birds and biodiversity

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Patron
Michael D.
Higgins
President of

Éarlamh
Micheál D Ó hUigínn
Uachtarán Na
hÉireann

We would recommend that a detailed review is undertaken concerning the potential impacts of wind farms on the bird species relevant to this site and its surrounding areas, in addition to appropriate surveys to determine species utilization of the area, including flight-lines. Potential impacts of the proposed development alone should be considered in addition to the potential cumulative impacts from existing, approved and/or proposed developments in the area. Furthermore, should the development go ahead we would recommend post construction monitoring to include vantage point surveys and fatality monitoring.

We would appreciate if you could let us know if or when this proposal enters the planning process and if you would forward us a copy of the survey results and the Ecological Impact Assessment reports for this proposed wind farm when they become available. Digital copies are welcomed (Email: casework@birdwatchireland.ie).

Yours sincerely,

Karen Carrigy
Policy & Advocacy Team



Directors: K O'Byrne (Chairman), B Lavery, JB Peart, Seamus Bridgeman, Gerry Lyons, Margaret Stephens, David Fay. Registered charity no. 5703. BirdWatch Ireland is the trading name of the



Commission for Energy Regulation
An Coimisiún um Rialáil Fuinnimh

Ms. Catherine Keogan,
Project Planner,
IWCM Ltd.,
Clondargan,
Stradone,
Co. Cavan.

28 JAN 2015

27 January 2015

Re: Proposed Wind Farm Development in North Kilkenny and South Co. Laois.

Dear Ms. Keogan,

I refer to your letter dated 2nd December 2014. The Commission for Energy Regulation has no comments to make on the above proposed development.

Yours sincerely,

A handwritten signature in black ink that reads 'Liz Kavanagh'.

Liz Kavanagh
Licensing Officer
Commission for Energy Regulation

Laois County Council Planning Authority, Viewing Purposes Only

Ms Catherine Keogan
Project Planner
IWCM Ltd.,
Clondargan,
Stradone,
Co. Cavan

16th February 2016.

Re; Proposed Wind Farm Development in North Kilkenny and South Co. Laois.

Dear Ms Keogan,

I refer to your recent correspondence concerning the above. It is suggested that you consider the likely impact, if any of the proposed development on agriculture/agricultural activities in the locality as part of the Environmental Impact Assessment. Aspects that could be considered include the following:

- Likely impacts during the site preparation, excavation and erection phases (examples of impacts include impact on water quality, risk to soil stability).
- Likely impacts when the development is complete.

Please also note:

**Forest Service Policy on the Granting of Felling Licences
for Wind Farm Development**

[Effective from 3rd June, 2011]

Where a developer intends to construct a wind farm within a forest, or partially within a forest, or that will affect a forest environmentally or that will require tree felling, it is extremely important that the developer consults the Forest Service at the earliest possible stage of the project. This approach may help to develop a collaborative approach that will ensure that all forestry issues are identified and mitigated at the earliest opportunity.

1. Only Limited Felling Licences (LFL) should be applied for and will be issued for wind farms. No General Felling Licences (GFL) will be granted. GFL's carry an obligatory replanting condition, whereas LFL's provide flexibility with regard to the imposition of a replanting condition and the extent of such a condition. Two LFLs must be applied for – 1) to cover the turbine bases, the roads, buildings, etc; 2) to cover the area on which 'turbulence felling' will take place, if required.

NOTE: Where a person intends to fulfil the replanting condition of a Limited Felling Licence by planting an area other than the area felled under the licence, Section 41(1)(a)(i) of the Forestry Act, 1946, stipulates that the licensee must own the alternative site at the date of the grant of the licence.

Turbulence felling is deemed to be felling in the vicinity of the turbines, the purpose of which is to avoid turbulence that can be created by the forest canopy and that can affect the performance and efficiency of the turbines. Turbulence felling may be allowed in certain cases, at the discretion of the Minister and subject to replanting requirements as outlined at section 10 below.

2. As it is Forest Service policy to facilitate wind energy as much as possible within the requirements of sustainable forest management, please note the following as guidance:
 - i. The felling required to facilitate the turbine bases, the roads, buildings, etc. will not be considered turbulence felling.
 - ii. A felling coupe is defined for this purpose as a contiguous or adjacent area, any part of which is felled in a 2 (calendar) year period. As a felling coupe of less than 20 hectares is usually consistent with sustainable forest management, where a cumulative total area of 20 hectares or less is adjacent to one or more turbines and it is proposed to fell this area in accordance with normal good forest practice, such felling will not be considered turbulence felling.
 - In the context of this section 2(ii), the felling required to facilitate the turbine bases, the roads, buildings, etc. will not be considered to be part of the 20 hectare limit. That is to say, there can be a felling of up to 20 hectares in the wind farm development plus the area for the bases, etc., e.g. a 20 hectare felling plus, say, 4 hectares for the bases, etc.
 - The granting of a licence for a felling of 20 hectares or less will be subject to the normal checks carried out by the Forest Service in respect of silvicultural, environmental and landscape considerations, etc.
 - A licence granted in respect of such an area of 20 ha or less will contain a replanting condition, as normally imposed by the Forest Service for such felling. The replanting condition may require the replanting of slow growing species. There will be no requirement for additional land to be planted; the area to be planted will be equal to the area felled (e.g. if 16 hectares are felled, then the replanting condition will require planting of 16 hectares).
 - Excluding the area for the turbine bases, etc. from the limit, the 20 hectare limit specified in this section is a total limit for the entire wind farm development. The limit is not interpreted as 20 hectares per turbine or any other interpretation that is deemed by the Minister to be in excess of a total of 20 hectares per wind farm development.
 - Subsequent to a licence being granted for 20 hectares or less, any cumulative felling applied for above the 20 hectare limit will be considered to be turbulence felling. This will be deemed to be 'project splitting' and, therefore, the original area of 20 hectares or less that was licensed will also then be regarded as turbulence felling. For example, if 20 hectares are felled in the first year and a further 12 hectares of felling is applied for in say year 3, then the additional 12 (if granted) and the original 20 hectares will be treated as 32 hectares of turbulence felling. The rules for turbulence felling will then apply to all 32 hectares.

See the scenarios outlined in section 10 below.

3. As standard, areas cleared for turbine bases, access roads, and any other wind farm related infrastructure must be replaced by replanting at an alternative site. Under the Forestry Act, 1946, the felling licence applicant must own the alternative site at the time the licence is granted. The alternative area will not be eligible for any grants or premiums from the Forest Service.

Please note that any alternative replanting area(s) must be formally approved by the Forest Service before a felling licence is granted. Consequently, in order to avoid any undue delays in

the granting of a licence, the proposed alternative replanting site(s) should be submitted for approval as early as possible, ideally at the same time as the felling licence application is submitted.

Approval must be applied for using the Afforestation Scheme application Form (Form 1 - Application for Preplanting Technical Approval). As no grants or premiums are payable on these sites it should be stated on the form that only technical approval and not financial approval is required.

4. In line with general Forest Service policy, where grant-aided forestry is to be used for wind farm development, any grants and premiums that were paid by the Forest Service in respect of the areas felled for the turbine bases, roads, and infrastructure must be refunded. (The refunding of grants applies to the areas licensed under LFL "1" above.)
5. Notwithstanding any requirement for the wind farm developer to produce an Environmental Impact Statement (EIS) in respect of the development and the desirability of scoping the impact of tree felling/replanting proposals in an EIS, when felling licence applications are made, the Forest Service may require the developer to report on the potential loss of soil and biomass CO₂, and the reduction in productivity of the forest area associated with different wind farm, forestry management, and landscape plans. Potential impacts to be reported on and assessed may also include stability of the site, water quality, landscape issues, habitats, archaeology and other issues that may be deemed appropriate by the Forest Service.
6. When possible, both Limited Felling Licences should be applied for at the same time. This is advisable as developers should be aware that it is possible, for example, that the LFL for the bases, and roads, etc. could be granted, while the LFL for the area of turbulence felling could be refused.
7. The required felling licences should be applied for as early as possible. This will minimise delays by giving the Forest Service timely notice of the full felling requirements. It also lessens the risk of commitments being made by the developer before felling licences are granted. However, it should be noted that under the Forestry, 1946, the validity of a Limited Felling Licence is currently limited to 2 years.

As soon as planning permission is granted for the development by the local authority or Bord Pleanála, a copy of the full planning permission should be submitted to support the felling licence application(s).

8. If turbulence felling is necessary it should be kept to the absolute minimum required.
9. Where turbulence felling is necessary, replanting with slow growing species may be made a condition of the LFL. The approach may allow premature clearfell with replanting using slow growing species; lodgepole pine or another suitable species should be used, with clearfell again once the crop is 10 metres high. The height of 10 metres is a guideline; the height is selected on turbine manufacturers' specification and loss of turbine efficiency.

10. In light of the consideration that the effect on the forest estate should be kept to a minimum and the principal of retaining healthy and permanent forest, the Forest Service requires the establishment of an area that will provide the same wood production and 'climate change benefit' over the long term plus an additional 10% to allow for the increase in soil carbon emissions at afforestation and the loss of potential carbon sequestration due to the proposed method of forest management.

To this end, as standard, the requirement will be for replanting on a hectare for hectare basis for the footprint of the turbines and the other infrastructure developments. In the case of the area to undergo turbulence felling, the requirement will be for replanting on a hectare for hectare basis plus an additional 10% to allow for the increase in soil carbon emissions at afforestation and the loss of potential carbon sequestration due to the proposed method of forest management. See **example 1** below.

However, where the proposed felling is less than 20 hectares (excluding the felling in respect of the bases, roads, buildings, etc.) as stated in section 2 above, there will be no requirement to plant an additional 10% for turbulence felling. See **example 2** below.

Example 1:

In the case of a 200 ha plantation, where say 15 ha will be for turbine placement, other buildings and roads, etc., and 100 ha will undergo turbulence felling, the requirement would be:

- replanting on 15 ha for the turbines, etc.;
- replanting on 100 ha for turbulence felling;
- replanting on 10 ha (10% of 100) for soil carbon emissions at afforestation and the loss of potential carbon sequestration due to the proposed method of forest management.

Total replanting in this example = 125 ha, with 100 being on the site of the turbulence felling; and the 25 ha balance being on alternative land owned by the licence applicant at the time the licence is granted.

Example 2:

In a 200 ha plantation, where say 15 ha will be for turbine placement, other buildings and roads, etc., and an additional felling of say 18 ha (i.e. Less than 20 ha) is sought, the requirement would be:

- replanting on 15 ha for the turbines, etc.;
- replanting on 18 ha for the additional felling;

Total replanting in this example = 33 ha, with 15 ha being on alternative land owned by the licence applicant at the time the licence is granted.

Example 3:

In a 200 ha plantation, where say 15 ha will be for turbine placement, other buildings and roads, etc., and an additional felling of say 18 ha is initially sought, but an additional area of say 12 ha of felling is sought within the next few years, then the requirement would be:

- replanting on 15 ha for the turbines, etc.;
- replanting on 18 ha for the additional felling;
- replanting on the additional 12 ha

- replanting on 3 ha which is 10% of the turbulence felling, i.e., 10% of 30 ha (i.e. 18 ha + 12 ha) for soil carbon emissions at afforestation and the loss of potential carbon sequestration due to the proposed method of forest management.

Total replanting in this example = 48 ha, with 30 being in respect of the turbulence felling; and the 18 ha balance being on alternative land owned by the licence applicant at the time the licence is granted.

11. In exceptional circumstances a contribution condition can be imposed on a felling licence instead of a replanting condition. Where, for any reason, a contribution condition is imposed, the cost of the contribution condition should be calculated on the area as calculated at policy section 10 above. That is to say, the area on which the calculation is based will contain an additional 10% of the turbulence felling area.

By way of an indication, the contribution amount will equal the cost of acquiring good quality planting land (i.e. at the upper levels of current market prices); the cost of the replacement trees; the planting operation cost; fencing costs; and a 10-year maintenance cost. An additional 10% of the total cost of the aforementioned to cover administration costs, etc. if grants and premiums were paid in respect of the land in question.

If an area is to be licensed for turbulence felling, there will be an additional 10% added to the cost calculated above to allow for the increase in soil carbon emissions at afforestation and the loss of potential carbon sequestration due to the proposed method of forest management, as under Section 10 above.

Yours sincerely



pp Danfelle Coll
Climate Change & Bioenergy Policy Division
Department of Agriculture Food & the Marine
Pavallion A
Grattan Business Park
Dublin Road
Portlaoise
Co. Laois.



Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government

31st May 2010

Ms. Catherine Keogan,
Environmental Manager,
IWCM Ltd.,
Cootehill Enterprise Centre,
Cootehill,
Co. Cavan,
Ireland.

Our Ref: G2010/152
Your Ref:

Re: Proposed Windfarm Development at Knockardagur, Co. Laois



A Chara,

With reference to the above mentioned proposed Windfarm please find below the nature conservation recommendations of the Dept. of the Environment, Heritage and Local Government.

With regard to any EIS for this proposed development an ecological survey should be carried out on the proposed development site to survey the habitats and species present. Such surveys should be carried out at an appropriate time of the year depending on the species being surveyed for. The EIS should include the results of the surveys. The impact of the development on the flora, fauna and habitats present should be assessed, and in particular the impact of the proposed development should be assessed on habitats listed on annex I of the Habitats Directive, on areas important for birds, on species protected under the Wildlife Acts of 1976 and 2000, on species listed on Annexes II and IV of the EC Habitats Directive (92/42/EEC) and on birds listed on Annex I of the EC Birds Directive (Council Directive 79/409 EEC). Where negative impacts are identified suitable mitigation measures must be detailed if appropriate. The impact on any flight paths of animals such as bird and bat species should also be included in the EIS. Should the survey work show that the wind turbines would impact on flight paths, such as migratory routes or routes from roosts to feeding areas, there will be a need for further consultation with the National Parks and Wildlife Service of this Dept. The EIS should also include mention of invasive alien species and the methods required to ensure they are not accidentally introduced or spread during construction.

The EIS should assess the impact on Natura 2000 sites and any other sites designated for nature conservation. In particular it should assess the impact on the habitats and species listed by NPWS as

being within such sites and any other protected species which may be present. Where negative impacts are identified suitable mitigation measures must be detailed if appropriate. This proposed development is within 2 km of the River Barrow River Nore candidate Special Area of Conservation (cSAC) (site code 002162) designated under the Habitats Directive (Council Directive 92/43/EEC). The project should be screened for appropriate assessment (AA) and if necessary subject to appropriate assessment. The EIS and AA should also assess cumulative impacts with other plans or projects if applicable.

In addition we refer you to the documents listed below which may be of use to you.

The final draft EU Guidance on Wind Energy Developments and Natura 2000 which can be downloaded from

http://circa.europa.eu/Public/irc/env/wind_nature/library?l=/final_draft_guide/guide_march_2010doc/EN_1.0_&a=d

The Departmental Wind Energy Planning Guidelines which can be downloaded from <http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownload.1633.en.pdf>

Windfarms on Peatland (2008-2010) Mires and Peat volume 4 which can be found on <http://www.mires-and-peat.net/mpj3.html>

Best Practice guidance for Habitat Survey and Mapping (pre-publication version) by George F Smith, Paul O'Donoghue, Katie O'Hora and Eamon Delaney, January 2010, The Heritage Council, which can be downloaded from http://www.heritagecouncil.ie/fileadmin/user_upload/Publications/Wildlife/HabitatMappingPre-Pub.pdf

The Departmental guidance document on Appropriate Assessment available on the NPWS web site www.npws.ie under the section entitled Wildlife Planning and the Law

The EU Commission guidance entitled "Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC"

Finally, this recommendation is based on the papers submitted to this Department on a pre-planning basis and is made without prejudice to any decision the Minister may take upon sight of a former planning application or the submission of an Environmental Impact Statement.

Is mise le meas,



Simon Dolan
Development Applications Unit
Phone No.: 053 9117377
Simon.Dolan@environ.ie

Subject: Proposed Windfarm North Kilkenny / South Co. Laois - Attn: Catherine Keogan

Date: Tuesday 27 January 2015 14:31:31 Greenwich Mean Time

From: Donncha O'Sullivan

To: 'ck@iwcm.ie'

Catherine,

Your letter dated 2nd December 2014 refers:

We have reviewed the townlands where you propose to erect Wind Turbines. We are pleased to advise you there is no Gas infrastructure in any of the subject vicinities. As such, Gas Networks Ireland has no proposal to make in regard to the development.

Please accept our apology for this delayed response.

Regards,

Donncha

You are reminded that all work in the vicinity of Gas Networks Ireland Pipelines and Installations must be completed to comply fully with the relevant guidelines to be found in the current editions of the Health & Safety Authority publications, 'Code Of Practice For Avoiding Danger From Underground Services' and 'Guide To Safety In Excavations'. Both documents are available free of charge from The Health And Safety Authority. www.hsa.ie, 1890-28 93 89.

Donncha Ó Sullivan BE CEng MIEI

Development Liaison Engineer

Gas Networks Ireland

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Tá an fhaisnéis á seachadadh dírithe ar an duine nó ar an eintiteas chuig a bhfuil sí seolta amháin agus féadfar ábhar faoi rún, faoi phribhléid nó ábhar atá fogair ó thaobh tráchtála de a bheith mar chuid de. Tá aon athsheachadadh nó scaipeadh den fhaisnéis, aon athbheithniú ar nó aon úsáid eile a bhaint as, nó aon ghníomh a dhéantar ag brath ar an bhfaisnéis seo ag daoine nó ag eintitis nach dóibh siúd an fhaisnéis seo, toirimisce agus féadfar é a bheith neamhdhleathach. Níl Líonraí Gáis Éireann faoi dhliteanas maidir le seachadadh iomlán agus ceart na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Ní ghlacann Líonraí Gáis Éireann le haon dliteanas faoi ghníomh nó faoi iarmhairtí bunaithe ar úsáid thoirmisce na faisnéise seo. Níl Líonraí Gáis Éireann faoi dhliteanas maidir le seachadadh ceart agus iomlán na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Má fuair tú an teachtaireacht seo in earráid, más é do thoil é, déan teagmháil leis an seoltóir agus scríos an t-ábhar ó gach aon ríomhaire.

Féadfar ríomhphost a bheith soghabhálach i leith truaillithe, idircheaptha agus i leith leasaithe neamhúdaraithe. Ní ghlacann Líonraí Gáis Éireann le haon fhreagracht as athruithe nó as idircheapadh a rinneadh ar an ríomhphost seo i ndiaidh é a sheoladh nó as aon dochar do chórais na bhfaighteoirí déanta ag an teachtaireacht seo nó ag a ceangaltáin. Más é do thoil é, tabhair faoi deara comh maith go bhféadfar monatóireacht a dhéanamh ar theachtairreachtaí chuig nó ó Líonraí Gáis Éireann chun comhlíonadh le polasaithe agus le caighdeáin Líonraí Gáis Éireann a chinntiú agus chun ár ngnó a chosaint. Ervia ag trádáil mar Líonraí Gáis Éireann corparáid reachtúil a bunaíodh de bhun an Achta Gháis 1976 agus a bhfuil a phríomháit ghnó ag Webworks, Sráid Eglinton, Corcaigh.

Go raibh maith agat as d'aird a thabhairt.

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Thank you for your attention.

Laois County Council Planning Authority, Viewing Purposes Only

Suirbhéireacht Gheolaíochta Éireann
Tor an Bhacaigh
Bóthar Haddington
Baile Átha Cliath 4



Geological Survey of Ireland
Beggars Bush
Haddington Road
Dublin 4
Tel. +353 1 6707444
Fax. +353 1 6681782
<http://www.gsi.ie>

Ms Catherine Keogan
Project Planner
IWCM
Clondargan
Stradone
Co Cavan.

10 February 2015

RE: Proposed Wind Farm Development in North Kilkenny and South Co Laois

GSI Ref: 15/16

Dear Ms Keogan

I would like to acknowledge receipt of your your correspondence of 02 December 2014 concerning the above Windfarm Development.

Please see the attached for details of geological heritage sites near or within the study area provided.

Please note that Geological Heritage data can now be viewed online on the GSI Public Data Viewer at: http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple – see below.

Datasets

The Geological Survey of Ireland, as the national earth science agency, has datasets on Bedrock Geology, Quaternary Geology, Mineral deposits, Groundwater Resources, Geological Heritage, Landslides and the Irish Seabed. These comprise maps, reports and extensive databases that include mineral occurrences, bedrock/mineral exploration, groundwater, site investigation boreholes, karst features, wells and springs.

To assist with an Environmental impact Assessment (EIA), and especially the "Soils & Geology" and "Surface Water & Groundwater" parts, maps/databases are available on the GSI website under "Online Mapping"- direct link: <http://www.gsi.ie/Mapping.htm> with datasets currently available for Bedrock, Geological Heritage, Groundwater, Karst, Geotechnical boreholes, Mineral locations. More recent viewers accessible from the same link include the National Landslide Viewer, the Aggregate Potential Mapping and the Geotechnical Viewer.

Please note that Geological Heritage data can now be viewed online on the GSI Public Data Viewer at: http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple

There are two map layers under 'Geological Heritage':

1. 'Geological Heritage Sites Boundaries': a national dataset (one shapefile with boundary polygons) showing the nine County Geological Sites audits to date (Carlow, Clare, Kildare, Sligo; and Meath, Kilkenny, Fingal, Waterford and Roscommon, at July 2013).



County Geological Sites audit data are still available for download (as individual county shapefiles and site report pdfs; with direct links to individual reports in the most recent 5 audits) at: <http://www.gsi.ie/Programmes/Heritage+and+Planning/County+Geological+Sites+Audits/>

2. 'Geological Heritage Sites No Boundaries': a national dataset (one shapefile with buffer polygons) covering all the other counties not yet audited, indicating the provisional location/extent of sites. These sites have buffers appropriate to their type (or theme), ranging between 200m, 500m and 1000m (for the largest landscape/glacial features). These are not 'mitigation' buffers, but an attempt to encompass the extent of the particular type of site.

These will all be available to download as well in the next few weeks from: <http://www.dcenr.gov.ie/Spatial+Data/Geological+Survey+of+Ireland/GSI+Spatial+Data+Downloads.htm>

Data Updates

The 'No Boundaries' data is **provisional data only**. As each county's geological heritage is audited, the 'No Boundaries' data will be replaced with the audited 'Boundaries' data, **so please re-visit the viewer regularly for updates. There can also be *ad hoc* updates of individual site data at any time.**

We anticipate that with necessary funding and the ongoing good partnerships of local authorities and the Heritage Council, that it will be possible to complete the remaining county audits within the next 5 years. Please note that all the above sites are of, at least, County Geological Site (CGS) status (some are also recommended for designation as Natural Heritage Areas) and are included in the relevant County Development Plan with associated protection policy/ies.

Other comments

Should you identify a Geological Heritage Site with buffer within your study area, please contact Sarah Gatley, Head of the Geological Heritage and Planning Programme at sarah.gatley@gsi.ie, for further information and possible mitigation measures if applicable.

As GSI's karst dataset is far from comprehensive due to important data gaps, GSI would welcome complementary data collected during any EIA; data which would be added to the national database. If you wish to contribute data, please contact Caoimhe Hickey for details (caoimhe.hickey@gsi.ie).

At a later stage, GSI would much appreciate a copy of reports detailing any site investigations carried out. The data would be added to GSI's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to Beatriz Mozo (beatriz.mozo@gsi.ie, 01-678 2795).

I hope that these comments are of assistance, and if the GSI can be of any further help, please contact me.

Yours sincerely,



John Butler, Clerical Officer





3rd February, 2015

Catherine Keogan
Project Planner
IWCM Ltd
Clondargan
Stradone
Co. Cavan

Re: Proposed Wind Farm Development in North Kilkenny and South Co. Laois

A Chara,

Further to your letter of the 27th January, 2015 and pre-planning meeting held on the 4th December, 2014, I refer you to the Kilkenny County Development Plan (2014-2020). The sections relating to wind energy are as follows:

- Section 10.5 Wind Energy
- Section 10.5.1 Current Status
- Section 10.5.2 Wind Energy Development Strategy
- Section 10.5.3 Development Management Standards
- Section 10.5.4 Wind Energy Policy Areas
- Appendix J: Wind Energy Development Strategy

The Development Plan (2014-2020) is available on our website www.kilkennycoco.ie.

Mise le meas,

Anne Maria Walsh
Senior Executive Officer
Planning

Laois County Council Planning Authority, Viewing Purposes Only

Ms. Catherine Keogan
Project Planner
IWCM Ltd.
Clondargan
Stradone
Co. Cavan

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Dáta | Date 3 February 2015

Ár dTag | Our Ref.

NRA15 91515

Bhur dTag | Your Ref.

Re: Proposed Wind Farm Development in North Kilkenny and South Co. Laois

Dear Ms. Keogan

The Authority wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. The Authority will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by the Authority in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (Department of Environment, Community & Local Government, 2012). Regard should also be had to other relevant guidance and circulars available at www.nra.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice the NRA's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

The Authority has previously indicated to IWCM Ltd. that we would welcome site location mapping with any similar future EIS Scoping referral to enable a more relevant response to issue. This remains the position of the Authority. Please provide relevant mapping with future EIS Scoping requests.

With respect to EIS scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIS, which may affect the National Roads Network.

The developer should have regard, *inter alia*, to the following;


- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes,
- The Authority would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development; N77 and N78,
- The developer should assess visual impacts from existing national roads,
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts,

- The developer, in conducting Environmental Impact Assessment, should have regard to the NRA DMRB and the NRA Manual of Contract Documents for Road Works,
- The developer, in conducting Environmental Impact Assessment, should have regard to the NRA's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006),
- The EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (1st Rev., National Roads Authority, 2004)),
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. The Authority's Traffic and Transport Assessment Guidelines (2014) should be referred to in this regard. The scheme promoter is also advised to have regard to Section 2.2 of the NRA TTA Guidelines which addresses requirements for sub-threshold TTA.
- The designers are asked to consult the National Roads Authority's DMRB *Road Safety Audit* (NRA HD 19/12) to determine whether a Road Safety Audit is required,
- In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.
- In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route.
- In relation to cabling and potential connection routing, the scheme promoter should note locations of existing and future national road schemes, and in the context of existing national roads, should be aware that separate approvals may be required for works traversing the national road network. The Authority requests referral of any agreements between the local authority and the scheme promoter in that regard; for record.

Notwithstanding, any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I hope that the above comments are of use in your scoping process.

Yours sincerely


p.p. Michael McCormack
Policy Adviser (Planning)



Southern Regional Fisheries Board

Bord Iascaigh Réigiúnach an Deiscirt

14th May 2010.

Ms. Catherine Keogan,
IWCM Ltd.,
Unit 1 Cootehill Enterprise Centre,
Cootehill,
Co. Cavan.



Fisheries Ireland
Our Natural Heritage

PROPOSED WIND FARM AT KNOCKNARDAGUR BY GALETECH ENERGY DEVELOPMENTS LTD.

Dear Ms. Keogan,

I refer to your letter dated 9th March 2010 to the Eastern Regional Fisheries Board. Kindly note the proposed development site is situated within the functional area of this Board.

As you may be aware, the Southern Regional Fisheries Board is charged with the protection, conservation and promotion of fisheries within our functional area. Board policy is aimed at maintaining a sustainable fisheries resource through preserving the productive capacity of fish habitat by avoiding habitat loss, or mitigating harmful alteration to habitat. Projects such as proposed have the potential to impact on downstream fisheries resources if they are not carried out in an environmentally sensitive manner.

The following observations and comments are of necessity of a general nature, as construction proposals and method statements are not as yet available. While they apply to the proposed development in general, the waters in fisheries terms likely to be impacted act primarily as contributories to downstream habitat for juvenile salmonids and other species as well as macrophytes, algae and macroinvertebrates which as drift form a significant part of the food supply to the downstream fisheries of the Owenbeg Catchment. They also, in the context of the proposed works, have the potential to convey deleterious matter from those works such as concrete, silt, fuel, lubricating and hydraulic oils from construction plant and equipment downstream unless proper safeguards are in place.

Stream size can be misleading in regard to fish presence. A significant amount of fish rearing occurs in very small channels and seasonal streams. These streams may not be recognised as fish or macroinvertebrate habitat and their importance to fisheries sometimes overlooked.



The Southern Regional
Fisheries Board
Anglesea Street
Clonmel
Co. Tipperary
T: (052) 6180055
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E: enquiries@srfb.ie
www.srfb.ie

Stream crossings structures should not damage fish habitat or create blockages to fish and macroinvertebrate passage. Design and choice of structure is up to the engineer or qualified person who must make a decision based on the technical and economic feasibility of the structure to pass fish and macroinvertebrates (and the requirement to protect critical fish habitats e.g. fish spawning and over wintering areas) and prevention of erosion and sedimentation. In the case of the proposed development, noting the location of the proposed turbines, it is unclear as to whether a crossing or crossings of the Owenbeg River headwaters will not be required.

Uncured concrete can kill fish and macroinvertebrates by altering the pH of the water. Pre-cast concrete should be used whenever possible, to eliminate the risk to all forms of aquatic life. When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from any water that may enter the drainage network for a period sufficient to cure the concrete.

One of the potential impacts of the proposed development is the discharge of silt-laden waters to fisheries streams from newly developed sites at which earth moving and excavation works are ongoing. Silt can clog salmonid spawning beds, and juvenile salmonids are particularly sensitive to siltation of gill structures. Similarly, plant and macroinvertebrate communities can literally be blanketed over, and this can lead to loss or degradation of valuable habitat. It is important to incorporate best practices into construction methods and strategies to minimise discharges of silt/suspended solids to waters.

Silt traps should be constructed at locations that will intercept run-off to the drainage network. Traps should not be constructed immediately adjacent to natural watercourses. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact so as to assist silt interception. All natural watercourses which have to be traversed during site development and road construction works should be effectively bridged prior to commencement. The crossing of watercourses at fords is unacceptable because of the amount of uncontrolled sedimentation that can be generated by their use.

All oils and fuels should be stored in secure bunded areas, and particular care and attention should be taken during refuelling and maintenance operations on plant and equipment. Where site works involve the discharges of drainage water to receiving rivers and streams, temporary oil interceptor facilities should be installed and maintained.

Additionally, we would request that in terms of stability both during the construction and operational phases, the developers assess and critically review the soil type and structure at the proposed turbine locations, and along the route of any proposed access track(s)/road(s) including areas where temporary or permanent stock piling of excavated material takes place. This is particularly important if the areas concerned contain peat soils.

During the construction process and operational phase, natural flow paths should not be interrupted or diverted so as to give rise to or create potential for erosion. Furthermore, excavation and installation of road(s)/access track(s) should be undertaken so as not to result in the creation of preferential flow paths that may result in erosion. Where imported materials are used in road construction, these should be such as not to be liable to become

crushed by vehicular movement, and lead to discharge of fine particulates to downstream receiving waters.

I trust these preliminary observations will be of assistance, and would be obliged to receive more detailed information, particularly as regards the proposed location of temporary and permanent access tracks/routes, as soon as same is available.

Yours sincerely,



Patrick Kilfeather,
Senior Fisheries Environmental Officer.

Laois County Council Planning Authority, Viewing Purposes Only

Chapter 2: Description of the Proposed Development

(Revised January 2017)

Laois County Council Planning Authority, Viewing Purposes Only

2.1 Introduction

The purpose of this chapter is to provide a description of the proposed development in sufficient detail, which, if taken together with the descriptions of the existing environment provided in this EIS, will allow an independent reader to understand the significant environmental impacts likely to arise from the proposed development. The description considers the location of the project together with its main physical characteristics including design, size, scale and land-use requirements of all relevant phases of the existence of the project from its construction through to operation and decommissioning. Further descriptions of specific elements of the proposed development and the existing environment are also provided in individual chapters of this EIS as they relate to particular environmental topics including, for example, in combination with other proposed developments; the nature and quantity of materials and natural resources used; and the potential production of residues, waste, pollution, noise and nuisances etc. This chapter should also be read in conjunction with the technical plans and drawings submitted with the planning application and photomontages provided in **Volume II** of this EIS.

The description of the proposed development also addresses other off-site/secondary developments which occur as a direct result of the proposed development, including the grid connection transmission line; haul route for turbine components; and extraction of materials and aggregates to facilitate construction. It further considers the evaluation of reasonable alternative locations in terms of project design, technology, location, size and scale, which are relevant to the proposed development and its specific characteristics together with an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The proposed development will be commissioned as a single construction phase and the construction period is likely to last for approximately 12-18 months. The description of the proposed construction phase includes land-use requirements; proposed site construction works; off-site/secondary developments; description of materials, plant and equipment used to facilitate construction together with a description of potential emissions; waste and traffic etc.

The planning permission being sought by the developer is for a period of 10 years and the operational lifespan of the proposed development is 25 years. Any further operation beyond 25 years would be subject to a further planning application and EIA. This EIS therefore assumes full decommissioning will take place at the end of the project lifespan. There are currently no proposals for the future expansion of the project. Any future expansion would be subject to a further planning application and EIA.

2.2 Site Location & Context

The proposed development site straddles the county boundary between County Laois and County Kilkenny in the townlands of Knockardugar, Boleybawn, Garrintaggart, Ironmills(Kilrush) and Graiguenahown, County Laois; and Crutt, County Kilkenny; approximately 17km south-west of Portlaoise and 25km north of Kilkenny City. The nearest towns are Abbeyleix, approximately 8km north-west, and Castlecomer, approximately 8km south-east. The village of Ballinakill is circa 4km south-west of the subject site. There are also a number of smaller nucleated and crossroad settlements throughout the wider environs of the subject site together with numerous dispersed 'one-off' dwellings and farmsteads outside of any identified settlements. The general site location of the proposed development site is illustrated in **Figure 2.1**. A receptor survey was conducted in order to quantify the number of dwellings, farms and other properties within 1,030 metres (10 rotor diameters) of the subject site and 33 no. receptors were identified. A map at scale 1:5,000 and showing the location of all dwellings within 1,030 metres of the proposed turbines and which indicate the distance from each dwelling to the nearest turbine is provided in **Appendix 2.1**.

The topography in the wider environs of the subject site is dominated by the upland area known as the Castlecomer Plateau, characterised by undulating hills and steep escarpments at its fringes.

Dissecting the lowlands on either side of the plateau are the rivers Barrow and Nore, which lie to the east and west respectively. The lowlands are a mixture of pasture and tillage with fields typically bordered by mature broadleaf tree lines and hedgerows. Agricultural land uses extend into the upland areas in the form of more marginal grazing with scrubby hedgerow field boundaries. Extensive commercial conifer plantations emerge on higher slopes and throughout the Castlecomer Plateau. There are also occasional small patches of woodland associated with demesne landscapes within lowlands as well as narrow strips of riparian vegetation at the margins of streams and rivers. A number of quarries are also present in the wider area. The site itself is located on a generally flat section of ridgeline at the north-western edge of the Castlecomer Plateau and contains a mixture of pastoral farming, commercial conifer plantation and scrub where forest harvesting has taken place.

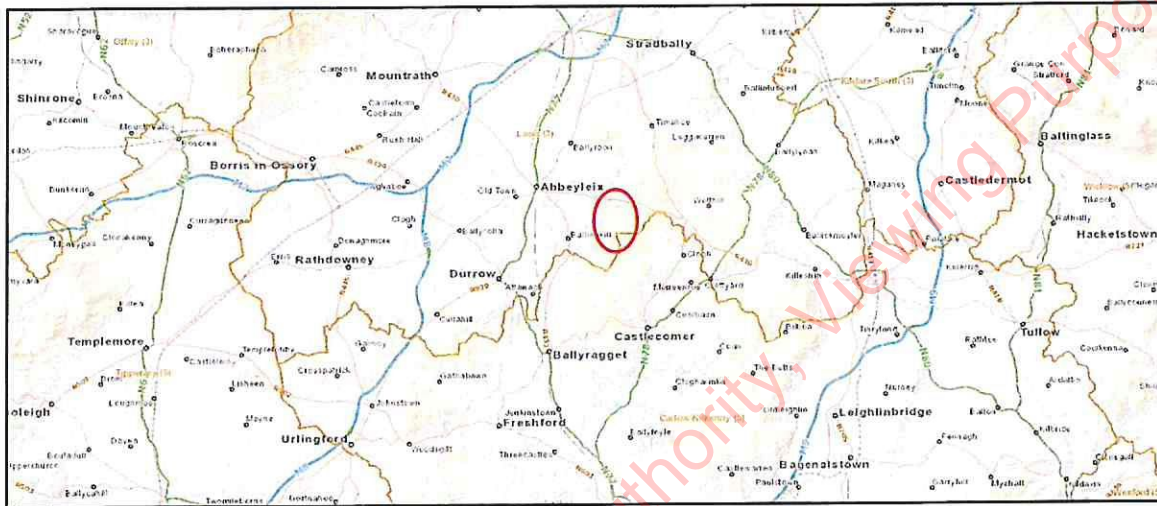


Figure 2.1: Site Location

The principal transport routes in the wider region are the M7/M8 motorways between Dublin and Cork/Limerick and the M9 motorway to Waterford is located to the east. The section of the old N8 national route, which runs between Portlaoise and Durrow is now part of the N77 national secondary road linking to Kilkenny which is at its closest to the subject site as it passes through Abbeyleix. The N78 national secondary road passes through the Castlecomer Plateau in a south-westerly direction as it links between Athy and Kilkenny. It is located 8km to the south-west of the subject site at its nearest point. Running perpendicular to the N78 along the north-eastern base of the escarpment that defines the Castlecomer Plateau is the N80 national secondary road. The intersection of these roads and the nearest point of the N80 to the proposal site is 13km to the north-east. In addition to the motorways and national roads described above, there are numerous regional and local roads traversing the wider hinterland of the site including the R430, which is c.1km to the north at its closest point and the R432, which passes through Ballinacorney c.4km to the west.

There are a number of important heritage features within the wider hinterland of the site. The most notable, and most prominently located, is the Rock of Dunamase. This elevated and natural defensive position was occupied by a fort as early as the 9th Century and the castle (now in ruins) was built in the latter 12th century. Castle Durrow, c.11km to the south-west, is an early 17th century stately home and demesne, which is currently in use as a hotel and wedding venue. Other heritage features of interest include Aghaboe Abbey (19km west of site) and the Tower of Timahoe (9km north of site).

An 80 metre anemometer mast for measuring wind speed and meteorological conditions is currently erected on the site (Laois County Council Register Reference 12/339). The closest operational wind farm is the Gortahile Wind Farm which consists of 8 no. turbines (Laois County Council Register

Reference 04/935 & 09/237). Planning permission has been granted for an 18 no. turbine wind farm at Cullenagh, County Laois, approximately 8km north of the subject site (Laois County Council Register Reference 13/268 & An Bord Pleanála Reference PL11.242626). Laois County Council has also granted planning permission for 4 no. turbines (Register Reference 10/129) approximately 30km west of the subject site as part of a larger application for 16 no. turbine wind farm to be known as Bruckana Wind Farm which straddles the county boundaries of Laois, Kilkenny and Tipperary (Kilkenny County Council Register Reference 10/145; Tipperary County Council Register Reference 10/510118). A single turbine development at Knocklead, Timahoe is currently the subject of a planning application to Laois County Council (Register Reference 15/401). Within County Kilkenny, the closest permitted wind farm is the 4 no. turbine Lisdowney Wind Farm near Ballyragget.

2.3 Consideration of Alternatives

The presentation and consideration of the various reasonable alternatives investigated is an important requirement of the EIA process and the single most effective means of avoiding environmental impacts. While EIA is confined to the environmental effects which influence the consideration of alternatives, it is important to acknowledge that other non-environmental factors may have equal importance e.g. project economics, engineering feasibility, accessibility etc. The consideration of alternatives also needs to be set within the parameters of the availability of land or the need for the project to accommodate demands or opportunities which are site specific. Additionally, the location of projects are informed by a hierarchy of plans, strategies and policies which have previously been decided upon at a higher administrative level and adopted by the local authority, including, for example, the County Development Plan and its Wind Energy Strategy which has been subject to Strategic Environmental Assessment in accordance with Directive 2001/42/EC. It is important to acknowledge that, in these circumstances, a developer cannot be reasonably be expected to examine locations which have already been previously excluded by the local authority based on higher level environmental assessments.

2.3.1 Alternative Locations

Site selection to avoid intrinsic environmental sensitivity is the principal mitigation option for wind farms. There is a well-established and widely used methodology for the selection of wind farm development locations. The methodology is based on a screening process by applying key criteria (not listed in order of importance), as follows:

- Available wind resource;
- Land use and site context (including spatial planning policy);
- Electricity grid connection and capacity;
- Transport accessibility;
- Residential amenity;
- Environmental constraints;
- Landscape and visual capacity;
- Energy supply and demand;
- Compliance with energy policies;
- Other Factors.

The Atlas of Wind Speeds in Ireland prepared by Sustainable Energy Authority of Ireland (SEAI) indicates that large areas of Laois/Kilkenny meet the technical resource requirements for the successful harnessing of wind energy. Accordingly, initial site investigations of potential sites in this region for a wind farm began in 2007. A number of alternative sites were originally identified and assessed for suitability, as follows:

- **Fossey Mountain**, which is circa 13km south-east of Portlaoise, was assessed as this area as identified as being located in a 'Preferred Area' and 'Areas Open for Consideration' for wind energy development in the Laois County Development Plan 2011 – 2017. However, the site

was excluded due to its potential visibility from the village of Timahoe and the larger number of potential visual and other receptors in the area;

- **Lamberton Demense**, which is approximately 8km south east of Portlaoise, was assessed but was excluded due to a number of features of architectural and cultural heritage significance in the area. There is a ringfort at Lamberton Demesne (LA018-011) which also the subject of a preservation order (No. 197). There are also a number of architecturally significant buildings and structures in the vicinity including a 19th Century gate lodge which is listed on the National Inventory of Architectural Heritage (NIAH) (Reg. No.12801803; NGR 251463/194802) and is also included in the Record of Protected Structures (RPS) for County Laois (Ref. 617). This location is also currently unclassified for wind energy development in the Laois County Development Plan 2011-2017;
- The area around **Ballyprior**, south of Stradbally and 16km south-east of Portlaoise, was also assessed. This area is partly designated as 'Open for Consideration' and 'Areas Not Open for Consideration' for wind energy in the Laois County Development Plan 2011-2017. It was decided not to proceed with this location as the environs of the site is designated as part of the Ballyprior Grasslands Special Area of Conservation (SAC) (Site Code: 002256), a designated European site which consists of orchid rich semi-natural dry grasslands and scrubland on calcareous substrates. The site is also located proximate to the Stradbally Hill Proposed Natural Heritage Area (pNHA) (Site Code: 001800).

Following detailed evaluation of all potential sites, the subject site as described in **Section 2.2** above was selected for the following reasons:

- The available wind resource is calculated at approximately 8.25 metres per second (m/s) at 85 metres which makes the site economically viable for a wind energy development. This has been confirmed from the results gathered from the meteorological mast which has been placed on the site;
- Spatial planning policy context with particular regard to the fact that the subject site is identified as being located in a 'Preferred Area' and 'Areas Open for Consideration' in the Laois County Development Plan 2011-2017, and which has been subject to SEA;
- Immediate proximity to the national grid, available grid capacity and ability to connect directly into the permitted 110kV Laois-Kilkenny Grid Reinforcement Project (An Bord Pleanála Reference PL11.VA0015) which passes through the subject site, and which has been subject to EIA;
- Convenient access to the national motorway network and good quality national/regional road access in order to transport turbine components and other construction materials to the subject site;
- The site's remoteness from population centres and the sparsely populated environs of the site with just 33 no. receptors identified within 1,030 metres of any proposed wind turbine;
- The ability of the subject site to provide a minimum of 500m setback from all wind turbines to dwellings in accordance with the *Wind Energy Development Guidelines for Planning Authorities, 2006*;
- The reasonable scientific certainty as to the absence of impacts on any designated nature conservation sites, particularly in respect of hydrological pathway connectivity;
- The absence of any special landscape designations or special areas of development control attached to the subject lands or immediate environs. Furthermore, there are no scenic routes or views orientated towards the subject lands either within County Laois or County Kilkenny. The Landscape Character Assessment in the Laois County Development Plan identifies the subject lands as being located in the 'Hills and Uplands Areas' landscape character type which is of moderate value and where the Planning Authority's Wind Energy Strategy has identified these upland areas for consideration in terms of future wind energy development;

- Current European and national policy and legislation and binding targets which clearly establishes a need to rapidly increase energy production from renewable resources for energy security and climate change reasons;
- The absence of any constraints in respect of aviation, telecommunication or existing infrastructure such as roads, rail or pipelines;
- The availability of land with initial consultation with the landowners beginning in 2008 and all landowner agreements secured.

Of prime importance in selecting the subject site is that it is identified as being located in a 'Preferred Area' and 'Areas Open for Consideration' for wind energy development in the Laois County Development Plan 2011 – 2017. Accordingly, the land use and planning context has previously been assessed by Laois County Council and considered at a strategic policy level as a suitable location for a wind energy development of this general scale, including during the SEA process. The Laois County Development Plan 2011 – 2017 has categorised four distinct areas for wind energy generation, as follows:

- **Strategic Areas:** Areas deemed eminently suitable for wind farm development and reserved for such purposes. No strategic areas have been identified;
- **Preferred Areas:** Areas deemed suitable for wind farm development that should be granted planning permission unless specific local planning circumstances within the context of the development plan support a decision to refuse. Four areas are identified, with the subject site identified as: '*Preferred Area No. 3A – Spink and Ballinakill*';
- **Areas Open for Consideration:** Applications in these areas will be treated on their merits with the onus on the applicant to demonstrate why the development should be granted permission. Four areas are identified, with the primary area an extension of Area No. 3 identified in the 'Preferred Areas' category described above;
- **Areas Not Open for Consideration:** These are areas identified as particularly unsuitable for wind farm development. The major area identified as being unsuitable for wind energy is the Slieve Bloom Mountains in the north-west of the county.

The criteria identified in the Laois County Development Plan for designating a 'Preferred Area' are as follows:

- Relatively low sensitivity to wind development;
- Have a viable wind regime;
- Avoid most designations;
- Are sparsely populated;
- In close proximity to a grid connection;
- An approved or built wind farm in the vicinity.

Within the Kilkenny County Development Plan 2008-2014, the proposed development site was formerly located in an area designated as 'Acceptable in Principle' for wind energy. However, this designation was altered in the Kilkenny County Development Plan 2014 – 2020 and the site is currently unclassified for wind energy development. However, it is noted that only the site access road for the proposed wind farm is located within County Kilkenny and no wind turbines are proposed within this jurisdiction.

2.3.2 Alternative Processes

The proposed development is for the generation of renewable energy from wind resources. No alternative processes were considered.

2.3.3 Alternative Designs

Site layout and design to achieve appropriate orientation, spacing, setbacks and alignment is an appropriate secondary mitigation measure. The process of designing a wind farm and assessing the

potential environmental effects arising from the project is a highly complex, iterative and non-linear process. The design of the project informs the need for environmental mitigation and which in turn iteratively informs the project design through on-going circular scoping. Figure 2.2 below illustrates the various stages taken to determine a final site design layout for the proposed development.

Careful consideration has been given to alternative designs including turbine sizes, models, number of turbines, spacing and layout. The EIS process and output efficiency proved the greatest influences on the final design and the site layout was amended on several occasions throughout the EIS process. This proposed layout has been particularly influenced by the following considerations:

- Visual impact/Inter-visibility;
- Setback to existing/permitted residential dwellings;
- Existing access tracks within the site.

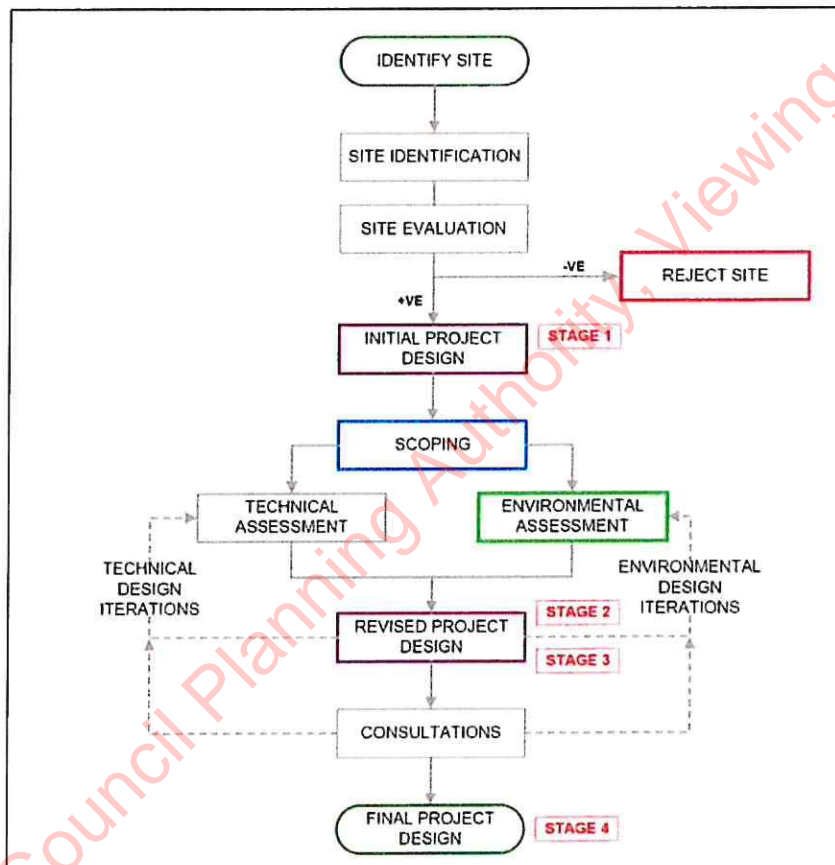


Figure 2.2: Stages of the Project Design/EIS Process

In 2013, a planning application was submitted on the subject site for 8 no. turbines with a maximum height of 152m with a total output of 22.8 MW (Laois County Council Register Reference 13/262 & Kilkenny County Council 13/397) (see Figure 2.3). Following the withdrawal of this planning application, a series of wind modelling analyses using specialist software was undertaken to establish the revised optimal location and dimensions for the turbines. It was considered that the overall renewable energy output of the proposed development could be enhanced to take advantage of this strategically located site through a revised layout/design and the installation of 11 no. turbines each with an overall height maximum height of up to 136.5m. In terms of layout and spacing, to ensure optimal performance and to account for turbulence and wake effects, the proposed turbines have been spaced using three rotor diameters (309m) in the crosswind direction and five rotor diameters (515m) in the prevailing downwind direction. Furthermore, and also taking

residential amenity into consideration, a minimum setback buffer of 500m was applied to all dwellings. The resulting spacing pattern is regular and geometric which provides a distinct cluster of wind turbines and responds to the underlying field pattern and existing forest tracks. These forest tracks are generally in good condition and require little upgrading, thus minimising construction phase impacts. A balance was therefore struck in order to achieve optimum performance and respond to environmental constraints as best as possible in order to minimise the spatial extent of the proposed wind farm and provide a visually coherent pattern of development. Further 'mitigation by design' amendments prior to the selection of the final layout proposal were as follows:

- On the advice from the archaeological specialist consultant, the access road was slightly amended to take account of a water well recorded during the site visit on the south side of the access road between Turbines 1 and 2 and which is not recorded on the First Edition map;
- On the advice from the ecological specialist consultant, the access road was slightly amended to avoid an unoccupied badger sett found during the ecological site walkover. Also the access road between Turbine 7 and Turbine 8 was slightly rerouted on advice from the project ecologist in respect of bats;
- On the advice of the ecological consultant, the temporary construction site compound was relocated away from a small stream which runs through the site.

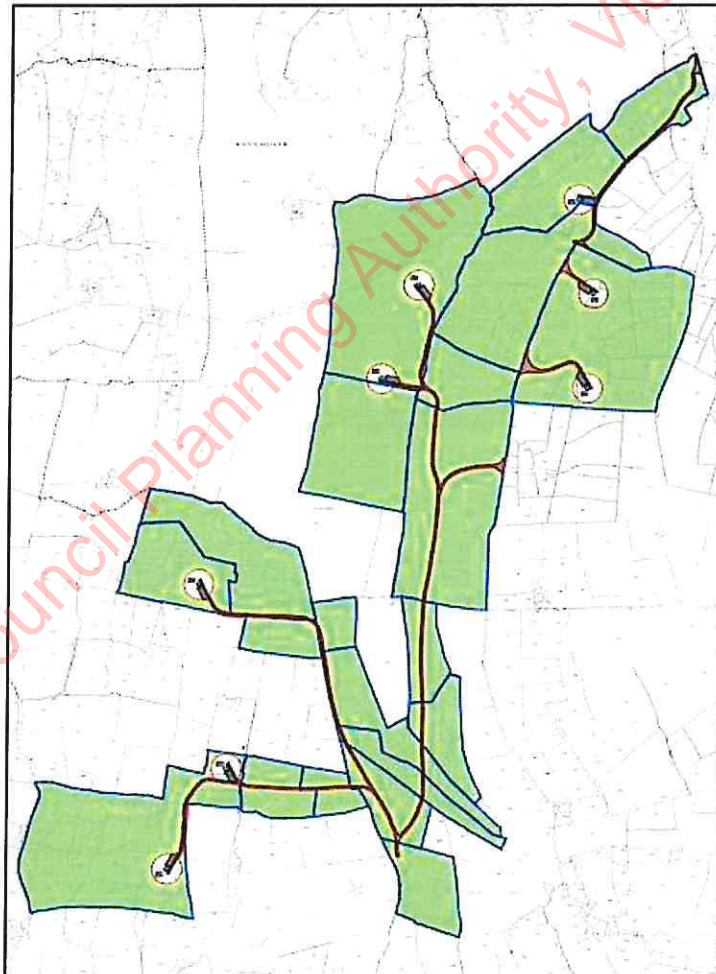


Figure 2.3: Previous alternative layout submitted as part of Laois County Register Reference 13/262 & Kilkenny County Council 13/397

2.4 Description of the Proposed Development

The proposed development (the 'project') comprises of 11 no. wind turbines and all associated development works to accommodate their installation, operation, maintenance and the export of electrical power to the national grid. This will include a permanent meteorological mast 85m in height; site access tracks; foundations; hardstanding areas; underground cabling; single storey substation and switchroom, accompanying equipment and compound area. The co-ordinates of the proposed wind turbines are set out in **Table 2.1**.

Turbine	Eastings	Northings	Hub Height (m)	Rotor Diameter (m)	Max Height (m)	Electrical Output (MW)	Approx. Altitude (mAOD)
T1	251604	182460	85	103	136.5	3.2	258.7
T2	251693	182105	85	103	136.5	3.2	267.5
T3	251676	181781	85	103	136.5	3.2	273.2
T4	250937	181833	85	103	136.5	3.2	297.7
T5	251205	181628	85	103	136.5	3.2	299.3
T6	250756	181489	85	103	136.5	3.2	302.7
T7	250403	181186	85	103	136.5	3.2	278.9
T8	250682	180984	85	103	136.5	3.2	292.8
T9	250742	180675	85	103	136.5	3.2	291.0
T10	250826	180372	85	103	136.5	3.2	287.6
T11	250276	180413	85	103	136.5	3.2	260.8

Table 2.1: Turbine Locations and main features

**Note: Micro-siting and immaterial deviations to the proposed development within an overall development envelope are included in this EIS assessment.*

The total direct footprint of the proposed development site area ('red line' boundary) is 39.96 hectares including turbine locations, meteorological mast, cables routes, access tracks and substation/switchroom compound. Each element of the proposed development is discussed in turn below and all technical plans and drawings are included in Volume II of this EIS.

2.4.1 Wind Turbines

Given the available wind resource and relatively low terrain, a turbine with an overall height of up to 136.5 metres is presently considered to be the most suitable wind turbine currently available in the market for this site. Each of the 11 no. turbines shall have a rated electrical output of 3.2MW, giving a total electrical output of 35.2MW. The proposed turbine typically has a hub height of 85 metres, a rotor diameter of 103 metres, a rotor speed of 14.8 rpm (rotations per minute) and rotates clockwise. The turbine has a cut-in wind speed of 3 m/s and a cut-out speed of 25 m/s. At the cut-out speed the turbines will automatically shut down. The proposed turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms. The blades will be constructed of glass reinforced plastic and lightning protection conduits are integral to their construction. The nacelle is supported on a steel tower of tubular construction. The colour of the proposed turbines and blades will be white, off-white or light grey in accordance with the Wind Energy Development Guidelines for Planning Authorities (2006) and as determined by the Planning Authority.

It is important to stress that the exact model and manufacturer of the turbine has not yet been chosen and options will remain open until the construction tender stage. A number of other turbine models could be potentially suitable for the subject site. Turbine technology changes rapidly and the final turbine model to be installed will be subject of a competitive tendering process at the time of the commencement of construction. It may also be the case that the proposed turbine will not be

available at the time of competitive tendering due to the rapid obsolescence of individual models. A 136.5 metre turbine has therefore been used as a template for the basis of the assessments in this EIS as it is currently the turbine available in the Irish market that best fits the required profile for the subject site. Any immaterial deviations to turbine dimensions caused by a change in the turbine model eventually installed on-site (in terms of hub height, rotor width, dimensions, finishing or micro-siting within the overall height envelope of 136.5m) will not impact on the substantive conclusions of this EIS.

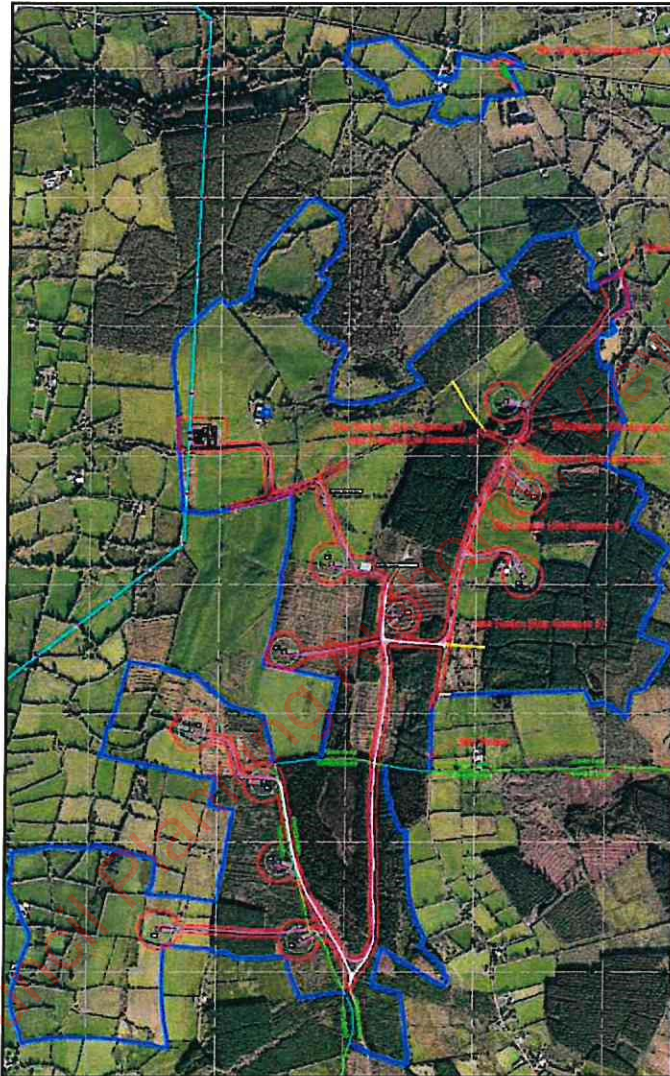


Figure 2.4: Proposed Site Layout

2.4.2 Turbine Foundations

Each turbine tower is bolted down to a steel ring foundation which can comprise either a reinforced concrete raft foundation or a piled foundation. The type of foundation used for each turbine will depend upon the specific ground conditions at each location. This shall be established through detailed technical design and post-consent geotechnical investigations prior to construction, as is normal best-practice in all construction projects. Geotechnical investigations carried out at each of the turbine locations demonstrate that the subsoil conditions are suitable for the construction of turbine foundations (see Chapter 5). It is proposed that, where possible, concrete, aggregates and materials for foundations shall be sourced locally, a process which has the advantage of reducing the overall vehicle movements (see Chapter 13). The typical foundation depth for each turbine will be

c.3 metres, including granular fill area. This depth may materially vary slightly depending on the depth to bedrock. The area of each turbine base will occupy approximately 18.5m x 18.5m and construction will involve the excavation of approximately 1,260m³ of material. Excavations will be undertaken by conventional mechanical methods and no blasting shall be required. Rock, topsoil and vegetation removed during construction of turbine foundation bases will be appropriately stockpiled and, in so far as is practicable, reused onsite to form access tracks and site reinstatement,

2.4.3 Hardstandings

Hardstanding areas shall be established adjacent to each turbine to facilitate crane operations for erection and occasionally for maintenance and decommissioning. Each hardstanding area shall typically be 45-55m x 20m for the construction phase and will allow for two large cranes to operate simultaneously. However, this may be immaterially altered within the micro-siting tolerance threshold depending on the final turbine model selected. Following installation of the turbine, the hardstanding will be covered in topsoil and grassed over to approximately 10m x 20m for the operational phase in order to minimise environmental and visual impact. During the decommissioning phase, or in the event of operational maintenance, the hardstanding can be re-exposed for crane operations to decommission and/or maintain the turbines.

2.4.4 Micro-siting

Following further detailed pre-construction site investigations and geotechnical analyses, immaterial micro-siting of turbines, access tracks and other components of the proposed development form part of the proposed development and the assessment in this EIS. This will allow scope for further detailed post-consent environmental mitigation should it be considered necessary. A micro-siting allowance of 20m in any direction is proposed for turbines and access tracks in accordance with Section 5.3 of the Wind Energy Development Guidelines for Planning Authorities (2006) and subject to the environmental constraints and mitigation measures included in this EIS. It is anticipated that the agreed tolerance micro-siting distance will form a condition accompanying a grant of planning permission. Any immaterial micro-siting will have no impacts on the substantive conclusions of this EIS.

2.4.5 Electrical Substation

The turbines will be connected to the proposed single-storey substation and from there electricity will be exported to the national grid via the 110kV Laois-Kilkenny Grid Reinforcement Project which passes through the subject site. Two single circuit strain towers of up to 26.5 metres in height will be required to connect into this 110kV transmission line. The substation will be approximately 203m² with an overall height of 6 metres. The switchroom 90m² and also with an overall height of 6 metres. The substation and switchroom will contain connection points and associated equipment such as incoming and outgoing circuit breakers, earth fault, protection devices, the grid transformer, metering equipment, computer and server. The proposed substation and switchroom shall be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors. For safety and security reasons, the substation, switchroom and ancillary equipment compound will be enclosed by a 2.4m high steel palisade fence and screened with landscaping to reduce visual impact.

2.4.6 Connection to the National Grid

The proposed development will connect to the national grid, for the export of energy, via the permitted 110kV Laois-Kilkenny Grid Reinforcement Project (An Bord Pleanála Reference PL11.VA0015) which passes directly through the site¹. A map at scale of 1:2,500 and 1: 5,000 metres together with an overall reference map of the permitted Laois-Kilkenny Grid Reinforcement Project Route is provided in **Appendix 2.2**.

¹ <http://www.eirgridlaoiskilkenny.ie/index.html>

Following detailed discussions with Eirgrid it has been agreed that the proposed development can loop directly into this 110kV line via a substation/switchroom at the subject site. This will include the erection of two single circuit strain towers of up to 26.5 metres in height. From there, the proposed development will have a fully consented transmission path to either the permitted 400/110kV substation at Coolnabacky or the permitted 110kV upgraded substation at Ballyragget which are both equidistant from the subject site. An assessment of the environmental impact of the proposed development in-combination with the permitted 110kV Laois-Kilkenny Grid Reinforcement Project is discussed in **Section 2.7.2**.

2.4.7 Meteorological Mast

A temporary meteorological (anemometer) mast currently exists on the western portion of the site for measuring wind speed and meteorological conditions. This mast is 80m in height and is installed pursuant to Laois County Council Register Reference 12/339. It has recorded an average wind speed for the site of approximately 8.25 at 85 metres (adjusted). It is proposed that this mast will be removed and replaced with the permanent mast.

A permanent meteorological mast will remain on-site during the operational phase of the development (permanent as per the life span of the wind farm). The proposed permanent mast is 85m in height and will consist of a steel lattice structure to which various measurement instruments will be attached. Some ground works, including the construction of concrete foundations and hardstanding area, will be required to erect the mast.

The purpose of the mast is to monitor wind speeds and climate conditions for the efficient operation of the wind farm. The data from the mast is sent remotely to a computer system located off-site so that the data can be analysed and to extrapolate the long-term wind resource at the site. The mast is also required to carry out power curve performance tests, a typical condition of the wind turbine warranty.

2.4.8 Transformers & Cables

Each turbine will utilise its own transformer, which will be located either inside or outside the turbine tower. Depending on the final turbine model selected, transformers will either be oil-filled (and banded to prevent spillage) or of a solid cast resin type which is effectively non-polluting should a spillage occur. The transformers will increase the electrical voltage on site and buried cables adjacent to the site access tracks will connect the turbines to the substation for export to the national grid.

The buried cables will be of a solid polymeric construction with either aluminium or copper conductors and will follow the alignment of the on-site access tracks insofar as is practical. Cable installation trenching will be by a mechanical digger. The proposed depth of the cable trench is approximately 1 metre and the proposed width of the cable trench is 50 centimetres. The excavated material will be laid alongside the trench for use in reinstatement following the laying of cables.

2.4.9 On-Site Access Tracks

A total of approximately 7.4km of on-site access tracks (excluding public roads) will be required for construction purposes and for site access during the operational phase. The access tracks proposed shall be similar to normal agricultural or forestry tracks but with a slightly wider typical running width of approximately 5 metres. Good quality forestry access tracks already exist within the site and these existing tracks will be upgraded and new tracks constructed, where necessary, to provide access to the proposed turbine locations. The location of these existing access tracks was a key consideration in the design and layout of the proposed development, in order to limit environmental impact.

Additional excavated strips will be required alongside the tracks to accommodate drainage and cable trenches. Track variations shall be made to accommodate turning of long loads and passing traffic, as required. Access tracks will be unsealed and constructed of inert crushed stone material on compacted sand to allow for permeability. Material will, where possible, be sourced from on-site construction

activities (e.g. foundation excavations) and local quarries, as necessary (see **Chapter 13**). In order to prevent inundation, a textile layer may be needed to avoid later access problems. Some cut/fill of the access tracks may also be necessary to ensure that gradients and crossfalls are suitable to accommodate vehicles, abnormal loads and adequate drainage. The selected wind turbine manufacturer shall be consulted during detail design of access tracks. Various hardstandings and turning areas will also be required in the vicinity of each turbine location to allow for crane operations.

No major watercourses exist within the site. However, a number of drainage ditches do exist together with the upper reaches of one first order stream (typically dry in summer). Where it is necessary for access tracks to cross any drains or identified water features, the relevant bodies (e.g. Inland Fisheries Ireland) will be consulted prior to construction and all mitigation measures proposed in the EIS will be fully adhered to. A minimum 50m buffer zone will be observed around all surface water features during the construction phase and no fuel/chemicals will be handled or stored within this buffer zone.

2.5 Construction Phase

The construction period is likely to last for approximately 12-18 months from commencement of detailed site investigation, survey and design work, through to the installation and commissioning of the turbines and ending with reinstatement of the construction compound. The construction phase of the development will comprise a 6 day week with normal working hours from 7.30am to 6.30/8.00 pm Monday to Friday and 7.30am to 1pm on Saturdays.

No construction works are envisaged during the operational phase. Works during this period will typically involve the routine inspection and servicing of the turbines and ancillary structures, as necessary. In exceptional circumstances there may be a requirement for more substantial works e.g. replacing a turbine blade, or gearbox/generator replacement.

Further details of the construction phase and specific mitigation measures for the construction phase are provided in each chapter of this EIS as they relate to each environmental topic.

2.5.1 Construction Method

The construction method will consist of the following general sequence:

- The construction of the site entrances;
- Construction of the temporary construction compound for off-loading materials and components, and to accommodate temporary site offices;
- Construction of bunded areas for oil, fuel and lubricant storage tanks;
- Progressive construction of internal on-site access tracks;
- As the internal access tracks progress to each turbine location, foundation excavations for the turbines and substation will commence and foundations laid. The hardstanding areas and the substation, switchroom and compound will be constructed as the track advances;
- Once the tracks are completed, the trenching and laying of underground cabling will begin;
- Installation of turbines will commence once the site tracks, hardstandings, foundations and drainage measures are in place and the temporary road junction upgrade is complete. It is anticipated that each turbine will take 2 to 3 days to install. Two cranes will be used for this operation. As each turbine is completed, the electrical connections will be made;
- Hardstandings will be partially resodded, where necessary, following construction phase crane operations;
- Decommissioning of the temporary meteorological mast and installation of the permanent meteorological mast will then take place;
- Progressive site reinstatement and restoration including removal of temporary construction compound.

Once the turbines are installed, the substation and electrical system completed, the turbines will be tested and commissioned.

A detailed Environmental Management Plan (including a Construction Management Plan) will be prepared in advance of all construction activities and will incorporate all mitigation measures proposed in this EIS. The site will be supervised by a project manager during the construction phase who will liaise closely with the on-site environmental engineer monitoring construction works. The Environmental Management Plan will be submitted to Planning Authority for approval prior to any works commencing on the site. The Construction Management Plan shall provide details of intended construction practices, including:

- Location of the site and materials compound including areas identified for the storage of construction waste;
- Location of areas for construction site offices and staff facilities;
- A plan for the timing and routing of construction traffic to and from the construction site and associated directional signage, to include in particular proposals to facilitate and manage the delivery of oversized loads to the site;
- Construction stage details of the proposed construction methodology, certified by a suitably qualified civil engineer;
- Measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network;
- A Traffic Management Plan and alternative arrangements to be put in place for pedestrians and vehicles in the case of the temporary closure of any public road or footpath during the course of site development works;
- Details of appropriate mitigation measures for construction stage noise, dust and vibration, and monitoring of such levels;
- Containment of all construction related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained; such bunds shall be roofed to exclude rainwater;
- Appropriate provision for re-fuelling of vehicles;
- Off-site disposal of construction/demolition waste and construction-stage details of how it is proposed to manage excavated soil;
- Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter water courses in full compliance with this EIS;
- Details of the intended hours of construction.

The Environmental Management Plan and Construction Management Plan will take full cognisance of the Surface Water Management Plan and Habitat and Species Management Plan proposed as a key mitigation measure in this EIS.

2.5.2 Site Entrances

Given the pre-existing local road network, seven site entrances are proposed, four of which are already in existence. The proposed entrances will be of sufficient width to facilitate turbine delivery and adequate visibility splays, and may involve the removal of short sections of road boundaries and hedgerows. It is not anticipated that any significant works will be required to the public road and all drains will be appropriately culverted.

2.5.3 Construction of Hardstanding Areas and On-Site Access Tracks

The areas of hardstanding for crane operations and on-site access tracks will generally be constructed as follows:

- Topsoil and subsoil will be removed and stored in separate mounds in appropriate areas adjacent to the crane site/access tracks;
- Crushed stone will be laid on a geo-textile mat to an appropriate depth;
- For hardstandings, after turbines are erected the topsoil will be used to cover the hardstanding where appropriate, to reduce the visual and environmental impact, but the

hard-standing shall be retained in situ for the operational phase of the wind farm. In the event that maintenance work requiring a large crane is needed (e.g. replacement of a blade set), the crane hardstanding areas will be re-exposed and will again be recovered with topsoil and reseeded on completion of the work;

- Where access tracks require to cross any drainage ditches or water feature, appropriate span bridges will be constructed to prevent any interference with watercourses;
- The hardstanding and on-site access tracks will be removed during the decommissioning phase, unless the Planning Authority agree to their retention for forestry/agricultural activities.

2.5.4 Temporary Construction Compound

During the construction period, a temporary construction compound will be required and will comprise:

- Temporary cabins to be used for the site office, the monitoring of incoming vehicles and welfare facilities for the construction staff, including temporary toilets;
- Parking for construction staff, visitors and construction vehicles;
- Secure storage for tools, plant and small parts;
- Safe bunded storage of components and materials including fuels, lubricants and oils;
- Security fencing around the compound.

Temporary portaloos, chemical toilets for construction staff will be sealed chemical units to ensure that no discharges will escape into the local environment. These will be supplied and maintained by a licensed supplier. Potable drinking water (for drinking, food preparation, hand washing etc.) will be supplied on-site by water dispensers and this will be sourced and maintained through a licensed supplier.

The compound will be marked out and fenced to prevent any environmental impact. The compound will be fully re-instated at the end of the construction period. Reinstatement will involve removing crushed stone and underlying geotextile and covering with topsoil and seeded out.

2.5.5 Construction Drainage & Effluent Disposal

The proposed development site is located in the catchment of the specified Freshwater Pearl Mussel populations as set out in First Schedule of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No. 296/2009). Sedimentation poses the biggest threat to the Freshwater Pearl Mussel which is the qualifying interest of the River Barrow and River Nore SAC (Site Code: 002162). All surface water run-off shall be strictly controlled such that no silt or other pollutants enter water courses and that no artificially elevated levels of downstream siltation or no plumes of silt arise when substratum is disturbed in accordance with the Fourth Schedule of the Regulations.

Construction works will be carried out in accordance with the soil and water assessments and mitigation measures included in this EIS in order to minimise any risks of pollution of nearby watercourses by debris, silt and oils (see **Chapter 5 & 6**). The potential impacts during construction on water environment will include increased volumes of surface water runoff; the generation of silt laden surface water runoff from excavations and the storage of stockpiles; surface water and groundwater contamination due to leakage oils/fuel from site vehicles, spillage during refuelling operations; and leakage from chemical, waste and fuel storage areas. Specific mitigation measures are presented in the relevant chapters of this EIS in relation to each of these issues.

During the construction phase, stockpiles of excavated materials will be stored appropriately in a designated area of the site (a minimum of 50m from nearby watercourses or drains), in order to minimise the risk of silt laden surface water runoff entering surrounding water courses. All surface

water runoff from stockpiles, excavations or from dewatering operations will be passed through a silt trap.

The refuelling of vehicles/machinery will normally take place off-site. In the event that refuelling occurs on-site, it will be under a strict protocol and will be carried out only by trained personnel. Storage areas for oils, chemicals and waste will be comprised of bunded areas of hardstanding of sufficient capacity. Bunds will have a watertight roof structure and will be supplied by a licensed manufacturer to enable adequate safe storage for the quantities of material required. An adequate supply of spill kits will be available in order to clean up any minor spillages should they occur. A hydrocarbon interceptor will be installed within the surface water drainage system during the construction phase to trap any hydrocarbons that may be present. A 50m buffer will be observed around all surface water features and no fuel/chemicals shall be handled or stored within this zone.

2.5.6 Spoil Management

The overall indicative volume of subsoil excavation for the proposed development has been established as being approximately 10,969m³ from roads and 9,072m³ from hardstands and the substation. The estimated volume of subsoil to be re-used on site is 20,038m³. A small section of road in County Kilkenny will be excavated amounting to 288m³ of subsoil excavated and a volume of 192.5m³ re-used in a roadside berm. Therefore the indicative volume of subsoil excavation within County Laois has been established as being approximately 10,681m³ from roads and 9,072m³ from hardstands and the substation. The estimated volume of subsoil to be re-used on site within County Laois is 19,845.51m³. Please refer to **Appendix 2.3** for indicative subsoil excavation volumes and repository areas and drawings of the locations of repository areas. Subsoil reinstatement will be possible through the following methods:

- Saving the top layer of the subsoil excavated for landscaping uses over any backfilled areas.
- Placing the excavated subsoil along roadside berms.

In the unlikely event that excess subsoil is encountered, which cannot be reused on site, this subsoil will be disposed of in an environmentally sensitive manner by a licensed waste contractor in consultation with the Planning Authority.

A detailed Subsoil Management Plan will be prepared prior to the commencement of construction at the site, for agreement with the Planning Authority. The preparation, application and documentation of this Subsoil Management Plan will enable all parties – including contractors, designers and competent authorities – to learn from the systematic implementation and assessment of best practice, particularly through the recording of summary information on performance outcomes.

The Subsoil Management Plan will also cover the storage and restoration of all subsoil excavated during the construction phase. Subsoil with a volume of approximately 20,038m³ will be re-used during the construction phase as follows:

- Resurfacing of hardstanding and splay areas
- Reinstatement of splays, stilling ponds, etc
- Roadside berms and landscaping
- Landowner land reclamation/improvement activities

Subsoil will not be placed:

- Within 50 m of natural watercourses
- Within 20 metres of a major arterial drain or 10m of any minor drain or drains containing dry weather flows greater than 1 litre/second
- Within areas of gradient greater than 1:20
- Within areas designated as sensitive habitat

The following methodology is proposed for such work:

- Prior to excavation, all grass areas shall be cut into turves and will be carefully stacked and re-used within one week of cutting during the period 1st April to 31st August or within two weeks of cutting during the remainder of the year. Turves not used within these periods shall be regarded as topsoil.
- Subsoil will be re-used to form berms either side of the track for the first 418m and on the western side of the track as far as Entrance 2. Berm heights will not exceed 0.5m.
- All reinstatement areas will be suitably fenced and signs warning the public will be erected.
- Bare subsoil will be seeded with a wild flower mix to enhance biodiversity.
- Any bare areas to be seeded shall be covered with topsoil to a minimum depth of 100mm which shall be reduced to a fine tilth, free from stones and debris with any dimensions greater than 35mm. The topsoil shall be graded and lightly compacted to a 100mm thickness or existing thickness-whichever is greater. Any upstanding debris or stones exceeding 35mm dimension shall be removed.
- Due regard will be paid to the season and weather condition before sowing the wild flower seed. Immediately prior to sowing the seed, the topsoil shall be reduced to a fine tilth. An even distribution of the approved mix will be applied. The seed shall be covered by lightly raking into the surface of the topsoil.
- All work will be carried out in an environmentally sensitive manner in consultation with the Planning Authority and the National Parks and Wildlife Service, as appropriate.
- A waste license will be obtained from the Local Authority / Environmental Protection Agency prior to any disposal of subsoil as per the Waste Management Regulations 2006 and the Waste management Act 1996 to 2008.

The proposed method of disposal will have no likely significant environmental impact. The proposed measures and methodology will help in the reinstatement of worked out areas of subsoil and aid in the attenuation of run off at these locations. It will further assist in the regeneration and landscaping of the area and result in no threat to existing drains, streams or their aquatic habitats.

2.5.7 Construction Waste Management

Waste will be generated during the construction phase and the main items of anticipated construction waste are as follows:

- Hardcore, stone gravel, concrete, plaster, topsoil, timber, concrete blocks and miscellaneous building materials;
- Waste from chemical portaloo toilets;
- Plastics;
- Oils, diesel.

Waste disposal measures proposed are:

- On-site segregation of all waste materials into appropriate categories including, for example, topsoil, bedrock, concrete, bricks, tiles, oils /diesels, metals, dry recyclables e.g. cardboard, plastic, timber;
- All waste materials will be stored in skips or other suitable receptacles in a designated area of the site;
- Wherever possible, left over materials (e.g. timber off-cuts) and any suitable demolition materials shall be re-used on-site;
- Uncontaminated excavated material (rock, topsoil, sub-soil, etc.) will be re-used on-site in preference to importation of clean inert fill;
- Bedrock may be encountered during foundation excavation. If bedrock is encountered it will be crushed appropriately onsite and used for infill during construction;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably licensed or permitted facilities and will be recycled, recovered or reused, where possible;
- All waste leaving the site will be recorded in accordance with legal requirements and copies of relevant documentation maintained.

2.5.8 Construction Employment

On average, approximately 53 people (based on 1.5 jobs per MW) will be employed at any one time on site during the construction of the scheme. The actual number will depend on the activities being undertaken at any given time and will vary throughout the course of the construction programme. Employment will be the responsibility of the construction contractor but it is likely that the workforce will include labour from the local area. Additional temporary employment will be created in any post-development environmental assessments and ongoing monitoring.

2.5.9 Construction Traffic

Vehicular traffic required for the construction phase is likely to include:

- Articulated trailer trucks to bring initial equipment onto site and later to bring the turbine components, electrical cables, steel reinforcement for foundations, anemometer mast, and ancillary equipment;
- Tipper trucks and excavation plant involved in site development and excavation works;
- Cranes to erect the turbines;
- Miscellaneous vehicles and handling equipment, including vehicles associated with construction workforce.

Potential impacts from construction traffic include temporarily increased local traffic levels and traffic noise. Construction traffic on the local road system would be managed in accordance with a Traffic Management Plan and the requirements of the local authority. This may include the installation of temporary road signage and traffic lights as appropriate. Noise arising from construction traffic would be localised, temporary and of a short term duration.

The site has good accessibility with close proximity to regional routes. This will greatly assist the logistics of delivering the components to site. Some temporary works to the L7800 junction will be required to facilitate abnormal oversized loads of turbine components and which will be fully reinstated post construction phase. Deliveries will take place at times to avoid peak traffic periods. All abnormal loads will be accompanied by an advance escort vehicle. Once the turbines are operational, the traffic movements will be greatly reduced to, on average, once/twice a week by a light commercial vehicle for maintenance purposes. There may be a need to replace some turbine components but these are unlikely to be frequent.

Traffic mitigation measures will be implemented during the construction phase, as follows:

- Signage at site entrances giving access information;
- Temporary traffic restrictions kept to minimum duration and extent;
- Diversions put in place to facilitate continued use of roads where restrictions have to be put in place;
- Construction traffic management – one way systems where possible and strictly enforced speed limits;
- Provision of a designated person to manage access arrangements and act as a point of contact to the public;
- All temporary road alterations and junction upgrades to be carried out in full consultation with the Local Authority;
- No hedgerows or potential breeding habitats to be removed during the breeding season.

2.6 Operational Phase

The operational phase of the proposed development is 25 years. During this period the wind turbines will be operational and, other than routine maintenance and monitoring, there will be no other activities on site and agricultural/forestry activities can continue as normal. On average the site will be serviced once/twice a week by a light commercial vehicle for maintenance purposes. In exceptional circumstances there may be a requirement to replace a turbine component which would require more substantive works on site.

Waste will be generated during the operational phase including, for example, cooling oils, lubricating oils and packaging from spare parts or equipment. All waste will be removed from site and reused, recycled or disposed of in accordance with best-practice, in a licensed facility and in accordance with all regulations.

Further details on the operational phase and specific mitigation measures are provided in each chapter of this EIS as they relate to each environmental topic.

2.7 Off-Site & Secondary Developments

2.7.1 Haul Route

Detailed consideration has been given to a number of alternative haul route options to the site as part of the EIS process (see **Chapter 13**). It is envisaged that the turbines will be transported from Dublin Port using the M50, M7, M9, N78 and the R430. At the junction of the R430 and the L7800 local road leading to the site entrance some temporary upgrade works are proposed at this junction to facilitate the turning movement of abnormal oversized loads. As the transport route will utilise mainly motorways and regional roads, no road widening along these routes will be necessary to accommodate oversized loads. At roundabouts and junctions along the route, road signs may need to be temporarily removed, as necessary, to accommodate the irregular loads and will be immediately reinstated in full. This will be agreed in advance with the relevant local authority. An Garda Síochána will be informed prior to transportation and appropriate escorts for abnormal oversized loads will be arranged to accompany the vehicles as necessary. Haul route access to the site will be via the existing forestry access point. Local improvement works to L7800 and L78001 are proposed to widen the site access point and undertake road strengthening to accommodate construction traffic, irregular loads and to provide appropriate visibility splays. A full Transport Impact Assessment has been carried out which demonstrates that the amount of traffic generated by the proposed development during both the construction and operation phases will be low-negligible. There will be consultation on all road works which will be carried out with all affected local authorities and fully reinstated following the construction phase, as required. The likely cumulative impact of the haul route in combination with the proposed development and other activities and permitted developments in the vicinity is considered to be temporary and low-negligible.

2.7.2 Grid Connection

The Wind Energy Development Guidelines for Planning Authorities (2006) state that:

"it is not always possible due to reasons outside the applicants control to provide details of the grid connection and in these instances details of indicative and feasible options for grid connection lines and facilities should in general be adequate for a planning authority to consider a wind energy application as the precise capacity required for connection will not be known until planning permission is obtained."

However, a High Court judgement of December 2014 (*O'Grianna & Ors v An Bord Pleanála*) held that, notwithstanding that the design and specification of the grid connection would be controlled

by the transmission system operators, for the purposes of EIA the grid connection could not be separated from the balance of a project for the purposes of EIA, and therefore the cumulative effect of both the wind farm and its grid connection must be assessed in order to comply with the EIA Directive. It should be noted that the *O’Grianna* case does not require that the proposed development and its connection to the national grid be part of a single planning application, but assessed in a single EIA.

Two alternative options for connection to the national grid were considered as part of the design phase of the proposed development, as follows:

- Option A - Underground line (UGL) along the public road to the existing substation at Ballyragget (see Figure 2.5):** This grid connection option would involve the digging of a trench and the laying of grid cables along public road, backfilling and reinstatement which will be carried out in accordance with the ESBI guidance ‘*HV Cables – General Construction Methodology*’ (PE424-F7001-R00-001-001). One of the advantages of laying cables under a roadway is that there is typically no permanent impact on the environment additional to that caused by the presence of the roadway (see, example, An Bord Pleanála Reference PL04.245082). When an underground cable is laid under an existing roadway there is a short-term temporary impact during the construction phase only. The underground cables would be of a solid polymeric construction with either aluminium or copper conductors. Cable installation trenching will be by a mechanical digger, with full reinstatement of the top layer to its original wearing course. Cables are laid in a granular bed and backfilled with surround material. This material offers protection to the cables and the contrasting material helps identify location should the need arise later. The proposed depth of the cable trench is approximately 1 metre and the width of the cable trench is 50 centimetres. The proposed cable duct is a very standard design and capable of accommodating a 38kV or 110kV cable. The duct would be constructed in agreement with the local authorities, including a bond for reinstatement works. It is estimated that the total construction phase will be 9 – 12 months in duration.
- Option B - Connection to the permitted 110kV Overhead Line (OHL) Laois-Kilkenny Grid Reinforcement Project:** One of the distinct advantages of the subject site from an environmental impact perspective is that the permitted 110kV Laois-Kilkenny Grid Reinforcement Project (An Bord Pleanála Reference PL11.VA0015) passes directly through the site². The permitted OHL, which has been subject to full EIA and AA, now has capital approval and is moving to detailed design stage with ESB Networks. Following detailed discussions with Eirgrid it has been agreed that the proposed development can loop directly into this 110kV line via a substation/switchroom at the subject site. This will include the erection of two single circuit strain towers of up to 26.5 metres in height to connect into this 110kV transmission line. From there, the proposed development will have a fully consented transmission path to either the permitted 400/110kV substation at Coolnabacky or the permitted 110kV upgraded substation at Ballyragget which are both equidistant from the subject site. An extract of the line of permitted Laois-Kilkenny OHL is illustrated in Figure 2.6. The line of the permitted transmission line passing through the subject site is illustrated in Figure 2.4 and in Appendix 2.2.

For the purposes of this EIS it is proposed that the proposed development will take advantage of the permitted grid infrastructure passing through the subject site and Option B is the preferred option. A cumulative assessment of the likely significant impact of the proposed development in-combination with this permitted OHL is included in the EIS – where appropriate and relevant - in accordance with the *O’Grianna* judgement. Overall the likely cumulative impact of the proposed development in

² <http://www.eirgridlaoskilkenny.ie/index.html>

combination with the permitted 110kV Laois-Kilkenny Grid Reinforcement Project is considered to be low-negligible, as summarised below:

- **Human Beings:** The project will directly affect the social, economic or enterprise status of the area. The provision of a higher quality and more secure power supply to the overall area and local employment will, however, have considerable positive social and economic effects on the region and the area. Local amenities have the potential to be impacted through visual impacts, shadow flicker, noise or effects on biodiversity – these impacts are considered in the relevant EIS chapter and it is concluded that there is unlikely to be any significant environmental impact. Avoidance of major towns during detailed project design together with the appropriate setbacks to one-off house locations provides for the optimum location and route for the project.
- **Flora & Fauna:** The EIS for the Laois-Kilkenny Grid Reinforcement Project concludes that, taking into consideration the sum of the residual impacts of the various elements of the project, no significant cumulative impacts are foreseen. Considering the small amount of habitat that will be affected and the overall significance of these habitats, it is predicted that the in-combination impact of the project will have a negligible cumulative impact on ecology. The loss of habitat jointly arising from the project is deemed to be of low significance. The off-site and in-combination impacts on flora, terrestrial and aquatic habitats, birds and mammals will be negligible and are not considered significant. Subject to correct implementation of all mitigation measures, there is reasonable scientific certainty as to the absence of impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives.
- **Soil & Geology:** The design of the project - turbines, proposed substation and electricity line routes - has taken account of the potential in-combination impacts on the soils and geology environment local to the area where construction is taking place. Comprehensive measures have been incorporated in the design to mitigate the potential effects on the surrounding soils and geology environment. A project-specific Construction Environmental Management Plan (CEMP) will be established for both the Laois-Kilkenny Grid Reinforcement Project and the proposed development and maintained by the contractors during the construction and operational phases. The mitigation measures for decommissioning phase would be the same as the measures highlighted for the construction phase. The implementation of the mitigation measures will ensure that the soils and geology environment is not adversely impacted by the project and no soil or silt, as a consequence of the proposed development, will enter into watercourses during normal and/or emergency construction activities. The cumulative impact will therefore be short term and negligible and the mitigation measures proposed will provide reasonable scientific certainty as to the absence of impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives.
- **Water:** The design of the project has taken account of the potential in-combination impacts of the proposed works on the water environment local to the area where construction is taking place. Measures have been incorporated in the design to mitigate the potential effects on the surrounding water environment. A project-specific Construction Environmental Management Plan (CEMP) for both the Laois-Kilkenny Grid Reinforcement Project and the proposed development will be established and maintained by the contractors during the construction and operational phases. The mitigation measures for decommissioning phase would be the same as the measures highlighted for the construction phase. The implementation of the mitigation measures will ensure that the water environment is not adversely impacted during normal and/or emergency construction activities. The cumulative impact will therefore be short term–negligible and mitigation measures proposed will provide reasonable scientific certainty as to the absence of impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives.

- **Air & Climate:** Short term impacts of the project on local air quality will arise from project construction related emissions but the overall impacts on air quality will be negligible both in the national context and in the immediate receptor area. The main potential impact to air quality will come from dust during the construction phase which could potentially have a localised effect on aesthetic surroundings or cause a nuisance due to reduced visibility, soiling of gardens, buildings or vegetation and impairment of air quality. Any impacts will be short-term and can be fully controlled using good site practice and good engineering construction practices during the construction phase. To prevent dust becoming a nuisance during the construction phase, dust suppression such as wheel washing of vehicles and dampening down of sites, lanes and roadways with water will be carried out in prolonged dry periods. The cumulative impact of the project on air quality and climate will therefore be short term, localised and negligible.
- **Landscape & Visual Impact:** The project will give rise to localised changes to the appearance of the landscape in the immediate vicinity of the wind farm. North of Ballyragget the grid connection will cause localised changes that will be intermittently visible from roads close to the development with limited impacts on the wider landscape. Visibility of the grid connection against the skyline will be very localised on account of topography and vegetation, particularly from the R432, the environs of Ballinakill or Haywood Demesne. North of Ballinakill the route crosses some elevated areas that will give rise to some skyline views – affecting small numbers of houses or roads. There will be localised effects around Boleybeg Cross Roads after which the route crosses elevated and afforested lands that contain low levels of roads or dwellings. The route and project location selection process was the main method used to avoid landscape effects. It is concluded that the cumulative landscape and visual impact of the proposed development in-combination with the grid connection route is low, given that the low perceptibility of the grid connection against the skyline, which will be very localised and largely negligible. The overall landscape and visual impact is considered to be in the mid-to-lower order of magnitude (moderate to minor-negligible)
- **Archaeology and Cultural Heritage:** No significant impacts on the archaeological, architectural or cultural heritage have been identified on, or in vicinity of the proposed development site, or along the grid connection route. Where potential impacts have been identified they are mainly categorised as slight and appropriate mitigation has been recommended in order to minimise any such impact. There is one Protected Structure (Saint Lazerian’s Catholic Church, Graiguenahown: RPS Ref. No. 374) within 1km of the proposed development site. There are an additional 28 Protected Structures within the 5km study area. It is considered there will be a minor visual impact on Saint Lazerian’s Catholic Church (RPS Ref. No. 374). Due to the distance of the remaining Protected Structures and other archaeological sites from the proposed development area, and the nature of the undulating landscape, it is considered there will be a negligible in-combination visual impact on archaeology and cultural heritage.
- **Noise & Vibration:** There will be some minor short-term impact on nearby residential properties due to noise emissions from site traffic and other activities during construction. Traffic noise impact will be of a temporary nature and will not be excessively intrusive due to relatively low volumes. Given the setback of the project and construction traffic routes to dwellings, together with the low intensity of traffic generated, there will be no likely significant cumulative impact in terms of vibration. The noise from the operational phase of the wind farm has been assessed to be within the thresholds set in the Wind Energy Development Guidelines for Planning Authorities 2006. Noise from overhead lines can be generally classed as either aeolian (wind-induced) noise, corona (electrically-induced) noise or from gap sparking. Gap sparking occurs at tiny electrical separations (gaps) that develop between mechanically connected metal parts which give rise to electrical noise. Gap

sparkling can develop at any time on power lines at any voltage and is monitored by the network. Corona noise is localised not expected to give rise to complaints for the Laois-Kilkenny Grid Reinforcement Project. Aeolian noise rarely occurs on overhead lines and in the unlikely event of it occurring, appropriate mitigation measures will be applied. Overall, it is concluded that the cumulative noise impacts of the proposed development in-combination with the overhead electrical line will be temporary-negligible.

- **Shadow Flicker:** As the proposed grid connection does not give rise to shadow flicker, there will be no cumulative impact.
- **Telecommunications:** There will be no likely cumulative impacts on telecommunications arising from the proposed development in-combination with the grid connection.
- **Transport:** It is not anticipated that the presence of additional heavy vehicles associated with the construction of the project will decrease road safety or have an impact on local roads, from current trends, along the roads surrounding the project. The cumulative impact of overhead line construction and wind farm development on traffic flows generally is not significant. Construction impacts will be short term and peaks in activity will be for short durations only. Additional traffic volumes for the construction of each wind turbine, hardstands, access tracks, angle mast and polesets will generally be low and for a very limited duration. At operational phase, the project will be generally unmanned therefore traffic will be limited to a relatively small number of personnel for maintenance and servicing requirements with a low number visits to the sites. The implementation of the mitigation measures as set out in the EIS and Traffic Impact Assessment will ensure that traffic is not adversely impacted and that the impact will be short term - negligible.

In the event that that the permitted Laois-Kilkenny OHL does not proceed, the developer will pursue either of two options:

- The UGL along the public roads as described above and illustrated in **Figure 2.6**; or
- Partial construction of the OHL along the route of the permitted Laois-Kilkenny grid reinforcement project in a southerly direction towards the existing substation at Ballyragget.

These abovementioned alternative options would be subject of a separate planning application but are mentioned here in order to ensure that the likely significant in-combination impacts are fully addressed in this EIS. Again, the likely cumulative environmental of the project in the event of the alternative options described above is considered to be low-negligible.

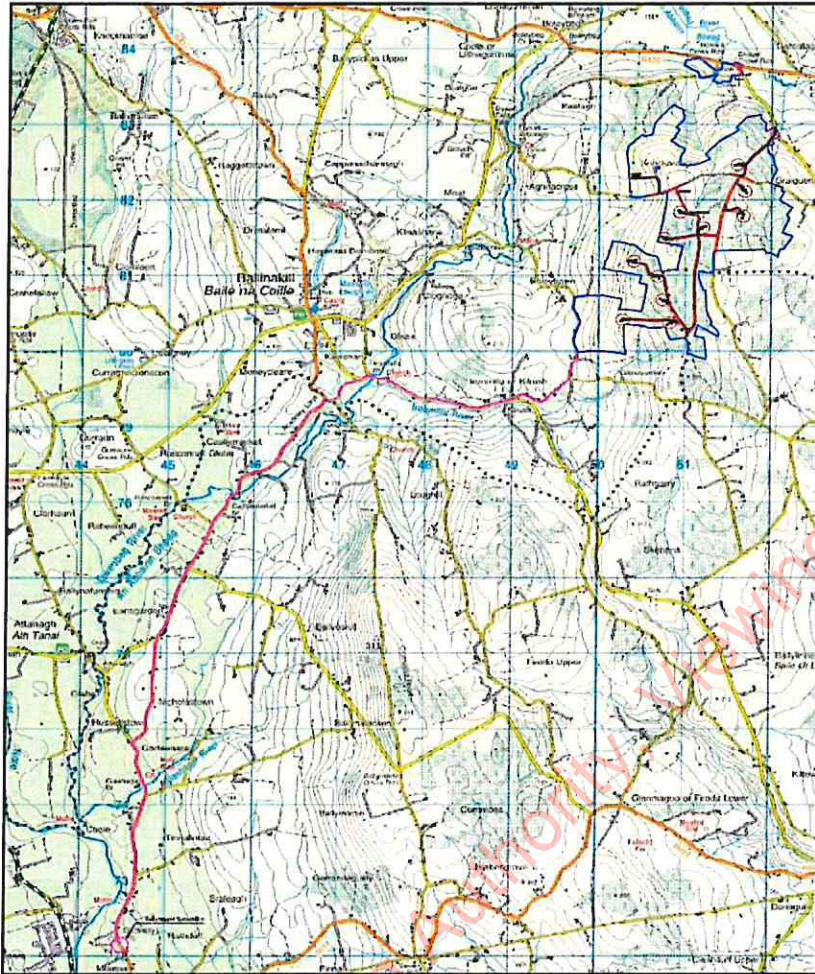


Figure 2.5: Option A: UGL grid connection route to Ballyragget Substation

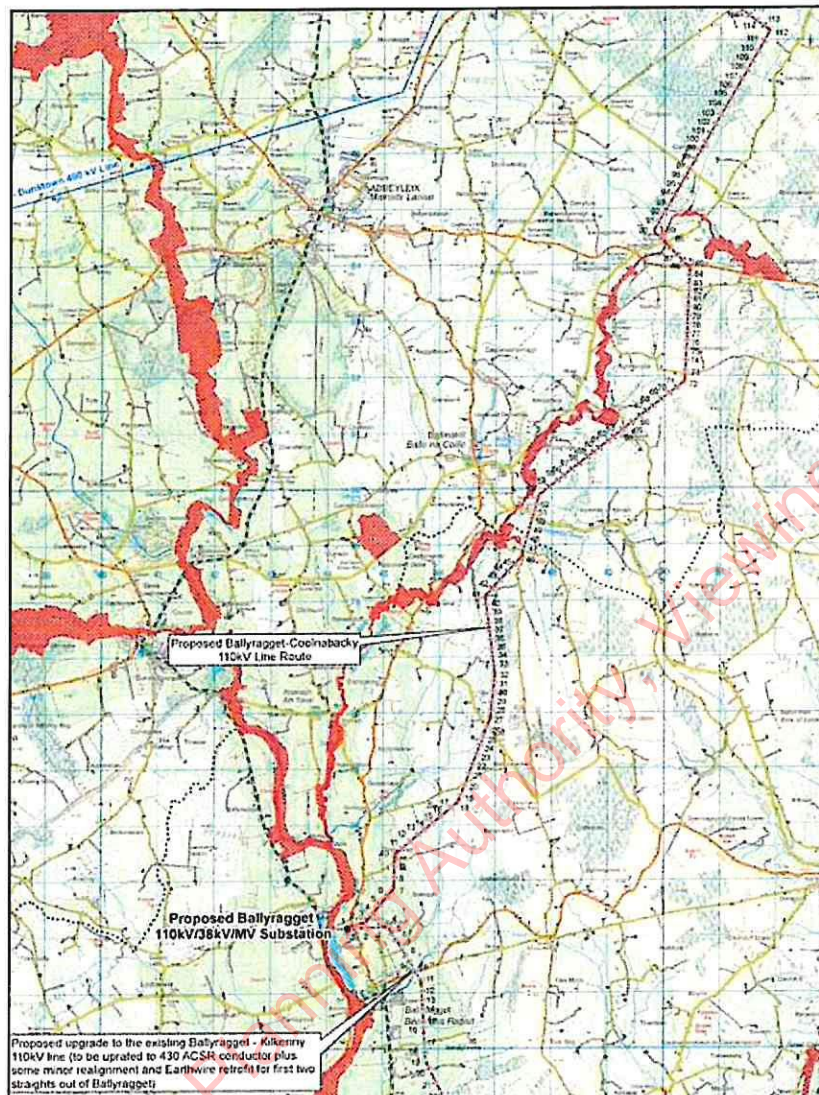


Figure 2.6: Option B: Extract of the route of permitted 110kV transmission line towards Ballyragget

2.7.3 Aggregates & Materials

To minimise the level of traffic along the national road system, all materials for the construction of the access tracks and foundations will be sourced, where possible, from construction activities (e.g. excavations) within the site and/or nearby quarries. Chapter 13 outlines the potential haul route of construction materials to the subject site from local quarries. The developer shall only use fully licensed quarries which have been subject to EIA and have appropriate planning permission for the volumes of material to be extracted. These aggregates are slated for extraction in the normal course of the quarries business and would be utilised by other consumers if same were not used in the project the subject matter of this EIS. The potential use of these quarries for aggregates in the proposed development will therefore have no additional environmental impacts above and beyond those normally entailed in the operation of the quarry. No borrow pits are proposed as part of the proposed development and no blasting of any rock will take place on-site.

2.7.4 Forestry

There are commercial forestry rotation plantations on the subject site with associated access tracks. Construction phase activities will be managed so as not to coincide with commercial forestry

operations, including felling. Accordingly, there will be no likely significant cumulative impacts in respect of forestry and the proposed development. Approximately 6 hectares of existing commercial forestry plantations will need to be removed to facilitate construction of the proposed development. Felling operations to facilitate construction works will be implemented in advance of construction activities in accordance with the Construction Management Plan. Pre-construction felling operations will only take place between April and October and, in all cases, fully in accordance with the Department of Agriculture's, Forestry and Food's (Forestry Service) *Forestry and Freshwater Pearl Mussel Requirements: Site Assessment and Mitigation Measures*.

2.8 Decommissioning Phase

The operational lifespan of the project is predicted to be 25 years. At the end of this period several options will exist:

- Continued operation of the existing turbines;
- Refurbishment/replacement of the turbines and continued operation;
- Decommissioning of the wind farm.

Any further operation beyond 25 years would be subject to a further planning application and EIA. In its scope, this EIS therefore assumes full decommissioning of the proposed development will take place. All structures above ground level shall be demolished and removed from the site for reuse/recycling.

A Decommissioning Management Plan will be agreed with the local authority in advance of decommissioning works. Further details on the decommissioning phase and specific mitigation measures are provided in each chapter of this EIS as they relate to each environmental topic.

2.8.1 Wind Turbines

Wind turbines are comprised of the tower, nacelle and blades which are modular items that can be disassembled. This shall involve a process which will be similar to the construction phase in reverse. If the turbines are to be sold on or reused elsewhere they shall be removed from site by specialist vehicles similar to those used during their transportation to site. If wind turbine components are not to be reused then they shall be scrapped. This shall involve sorting the components according to their material of construction. This shall be mainly steel/ferrous metals. Transformers and generators contain significant quantities of copper so it will be the decision of the demolition contractor if they wish to segregate on-site prior to disposal. All components shall be removed off site to an approved waste handling facility for recycling or disposal.

2.8.2 Foundations

Wind turbine foundations shall be grubbed up to a depth of 1 metre below ground level using conventional mechanical diggers. Exposed rebar and holding down bolts shall be burned off and removed off site to an approved waste handling facility for recycling or disposal. The broken concrete can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively it may be used on site as an inert fill to make up levels as part of a wider restoration plan, reducing the need for the importation of materials onto the site. Excavations shall be backfilled with excavated material, soiled over and seeded out.

Excavations shall be carried out to expose any cables buried in trenches to a depth of 1 metre below ground level and the cable removed. The majority of cables used in wind farm construction contain a core of either copper or aluminium. Both of these materials can be recycled. Any cable off-cuts shall be removed off site to an approved waste handling facility where the cores shall be recycled and the remaining material shall be disposed of at an approved facility. Excavations carried out to expose cables shall be backfilled with excavated material, soiled over and seeded out.

2.8.3 Substation & Staff Welfare Facility

The decommissioning of the substation will involve the strip-out and removal of steel, conductors, switches, transformer and other materials and equipment that can be reconditioned and reused or sold as scrap. A soft strip of the buildings shall ensure that all fixtures and fittings are removed prior demolition. Demolition of the structures shall take place using conventional demolition methods. Foundations and building services shall be grubbed up to a depth of 1 metre below ground level. The demolition waste shall comprise mainly rubble (bricks, block, broken concrete, plaster etc.) and timber. Rubble can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively it could be used on site as fill. The timber and other waste shall be segregated according to material type with a view to recycling where possible or disposal. All demolition materials which cannot be reused on site shall be removed off site to a licensed waste handling facility for recycling or disposal. Excavations shall be backfilled with suitable material, soiled over and seeded out.

2.8.4 Hardstandings

Hardstandings shall be grubbed up to a depth of 1 metre below ground level and the excavated material shall be used to regrade the hardstand area to match existing ground contours and profile. Additional inert material derived from demolition in other areas of the site may be used if sufficient material is available. Once the area has been profiled to match the surrounding ground, 50mm of topsoil shall be spread over the reinstated area. This area shall then be seeded out. If it is decided not to retain the access tracks on site for agriculture purposes then these shall be removed using a similar methodology.

2.8.5 Monitoring

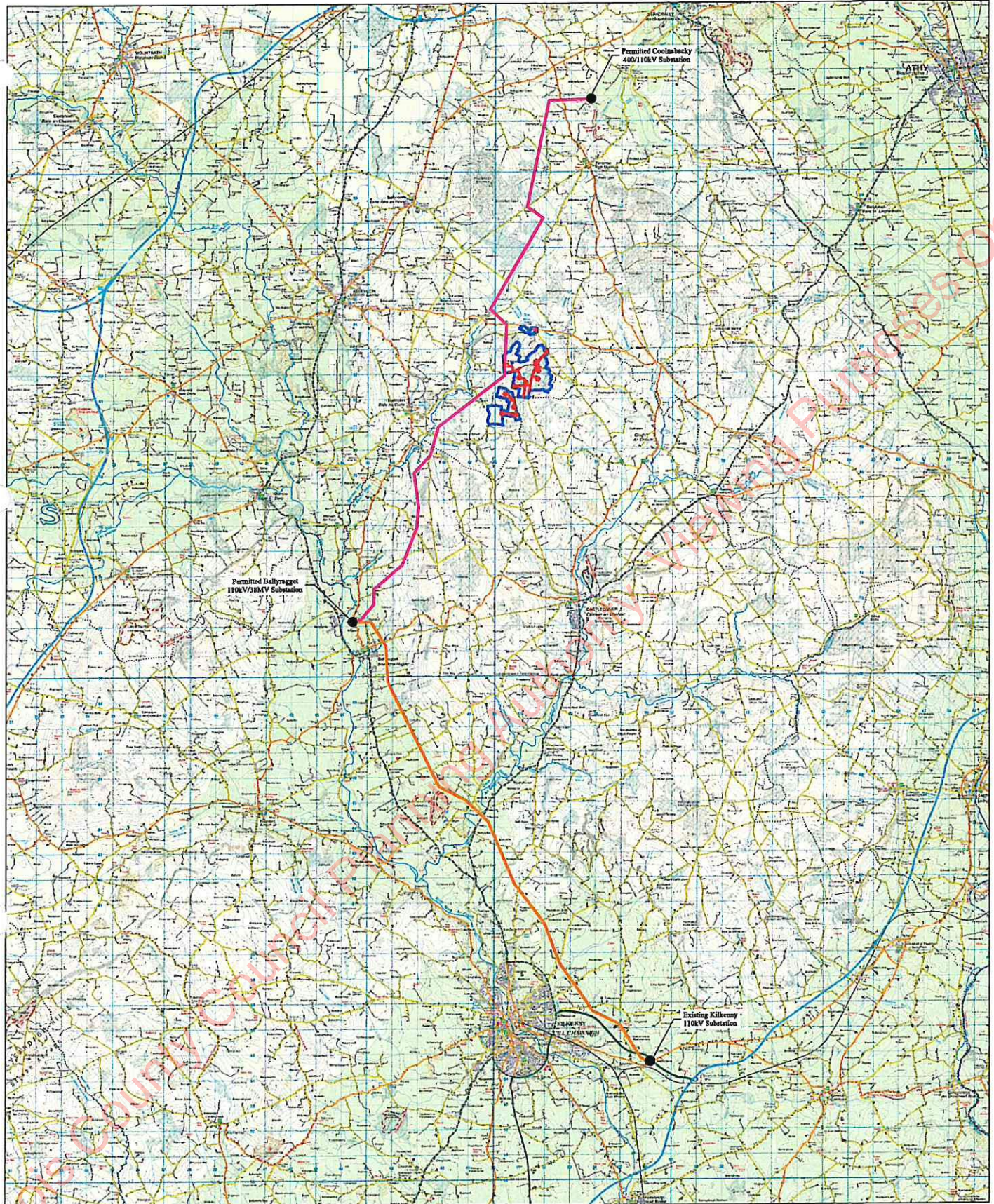
A monitoring period of two years immediately following the decommissioning and restoration activities will be provided. The monitoring period allows for the project area to experience seasonal changes and to determine if additional restoration works are required. If during this time any failure of works or reinstatements carried out occur, they shall be made good using similar process as described above.

Appendix 2.1 - Map indicating all Dwellings within 1,030m of a Proposed Wind Turbine

Laois County Council Planning Authority, Viewing Purposes Only

Appendix 2.2: Maps of Laois-Kilkenny Grid Reinforcement Project

Laois County Council Planning Authority, Viewing Purposes Only



OS © License: ENI 0062817 - Prepared using Irish National Grid (1965)

Legend:

- Ownership Boundary —
- Application Boundary —
- Permitted Ballyragget - Coolnabackey 110kV line route —
- Permitted upgrade to the existing Ballyragget - Kilkenny 110kV line —

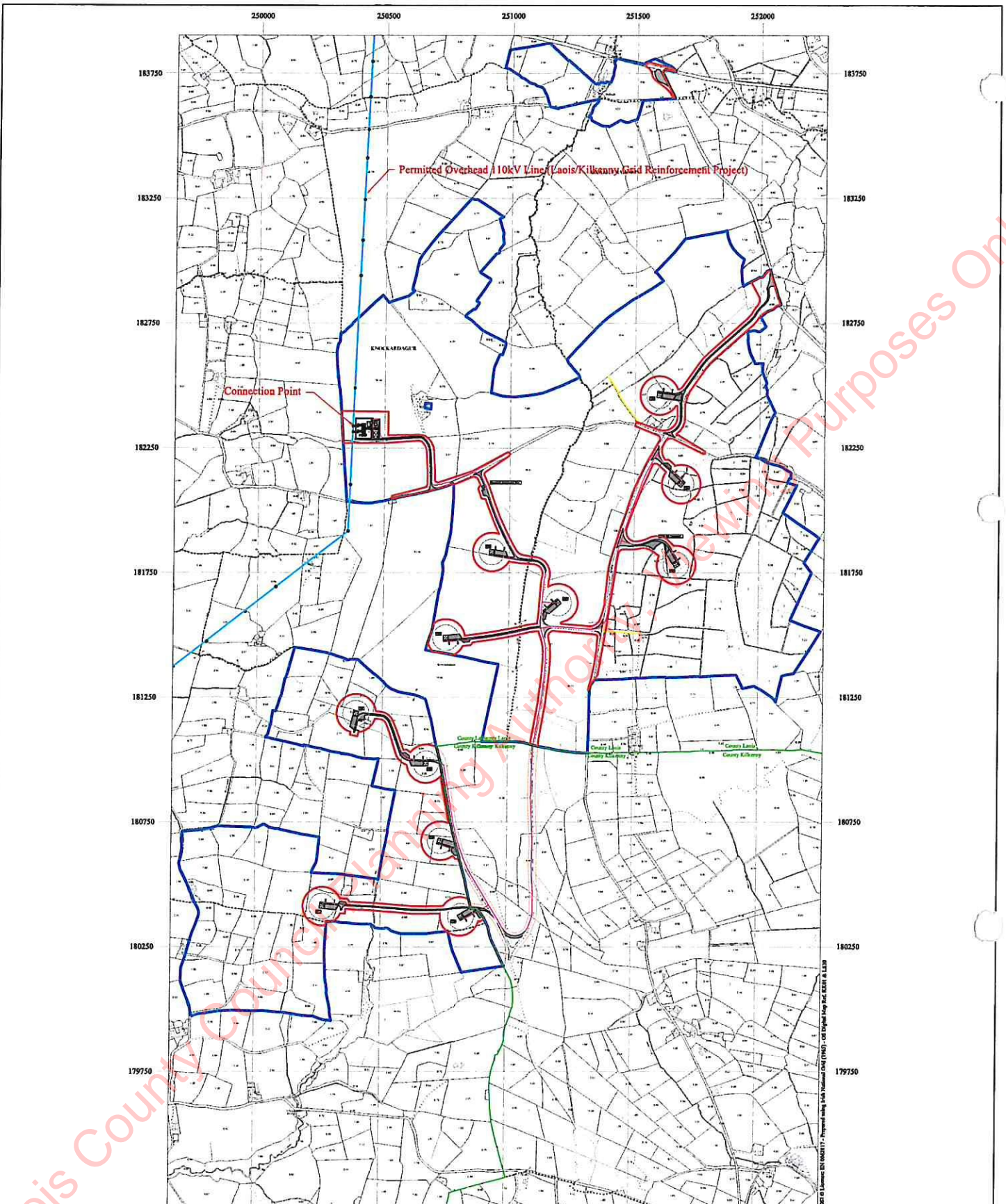


Client:
Pinewoods Wind Ltd

Job Title:
Pinewoods Wind Farm - Further Information Request

Drawing Title:
Laois/Kilkenny Grid Reinforcement Project Route

Date:	Rev:	Description:	Revision No.:	Drawn By:
Drawing No.:		Revision No.:		
20170112/IB/FIPD/001		00		
Scale:		Date:		
(A0) 1:50,000		12/01/2017		
Drawn By:	Checked By:	Confirmed By:		
J.B	C.M.P	D.S		



Legend:

Ownership Boundary		Wind Turbines	
Application Boundary (Co. Laois)		Co-ordinates Gridlines	
Application Boundary for concurrent application made in Co. Kilkenny		County Boundary	
Indicative Cable Route		Recorded Way Leave Areas	
Wind Farm Tracks		Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project)	
Existing Tracks (requiring upgrade)			





Client:
Pinewoods Wind Ltd

Job Title:
Pinewoods Wind Farm - Further Information Request

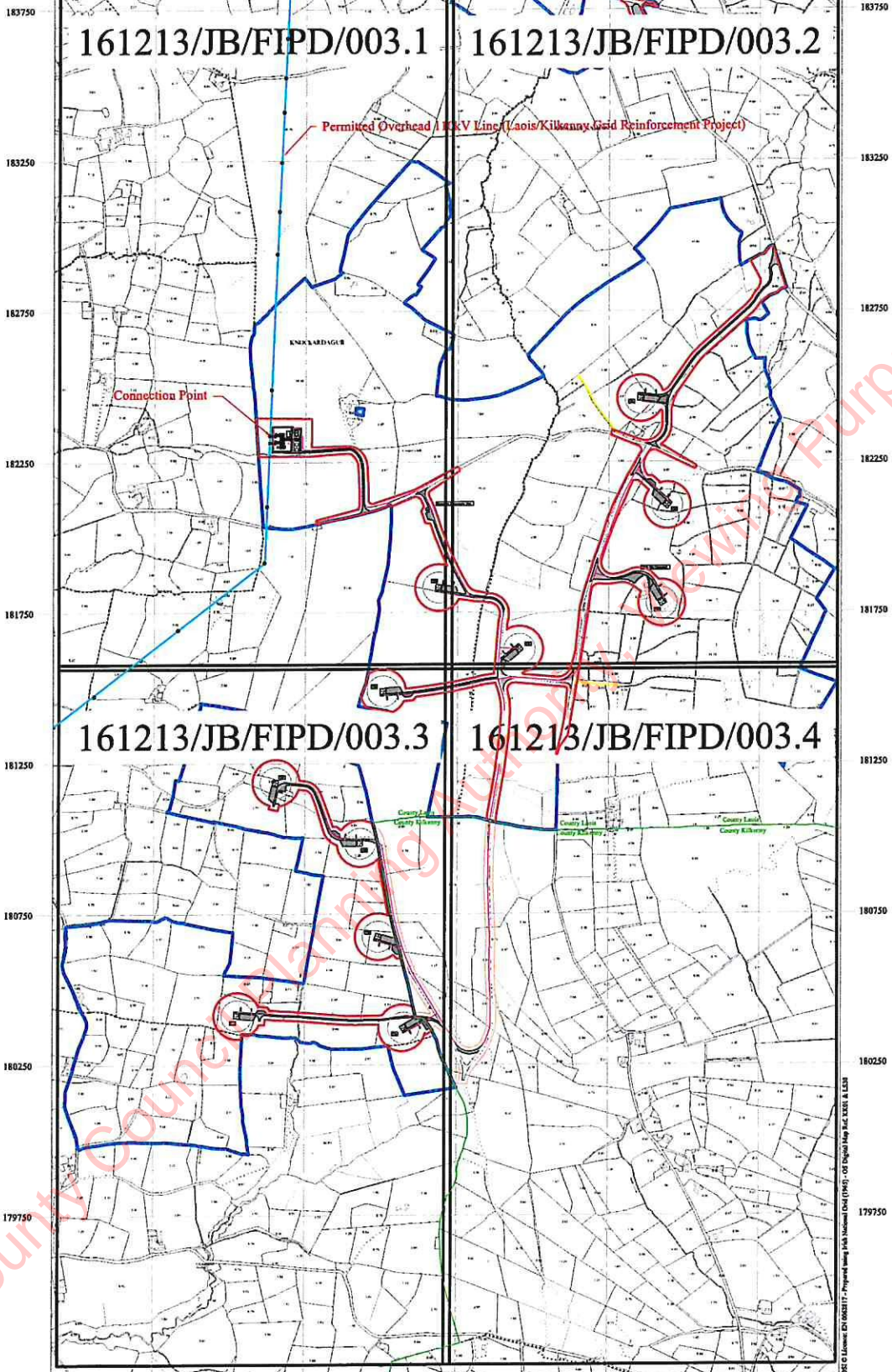
Drawing Title:
Location of Laois/Kilkenny Grid Reinforcement Project Map

Regarding Item 5 of Further Information Request

Date	Rev.	Description	Revision No.	Drawn By

Drawing No.: 20170112/JB/FIPD/002	Revision No.: 00
Scale: (A0) 1:5,000	Date: 12/01/2017
Drawn By: J.B.	Checked By: C.M.P.
	Confirmed By: D.S.

25000 25050 25100 25150 25200



Laois County Council Planning Purposes Only

Legend:

Ownership Boundary	Blue line	Wind Turbines	
Application Boundary (Co. Laois)	Orange line	Co-ordinates Gridlines	
Application Boundary for concurrent application made in Co. Kilkenny	Red line	County Boundary	
Indicative Cable Route	Red dashed line	Recorded Way Leave Areas	
Wind Farm Tracks	Black line	Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project)	
Existing Tracks (requiring upgrade)	Black dashed line		



Date	Rev	Description	Revision No.	Drawn By

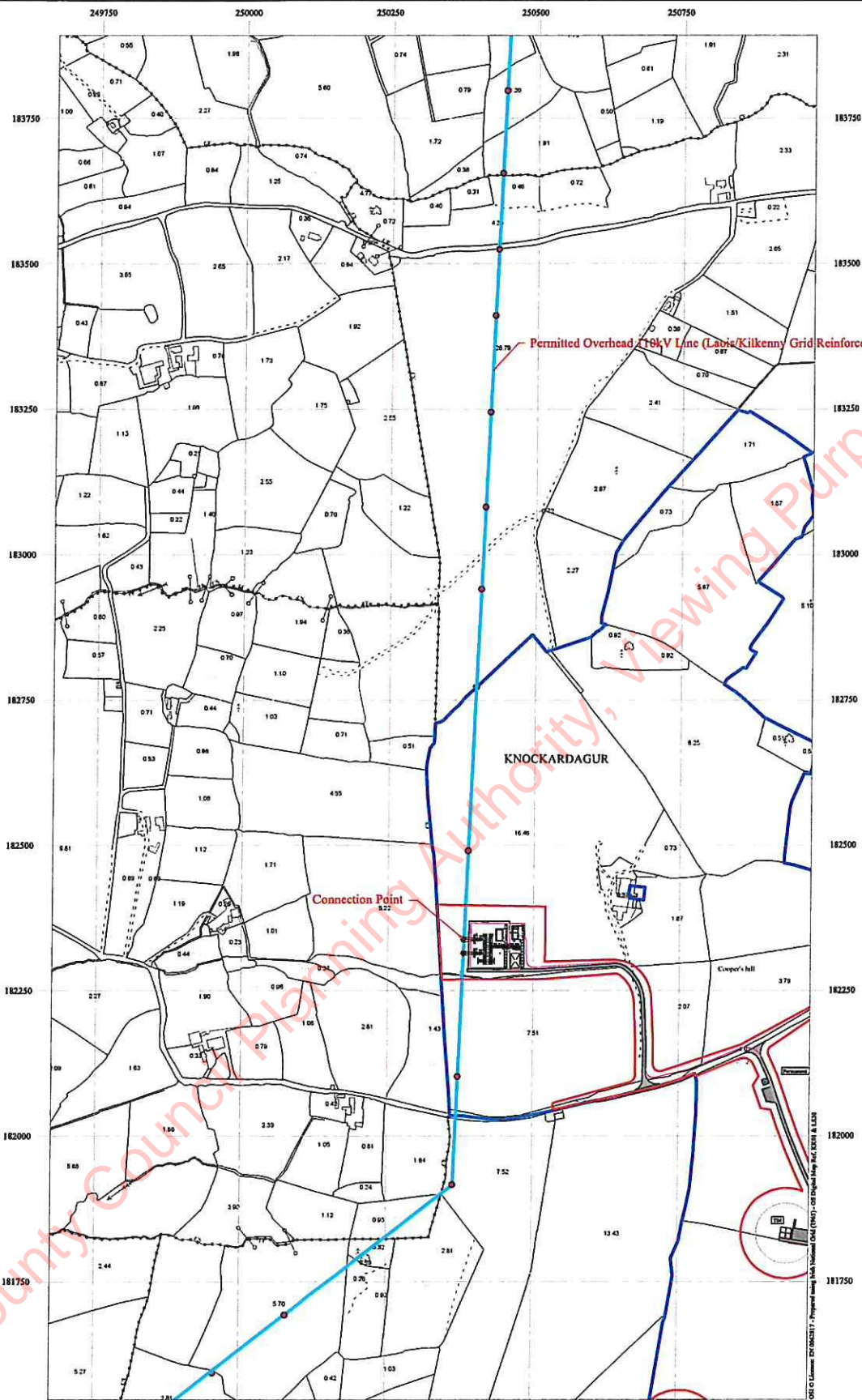
GALETECH ENERGY SERVICES
 Gaitech Energy Services
 Clondragan
 Stroudale
 Co. Carlow

Pinewoods Wind Ltd

Job Title:
 Pinewoods Wind Farm - Further Information Request

Drawn Title:
 Fig. 3.0 Overall Map showing Location of Laois/Kilkenny Grid Reinforcement Project Map
 Regarding Item 5 of Further Information Request

Date: 2017/01/12
Rev: 00
Description: 161213/JB/FIPD/003.0
Revision No.: 00
Scale: (A0) 1:5,000
Date: 12/01/2017
Drawn By: J.B.
Checked By: C.M.P.
Confirmed By: D.S.



Laois County Council Planning Authority, Viewing Purposes Only!

- Legend:**
- | | | | |
|--|--|---|--|
| Ownership Boundary | | Wind Turbines | |
| Application Boundary (Co. Laois) | | Co-ordinates Gridlines | |
| Application Boundary for concurrent application made in Co. Kilkenny | | County Boundary | |
| Indicative Cable Route | | Recorded Way Leave Areas | |
| Wind Farm Tracks | | Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project) | |
| Existing Tracks (requiring upgrade) | | | |



GALETECH ENERGY SERVICES
 Gaitech Energy Services
 Clondargan
 Stradone
 Co. Carlow

Client:
Pinewoods Wind Ltd

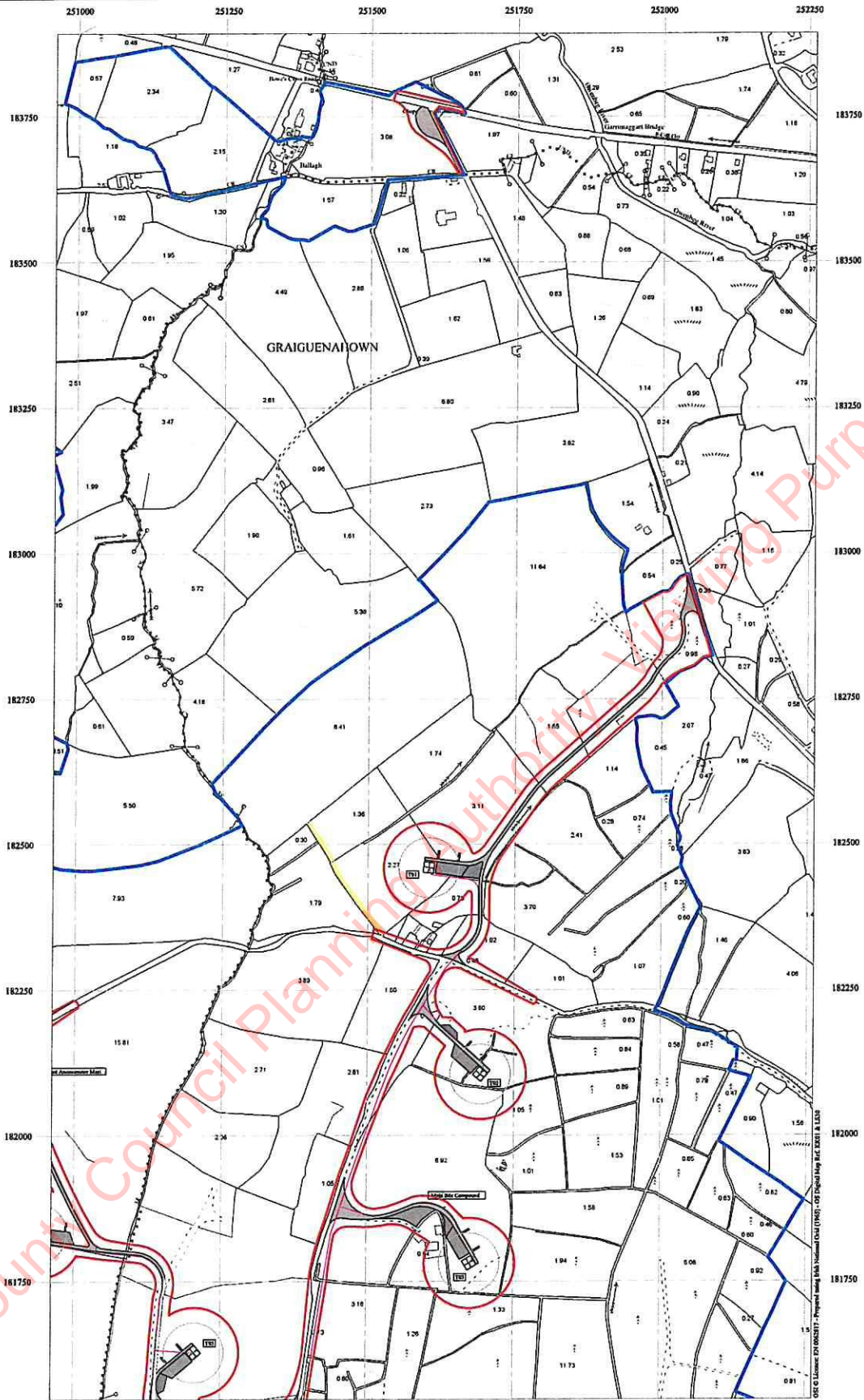
Job Title:
Pinewoods Wind Farm - Further Information Request

Drawing Title:
Fig. 3.1 Location of Laois/Kilkenny Grid Reinforcement Project Map (1:2,500)

Registering Item 5 of Further Information Request

Date:	Rev:	Description:	Drawn By:

Drawing No.: 20170112/IB/FIPD/003.1	Revision No.: 00
Scale: (A0) 1:2,500	Date: 12/01/2017
Drawn By: J.B.	Checked By: C.M.P.
	Confirmed By: D.S.



- Legend:**
- Ownership Boundary
 - Application Boundary (Co. Laois)
 - Application Boundary for concurrent application made in Co. Kilkenny
 - Indicative Cable Route
 - Wind Farm Tracks
 - Existing Tracks (requiring upgrade)
 - Wind Turbines
 - Co-ordinates Griddlines
 - County Boundary
 - Recorded Way Leave Areas
 - Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project)



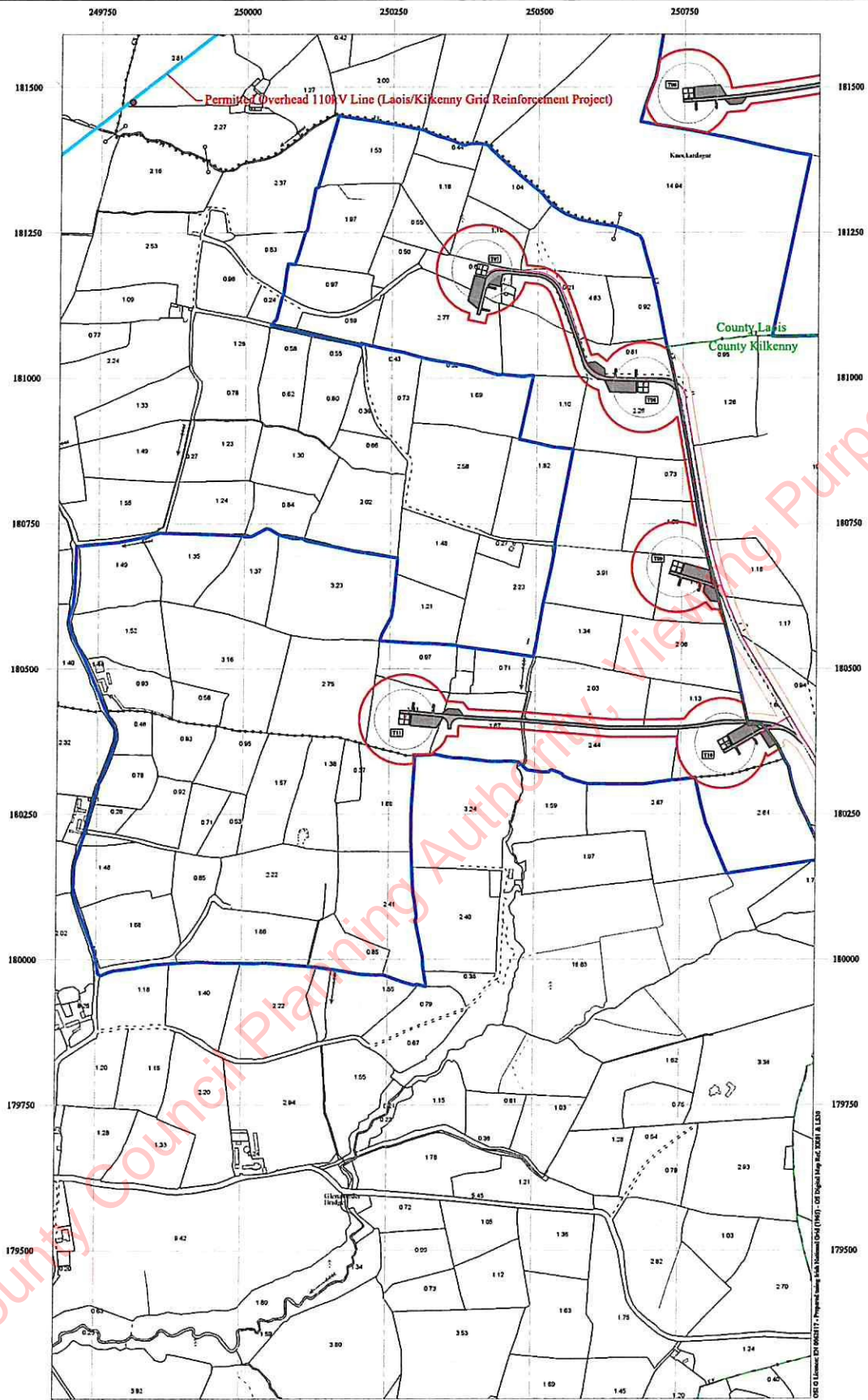
Client:
Pinewoods Wind Ltd

Job Title:
Pinewoods Wind Farm - Further Information Request

Drawing Title:
Fig. 3.2 Location of Laois/Kilkenny Grid Reinforcement Project Map (1:2,500)

Regarding Item 5 of Further Information Request

Drawn By:	Rev:	Description:	Revision No.:	Drawn By:
J.B.			00	
Drawing No.:		Revision No.:		
20170112/B/FPD/003.2		00		
Scale:		Date:		
(A0) 1:2,500		12/01/2017		
Drawn By:	Checked By:	Confirmed By:		
J.B.	C.M.P.	D.S.		



Legend:	
Ownership Boundary	Wind Turbines
Application Boundary (Co. Laois)	Co-ordinates Gridlines
Application Boundary for concurrent application made in Co. Kilkenny	County Boundary
Indicative Cable Route	Recorded Way Leave Areas
Wind Farm Tracks	Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project)
Existing Tracks (requiring upgrade)	



Gaitech Energy Services
Clondargan
Stradone
Co. Carlow

Client:
Pinewoods Wind Ltd

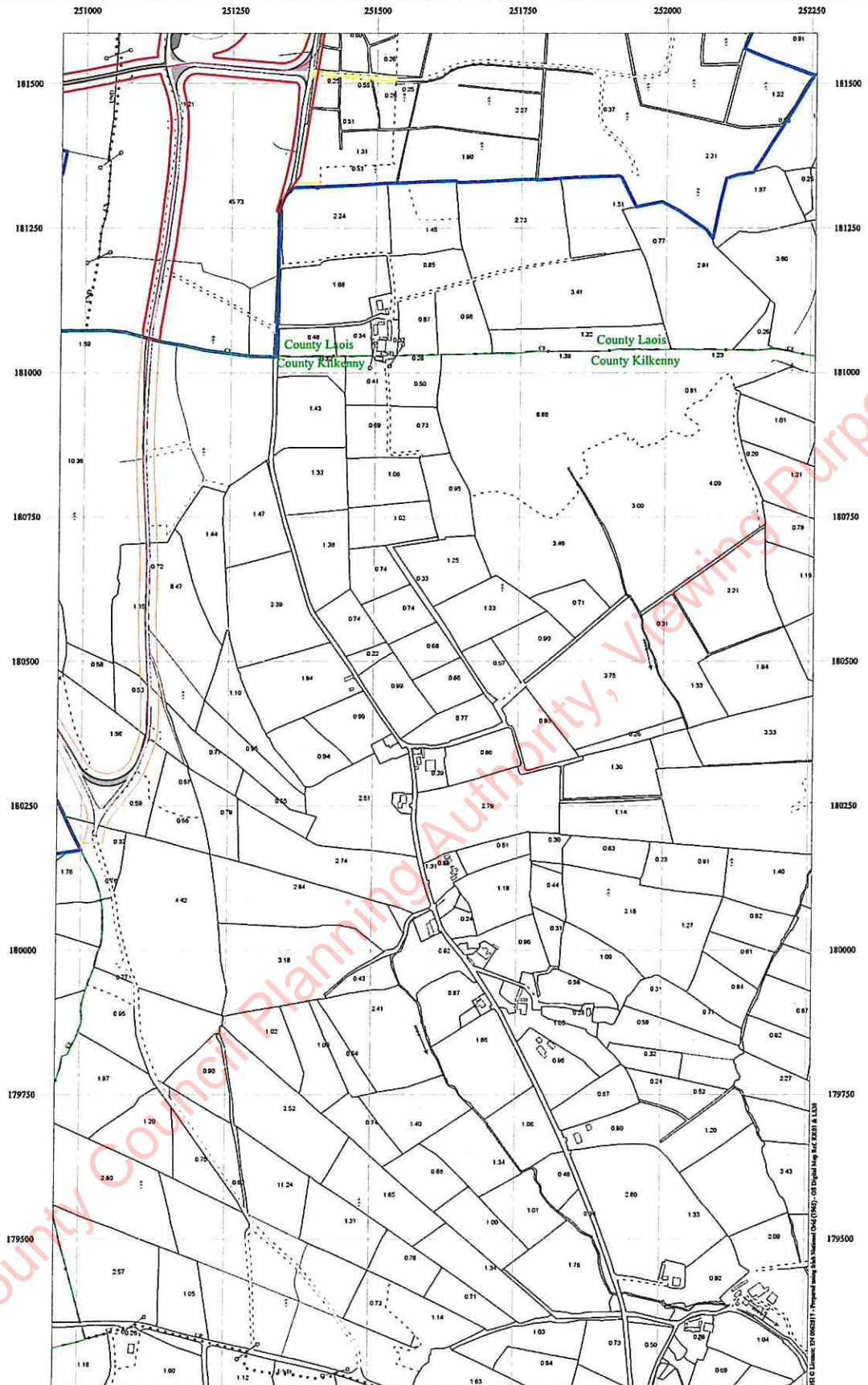
Job Title:
Pinewoods Wind Farm - Further Information Request

Drawing Title:
Fig. 3.3 Location of Laois/Kilkenny Grid Reinforcement Project Map (1:2,500)

Regarding Item 5 of Further Information Request

Date	Rev	Description	Drawn By

Drawing No: 20170112/IB/FPD/003.3	Revision No: 00
Scale: (A0) 1:2,500	Date: 12/01/2017
Drawn By: J.B	Checked By: C.M.F
	Confirmed By: D.S



- Legend:**
- Ownership Boundary
 - Wind Turbines
 - Application Boundary (Co. Laois)
 - Co-ordinates Gridlines
 - Application Boundary for concurrent application made in Co. Kilkenny
 - County Boundary
 - Indicative Cable Route
 - Recorded Way Leave Areas
 - Wind Farm Tracks
 - Permitted Overhead 110kV Line (Laois/Kilkenny Grid Reinforcement Project)
 - Existing Tracks (requiring upgrade)



Galetech Energy Services
 Cloddargan
 Sursdonac
 Co. Cavau

Client:
 Pinewoods Wind Ltd

Job Title:
 Pinewoods Wind Farm - Further Information Request

Drawing Title:
 Fig. 3.4 Location of Laois/Kilkenny Grid Reinforcement Project Map (1:2,500)

Regarding Item 5 of Further Information Request

Date	Rev.	Description	Revision No.	Drawn By

Drawing No.: 20170112/JP/FIPD/003.4	Revision No.: 00
Scale: (A0) 1:2,500	Date: 12/01/2017
Drawn By: J.B.	Checked By: C.M.P.
	Confirmed By: D.S.

Appendix 2.3: Indicative Subsoil Excavation Volumes and Repository Areas

Laois County Council Planning Authority, Viewing Purposes Only

Site Location	Spoil Excavated m ³		Repository		
	Road	Hardstand	Area		Volume
				m ²	m ³
Site Entrance 1 To Site Entrance 2	3211	495	1	891	425.405
			2	1123	530.965
			3	1071	497.305
			4	4019	1848.645
			5	414	198.37
			6	445	232.475
			7	221	120.555
At T02	965	495	8	417	199.735
			9	2803	1295.365
At T03	1958	495	10	1362	649.71
			11	2213	1757.205
At T05	294	495	12	2783	1286.265
At T04	1234	495	13	3593	1654.815
Substation		3627	14	3527	3733.35
At T06	750	495	15	2099	985.045
T7 to T8	415	990	16	1778	652.3
			17	385	135.5
			18	1570	491
At T09	10	495	19	1992	448.32
T10 to T11	1844	990	20	1920	961.2
			21	530	287.05
			22	1274	617.89
			23	540	271.9
			24	1124	565.14
Total in County Laois	10681	9072			19845.51
Total in County Kilkenny	288		25	385	192.5
Overall Wind Farm Total	10969	9072			20038.01



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- NOTES:**
1. PONDING DIVISIONS ONLY TO BE CONSIDERED AS A RISK MANAGEMENT MEASURE.
 2. THE DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.
 3. THE DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.
 4. THE DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.
 5. THE DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.

LEGEND:

	Operative Boundary
	Application Boundary (Co. Leitrim)
	Application Boundary for concurrent application made in Co. Leitrim
	County Boundary
	Wind Farm Track
	Existing Tracks (existing upgrade)
	Indicative Cable Routes
	Proposed Wind Turbines
	Recorded Way Leave Areas
	Existing Watercourse Shows That Watercourse Slightly 'Up' From This
	Existing Watercourse Crossing Shows That
	Proposed Primary / Settlement Pond / Lagoon Type (settling / trap silt) This
	Proposed Pond / Settlement Pond / Lagoon Type (settling / trap silt) This
	Proposed Pond / Settlement Pond / Lagoon Type (settling / trap silt) This
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	Proposed Pond / Settlement Pond / Lagoon Type (settling / trap silt) This

Client: PINEWOOD WIND FARM

Project: PINEWOOD WIND FARM

Stage: FURTHER INFORMATION

Title: SPOIL MANAGEMENT PLAN MASTER LAYOUT

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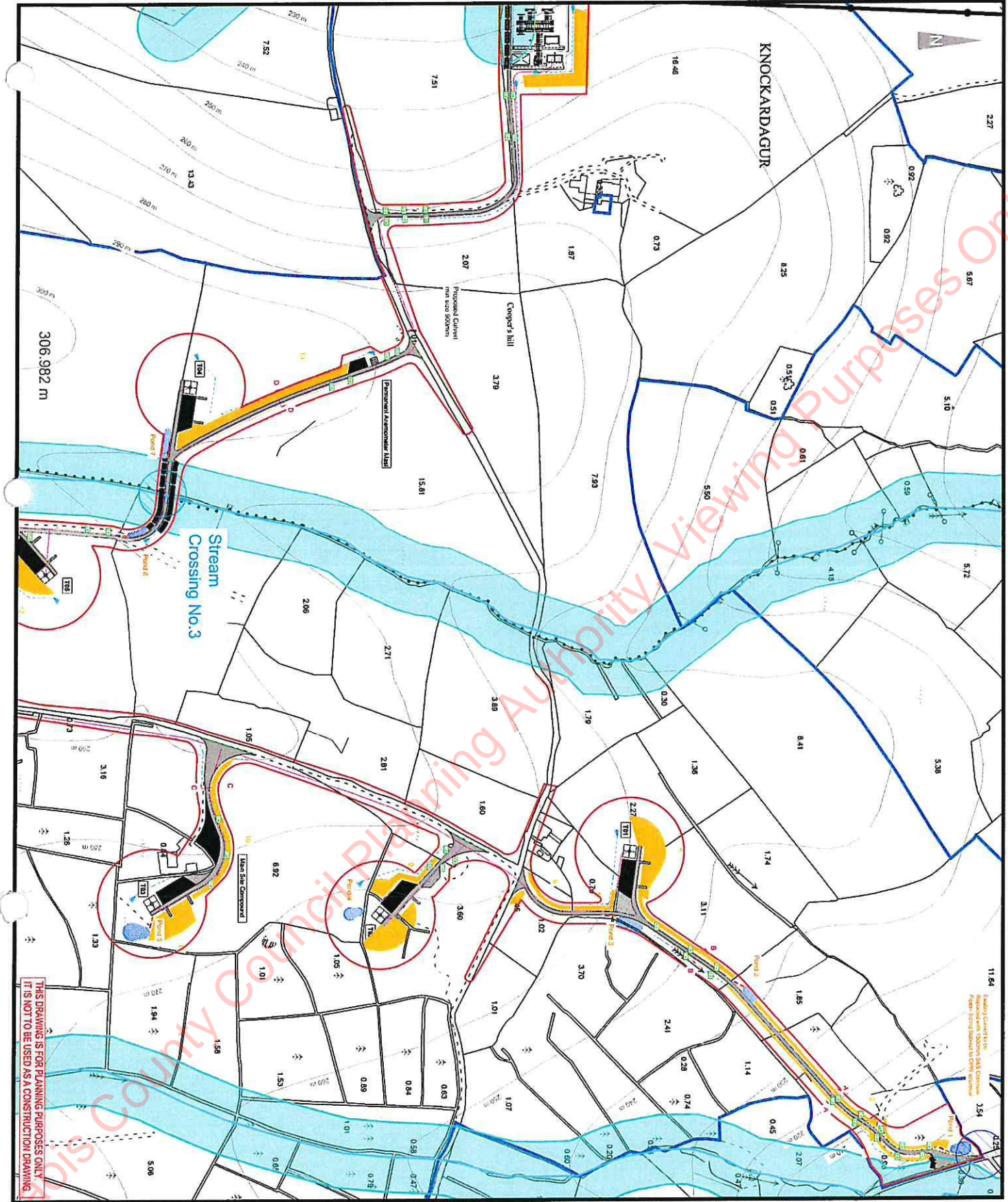
surveyed	OSI	drawn	J.B.	checked	DOC	date	JAN 2017
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COMPANIES: JENNINGS O'DONOVAN & PARTNERS CONSULTING ENGINEERS, FINISKILIN, SILEGO, IRELAND.

CONTACT: TEL: 00353 (0)71 918 1416

PROJECT: PINEWOOD WIND FARM

DATE: 04



- NOTES:**
- THIS DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.
 - ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE TO BE AWARE OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
 - THIS DRAWING TO BE USED IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THE PROJECT.
 - ALL LETTERS REFER TO DIMENSIONS (UNLESS HEADS).

- Legend:**
- Ownership Boundary
 - Application Boundary (Co. Leitrim)
 - Application Boundary for concrete
 - Carry Boundary
 - Wood Farm Tracks
 - Existing Tracks (requiring upgrade)
 - Accessed Cattle Routes
 - Proposed Way Lines Area
 - Existing Watercourse Stream That Watercourse Buffer Seen Shown That
 - Existing Watercourse Crossing Stream That
 - Proposed Watercourse Crossing Stream That
 - Proposed Primary Settlement Road / Access Road
 - Proposed 1st Class Road
 - Proposed 2nd Class Road
 - Proposed 3rd Class Road
 - Proposed 4th Class Road
 - Proposed 5th Class Road
 - Proposed 6th Class Road
 - Proposed 7th Class Road
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 - Proposed 96th Class Road
 - Proposed 97th Class Road
 - Proposed 98th Class Road
 - Proposed 99th Class Road
 - Proposed 100th Class Road

Client: PINEWOOD WIND FARM

Project: PINEWOOD WIND FARM

Scale: 1:2500 @ A1

Title: SPOIL REPOSITORY LAYOUT

Layout Drawing: 1 of 3

Drawings:

Drawn	Checked	Date
OS1	J.B.	JAN 2017

Scale: 1:2500 @ A1

Drawn: OS1

Checked: J.B.

COMPILED BY: JENNINGS O'DONOVAN & PARTNERS CONSULTING ENGINEERS, FINISKILIN, SLIGO, IRELAND.

TEL: 071 916 3000

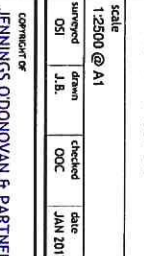
FAX: 071 916 3000

WWW: www.jodp.com

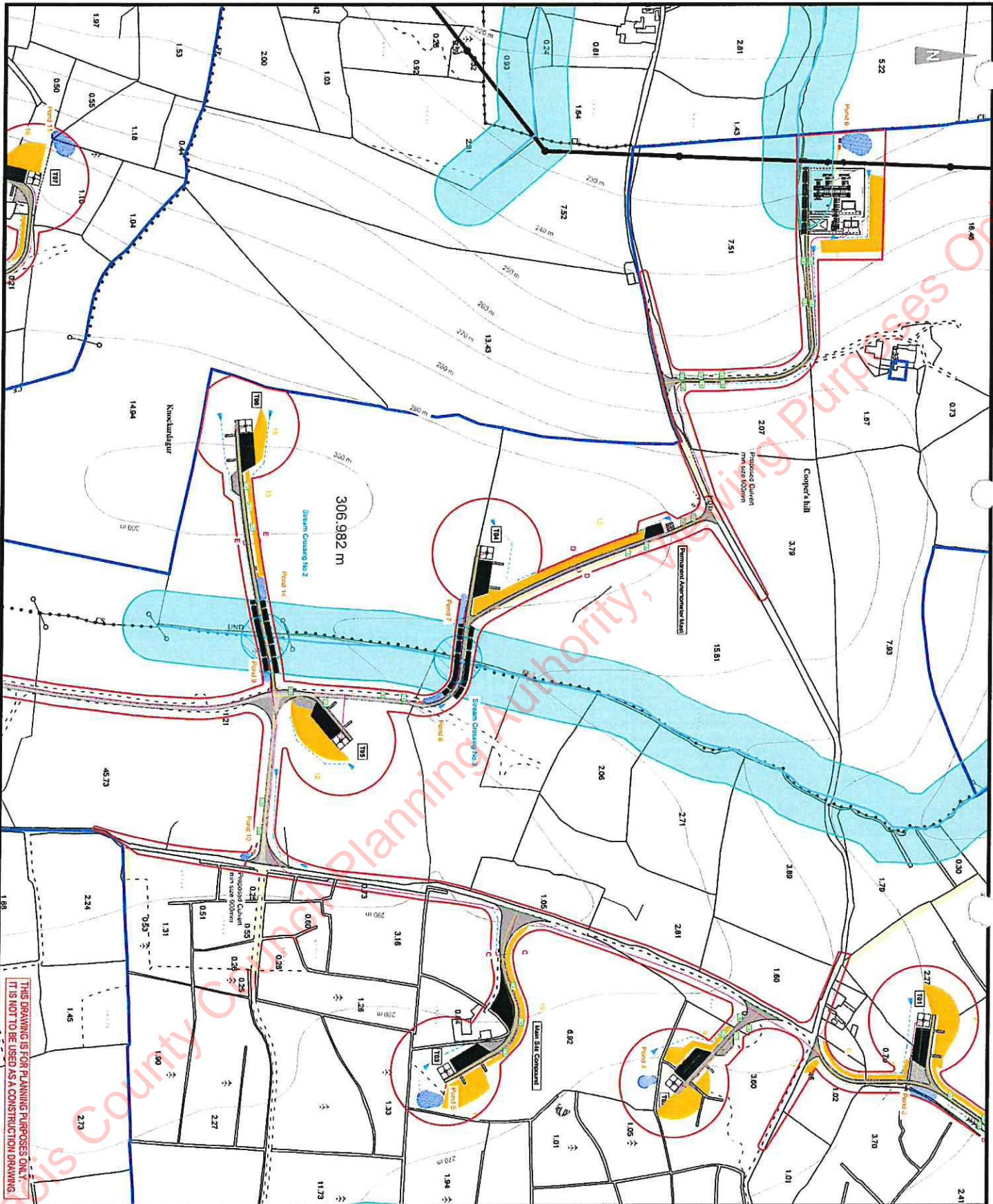
Job No.: 5538

Drawing No.: S300-C-19

Revision: 04



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THIS DRAWING IS FOR PLANNING PURPOSES ONLY. IT IS NOT TO BE USED AS A CONSTRUCTION DRAWING.

- NOTES:**
1. REWARD DIMENSIONS ONLY TO BE USED FOR THE CONSTRUCTION
 2. ALL DIMENSIONS TO BE CHECKED BY THE CONTRACTOR
 3. ON SITE TO BE INSPECTED BY ANY DISBURSERS BEFORE ANY WORK COMMENCES
 4. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS
 5. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED

LEGEND:

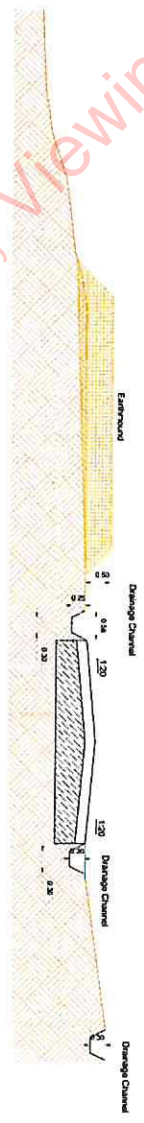
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	Application Boundary (see consent application made to Co. Kerry)
	County Boundary
	Wind Farm Tracks
	Existing Track (proposed upgrade)
	Excavate Cable Routes
	Proposed Wind Turbines
	Revised Wind Turbine Area
	Existing Watercourse Shown This Watercourse before 20m shown This
	Existing Watercourse Crossings Shown This
	Proposed Watercourse Crossings Shown This
	Proposed Primary Settlement Foot / Lagoon-type structures (see notes)
	Proposed Road (See Notes) / This Proposed Ballistic Quilt Shown This
	Proposed Drain Water Drain Shown This
	Proposed Dry Water Drain Shown This
	Proposed Check Dam Shown This
	Proposed Cart/Track Shown This
	Proposed Proposed Flood Storage Channel Shown This
	Proposed 4ft fence Shown This
	Proposed Lagoon - Type Settlement
	Proposed 500m Regulatory System This
	Proposed 500m Regulatory System This

client:	PINWOOD WIND FARM	
Project:	PINWOOD WIND FARM	
Stage:	FURTHER INFORMATION	
title:	SPOIL REPOSITORY LAYOUT	
LAYOUT DRAWING 2 OF 3		
Scale:	1:2500 @ A1	
Surveyed:	J.B.	checked: OOC
Drawn:	J.B.	date: JAN 2017
Consultant or Client:	JENNINGS O'DONOVAN & PARTNERS CONSULTING ENGINEERS, EINSKILIN, SLIGO, IRELAND. Tel: +353 (0)71 94 1416 Fax: +353 (0)71 94 1000 Email: info@jod.ie	
Job No.:	5538	Revision:
Drawn to:	S300-C-106	Issue:
Scale:	04	

ROAD CONSTRUCTION & DRAINAGE
STORAGE DETAIL A - A
Scale 1:100



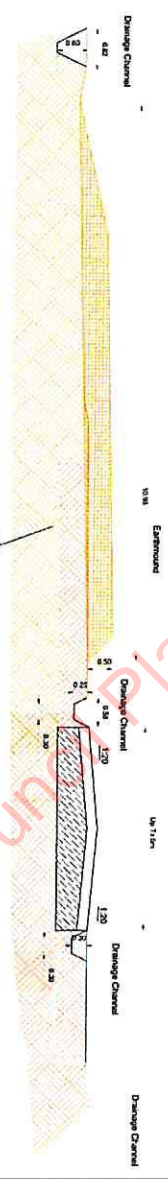
ROAD CONSTRUCTION & DRAINAGE
DETAIL - B - B
Scale 1:100



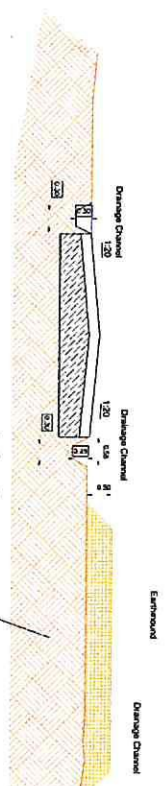
ROAD CONSTRUCTION & DRAINAGE
DETAIL - C - C
Scale 1:50 @ A1



ROAD CONSTRUCTION & DRAINAGE
DETAIL - D - D
Scale 1:50 @ A1



ROAD CONSTRUCTION & DRAINAGE
DETAIL - E - E
Scale 1:50 @ A1



- NOTES:
1. ROADWORK DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND SERVICES TO BE LOCATED BY THE CONTRACTOR.
 3. DIMENSIONS TO BE TAKEN FROM ANY DISCREPANCIES BEFORE COMMENCING WORK.
 4. OTHER RELEVANT DRAWINGS AND SPECIFICATIONS SHALL BE REFERRED TO FOR FULL DETAILS.
 5. ALL LEVELS REFER TO DATUM (WATER LEVEL).

REV.	DESCRIPTION	DATE

client: PINEWOOD WIND FARM
 project: PINEWOOD WIND FARM

stage: FURTHER INFORMATION
 title: SPOIL REPOSITORY SECTION

scale: 1:50 @ A1
 surveyed: 09/11/17
 drawn: JLB
 checked: OOC
 date: JAN 2017

consultant: JENNINGS O'DONOVAN & PARTNERS
 CONSULTING ENGINEERS,
 FINKSKLIN,
 SILEDO,
 IRELAND.
 TEL: +353 (0)11 914 100
 FAX: +353 (0)11 914 105
 Email: info@jod.ie



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job no: 5538
 drawing no: S300-C-108
 revision: 02

Chapter 3: Human Beings & Community

(Revised January 2017)

Laois County Council Planning Authority, Viewing Purposes Only

3.1 Introduction

This chapter addresses the potential social and economic impacts of the construction and operational phases of the proposed Pinewoods Wind Farm development under the heading of Human Beings. Actual and perceived impacts of the proposed development on human beings may arise from various aspects and could potentially have an effect on living and working conditions and well-being. These impacts are dealt with throughout the Environmental Impact Statement (EIS), in particular, interactions may occur with effects described in the following chapters:

- Chapter 6: Water
- Chapter 8: Landscape and Visual Assessment
- Chapter 10 & 10(a): Noise & Vibration
- Chapter 11: Shadow Flicker
- Chapter 12: Telecommunications
- Chapter 13: Transportation and Access

This chapter initially sets out the methodology used for the assessment (Section 3.2), and describes the receiving environment, the predicted impacts of the proposed development (Section 3.3), the interactions between potential impacts (Section 3.4), mitigation measures to be incorporated (Section 3.5). A summary table of impacts and mitigation is provided in **Table 3.11A and 3.11B** at the end of this chapter. No difficulties were encountered in compiling information in this chapter

3.2 Methodology

3.2.1 Legislation and Guidelines

The following guidelines were referred to while preparing and writing this chapter:

- EPA: Guidelines on the Information to be contained in Environmental Impact Statements, 2002;
- EPA: Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) 2003;
- Wind Energy Development Guidelines for Planning Authorities, 2006. Department of Environment, Heritage and Local Government.

An assessment of the socio-economic impacts has been undertaken in line with these guidelines. The EPA Guidelines provide advice on impact types including cumulative impacts which are often important for socio-economic assessments, for instance where an individual development has implications for subsequent or future development. Consideration has also been given to the EPA: Revised Guidelines on The Information to be Contained in Environmental Impact Statements (Draft, September 2015) and the EPA: Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015).

3.2.2 Data Sources and Consultations

A socio-economic assessment requires that an understanding of the community is built up through background research, site visits, and discussions with local people. Specifically, in the case of this study, data has been collected by means of:

- Primary data sources (e.g. preliminary demographic data from Census 2016 and from Census 2011 produced by the Central Statistics Office);
- Maps and photomontages of the proposed development;
- Other relevant environmental data considered during the preparation of the Environmental Impact Statement (EIS), especially traffic, noise, shadow flicker and visual impacts;

- A review of strategic energy policy documents, including the Government White Paper on 'Ireland's Transition to a Low Carbon Energy Future 2015-2030 and the Wind Energy Development Guidelines for Planning Authorities 2006 (DoEHLG).
- A review of relevant planning policy document including the Laois County Development Plan 2011-2017, including Appendix 5 Wind Energy Strategy, and the Kilkenny County Development Plan 2014-2020, including Appendix J: - Wind Energy Development Strategy;
- A review of secondary and supplementary data including the Ballinakill Village Plan 2008;
- Observation of local settlement and travel patterns and the location of community and commercial facilities;
- Discussions with local people;
- Review of submissions received to the planning application.

3.2.3 Impact Categories and their assessment

3.2.3.1 Overview

The purpose of this assessment is to identify the likely significant impacts of the proposed development which may affect locally sensitive receptors and the environmental resources and attributes which are valued by the local population. The effects examined include both known and perceived effects, such as perceived loss of rural character.

3.2.3.2 Construction impacts

Potential impacts on human beings during the construction phase that are potentially relevant and significant to human beings in a socio-economic assessment include:

- Impacts due to construction traffic on local journeys or general amenity;
- Impacts on environmental and residential amenity;
- Construction employment and local expenditure.

3.2.3.3 Operational Phase

Potential impacts during the operational phase fall into three key categories, namely:

- Population sustainability and residential amenity: An assessment of potential impacts on local environmental quality as it relates to residential amenity and property;
- General amenity and well-being: An assessment of potential impacts with regard to general amenity, including recreational amenity, social interaction and use of community facilities, particularly by older people, children or other sensitive or vulnerable groups. An assessment of the impact on objective and subjective well-being
- Economic impacts: an evaluation of the proposed development in the context of local economic resources, development and employment.

Impacts are compared between the Do-Nothing and the Do-Something (with proposed development) scenarios and result from direct, indirect, secondary and cumulative effects on environmental conditions. Effects can be positive, neutral or negative. The significance of an effect is described as Imperceptible, Slight, Moderate, Significant, Very Significant, or Profound. Significance depends, among other considerations, on the nature of the environmental effect, the timing and duration of an effect, and the probability of the occurrence of an effect. The impacts may be short term, medium term or long term. All construction impacts are temporary in nature.

For example, an impact on population sustainability and residential amenity, or on general amenity and well-being is defined according to the criteria set out in **Table 3.1**.

<i>Impact level</i>	<i>Significance criteria</i>
Imperceptible	No appreciable change to population sustainability, or present levels of amenity or well-being.
Slight	Slight stimulus to patterns of population sustainability, amenity or well-being where impact is positive. Some disruption of population sustainability, amenity or well-being where impact is negative.
Moderate	Moderate stimulus to population sustainability, amenity or well-being where impact is positive sufficient to cause an initial or lasting moderate change in social habits. Moderate disruption population sustainability, amenity or well-being where impact is negative.
Significant	Significant stimulus to population sustainability, amenity or well-being where impact is positive sufficient to cause lasting change in social habits. Significant disruption to patterns of population sustainability, amenity or well-being where impact is negative.
Very significant	Very significant stimulus to population sustainability, amenity or well-being where impact is positive sufficient to cause marked and lasting change in social habits. Very significant disruption to population sustainability, amenity or well-being where impact is negative.
Profound	A change sufficient to cause a complete and permanent improvement in population sustainability, amenity or well-being where impact is positive. Disruption sufficient to cause a complete and permanent loss of population sustainability, amenity or well-being where impact is negative.

Table 3.1: Criteria used in the assessment of population sustainability, residential amenity, and for general amenity and well-being

An economic impact is defined according to the criteria set out in Table 3.2.

<i>Impact level</i>	<i>Significance criteria</i>
Imperceptible	No significant economic impacts are apparent
Slight	A small effect on the business environment can be attributed to the proposed development
Moderate	A moderate effect on the business environment can be identified.
Significant	An effect that has the potential to impact on business performance or to influence the location decisions of new business.
Very significant	An effect that has the potential to substantially impact on business performance or to influence the location decisions of new business.
Profound	Effects of a scale to substantially impact on the performance of a major business or several businesses. Where these businesses are important local employers there is the possibility of major impacts for the general prosperity of the local area or region.

Table 3.2: Criteria used in the assessment of Economic Impacts

It usually follows that impacts of a socio-economic nature are a function of:

- the location of the proposed development and the character of the local environment;
- the sensitivity of the local population and its capacity to absorb change;
- the nature of the environmental effect;
- the scale or extent of the effect in terms of area or population affected;
- the duration and frequency of an effect, and
- the probability of an impact's occurrence.

The assessment addresses impacts at a community level rather than for individuals or identifiable properties. Impacts on individual receptors are addressed separately in Chapter 6 (Water), Chapter 8 (Landscape & Visual), Chapter 10 (Noise) (Chapter 10(a) Vibration) and Chapter 11 (Shadow Flicker).

The 'significance' of an impact as it would affect the worst affected subset of the local population is summarised in **Table 3.10** with respect to the human population and socio-economic factors. Construction impacts are by their nature temporary, while operational impacts can be short to long term. 'Scale' represents the number of people (or businesses) likely to be affected and are categorised as very high, high, medium or low. For example, an impact may be very significant for a particular population subset, but the number of people concerned could be small such that scale is labelled as "low".

3.2.4 Description of the Existing Environment

3.2.4.1 Context

Population

The subject site is located approximately 17.5km southwest of Portlaoise and 25km north of Kilkenny City. While the wind turbines are located within County Laois, the project in its entirety straddles the county border and is partially located in County Kilkenny. The site is centred on the Electoral Divisions (EDs) of Dysartgallen, Ballinakill and Blandsford in County Laois and Clogh in County Kilkenny, which according to the Preliminary Report from the recent Census 2016, have a combined population of 2,608.

Table 3.3 shows that Clogh has the largest population in the study area. The EDs of Clogh and Ballinakill both contain small urban centres of the same name. The table also shows how the population has changed since the previous Census in 2011 and reveals a combined reduction in population of 1.7%. In contrast, the populations of the two county centres of Portlaoise and Kilkenny have increased by respectively 5.1% and 3.9% over the same period. The study area has a low population density of between 12 and 42 persons per km² even when compared with that of the average for the largely rural counties of Laois and Kilkenny.

	2016	2011	Percent change	Population density persons/km ²
Clogh	1,219	1,276	-4.5%	34.9
Dysartgallen	255	266	-4.1%	12.3
Ballinakill	825	792	+4.2%	41.6
Blandsford	309	318	-2.8%	15.1
Co Laois	84,732	80,559	+5.1%	49.3
Co. Kilkenny	99,118	95,419	+3.9%	47.8

Table 3.3: Population 2016 and 2011

Other detailed Census data is currently only available for 2011. **Table 3.4** shows how the population at the time was distributed in terms of the number of households with Clogh having the highest number, which is consistent with its relative population size as outlined in **Table 3.3** above.

Size of family	Households
Clogh	435
Dysartgallen	86
Ballinakill	269
Blandsford	103
Co Laois	28,020
Co Kilkenny	33,679

Table 3.4: Households 2011

Table 3.5 shows how the mainly middle-aged adult population of the EDs around the subject site represents a higher proportion of the total population than for the counties of Laois and Kilkenny as a whole, although this pattern is not atypical for rural areas. The older population of “empty-nesters” and retired people is closer to the average of the two counties. The proportion of the population of pre-school age is slightly lower than at county level. Dysartgallen has a relatively high proportion of its population of early school years, although this figure is somewhat influenced by the small population (sample) size of the ED. Altogether the figures indicate a fairly typical age / family cycle pattern for a rural population in Ireland.

	<i>Clogh</i>	<i>Dysartgallen</i>	<i>Ballinakill</i>	<i>Blandsfort</i>	<i>Co Laois</i>	<i>Co. Kilkenny</i>
Pre-school	10.5%	9.1%	10.0%	10.6%	13.6%	11.8%
Early school	11.4%	21.2%	13.4%	7.1%	13.1%	11.3%
Pre-Adolescent	10.8%	10.6%	5.7%	9.4%	12.3%	11.3%
Adolescent	10.8%	12.1%	11.5%	9.4%	11.6%	11.9%
Pre-family	6.0%	6.1%	6.7%	10.6%	10.2%	9.3%
Adult	35.0%	24.2%	36.8%	34.1%	22.9%	25.4%
Empty nest	9.9%	9.1%	12.0%	9.4%	9.9%	10.9%
Retired	5.7%	7.6%	3.8%	9.4%	6.4%	8.0%

Table 3.5: Family Cycle 2011

Figures on the age of properties in **Table 3.6** do indicate an older housing stock than for the counties of Laois and Kilkenny as a whole with smaller proportions of recent builds except in the ED of Ballinakill. **Table 3.7** does, however, show that vacancy rates are not too dissimilar to those of the two counties, although nearly 20% of properties in Ballinakill are unoccupied.

<i>Year Built</i>	<i>Clogh</i>	<i>Dysartgallen</i>	<i>Ballinakill</i>	<i>Blandsfort</i>	<i>Co Laois</i>	<i>Co Kilkenny</i>
pre 1981	55.7%	57.0%	49.8%	49.5%	35.2%	43.4%
1981-1990	9.9%	8.1%	7.9%	17.5%	9.0%	10.4%
1991- 2000	16.4%	11.6%	7.5%	10.7%	13.0%	13.7%
2001 - 2005	6.7%	15.1%	18.7%	12.6%	21.4%	16.9%
2006 - later	7.6%	7.0%	13.5%	7.8%	17.5%	12.2%
Not stated	3.7%	1.2%	2.6%	1.9%	3.9%	3.4%

Table 3.6: Age of Housing Stock 2011

	<i>Clogh</i>	<i>Dysartgallen</i>	<i>Ballinakill</i>	<i>Blandsfort</i>	<i>Co Laois</i>	<i>Co Kilkenny</i>
Occupied	70	10	63	10	4,673	5,324
Percent	13.9%	10.3%	19.1%	8.8%	14.3%	13.6%

Table 3.7: House Occupancy 2011

Table 3.8 shows that levels of employment and unemployment are not dissimilar to those for counties Laois and Kilkenny as a whole, except in Clogh where there is a higher level of unemployment at 15% and also a high proportion who are not working for reasons of illness or disability. **Table 3.9** reveals a higher level of employment in the agriculture and forestry sectors than for Counties Laois and Kilkenny as a whole as might be expected. There is also a relatively lower proportion of people working in commerce or the transport and communications sectors.

	<i>Clogh</i>	<i>Dysartgallert</i>	<i>Ballinakill</i>	<i>Blandsford</i>	<i>County Laois</i>	<i>County Kilkenny</i>
At work	41.9%	52.5%	49.9%	55.9%	50.0%	50.2%
Looking for first job	0.7%	1.5%	1.1%	0.8%	1.1%	0.8%
Unemployed	14.8%	8.6%	9.7%	4.5%	12.5%	11.3%
Student	11.3%	11.1%	10.7%	10.2%	9.4%	10.4%
Home worker	10.5%	12.6%	13.2%	11.4%	10.7%	9.8%
Retired	12.7%	11.6%	10.0%	15.1%	11.1%	13.1%
Not working: sickness or disability	7.9%	2.0%	4.6%	1.6%	4.7%	4.2%

Table 3.8: Principal Economic Status 2011

	<i>Clogh</i>	<i>Dysartgallert</i>	<i>Ballinakill</i>	<i>Blandsford</i>	<i>Co Laois</i>	<i>Co Kilkenny</i>
Agriculture & forestry	9.5%	23.1%	13.4%	19.0%	8.0%	9.1%
Construction	6.2%	5.8%	3.5%	6.6%	5.4%	5.7%
Manufacturing	12.6%	11.5%	16.6%	9.5%	10.9%	12.0%
Commerce	19.5%	15.4%	17.9%	20.4%	22.6%	23.5%
Transport & communications	3.3%	2.9%	4.8%	6.6%	6.7%	4.9%
Public administration	7.1%	6.7%	5.8%	5.8%	8.7%	6.0%
Professional services	25.0%	24.0%	24.6%	24.1%	22.4%	24.3%
Other	16.7%	10.6%	13.4%	8.0%	15.2%	14.5%

Table 3.9: Persons at Work by Industry

Finally, **Table 3.10** provides information on people's sense of their own health, revealing a similar pattern as for the general population of Counties Laois and Kilkenny, albeit with a higher proportion reporting "fair" to "bad" health in the ED of Clogh. The 2011 Census also records that a total of 335 persons, or 12.8% of the population of the four EDs, have a disability, although the nature of this disability is not specified.

<i>Health</i>	<i>Clogh</i>	<i>Dysartgallert</i>	<i>Ballinakill</i>	<i>Total</i>	<i>Co Laois</i>	<i>Co Kilkenny</i>
Very good	54.9%	63.2%	57.1%	67.3%	59.9%	61.8%
Good	30.4%	27.8%	33.1%	24.8%	28.0%	27.3%
Fair	11.3%	6.0%	6.6%	5.7%	7.9%	7.8%
Bad	1.6%	0.0%	1.3%	1.3%	1.2%	1.1%
Very bad	0.2%	0.8%	0.4%	0.0%	0.3%	0.3%
Not stated	1.5%	2.3%	1.6%	0.9%	2.7%	1.7%

Table 3.10: Reported Health 2011

Tourism

Employment in tourism is not indicated in **Table 3.9**, but the nearby communities such as Abbeyleix and Durrow have a relatively high proportion of their populations employed in this sector given the presence of heritage features, hotels and guest houses. Although bypassed now by the M7, Abbeyleix is still a regular stop for visitors on route to destinations such as Cork or the west.

Although not a major tourism destination, County Laois contains various sites of interest to visitors, including the Rock of Dunamase, Emo Court and the Timahoe Round Tower. County Kilkenny has a somewhat higher tourism profile due to the City of Kilkenny, its heritage and annual festivals, destinations such as Thomastown and Inistoige, and attractions such as Dunmore Cave and the Castlecomer Discovery Park.

3.2.4.2 Character

Although elevated, the study area is not of great height (c.260-300 mAOD). The primary land use is coniferous forestry while transitional woodland scrub is amongst the main land cover types. The dominant land use in the vicinity is agricultural pasture. The top of the hill is not easily visible from its slopes, noting also the presence of hedgerows and woodland plantations. The hill is more visible from adjacent elevated areas, for example to the west.

The area is crossed by single vehicle minor roads and forestry tracks. A receptor survey indicates 33 no. properties within 1,030 metres (10 rotor diameters) of the proposed turbines. The properties are either single houses or occur in the form of scattered linear development, for example in Graiguenahown to the southeast. The nearby community of Knock contains a primary school, a church and a handful of houses. Boleybeg is a small community to the west containing a branch of Glanbia and a community field. The principal communities include Ballinakill on the R432 and Clogh to the east on the R426. The former contains a national school, churches and a mixture of community facilities, including an outdoor swimming pool. There is also tourist information point. The Heywood Demesne and its historic gardens are located just outside of Ballinakill to the north and the village is also located on Laois Cycle Trail (Number 1) which connects with Durrrow to the west. Heywood Community School is located close to the entrance of the demesne. The village of Clough contains a soccer and GAA club and a local community walk. The Swan is a similar sized community located at a junction between the R430 and R426 to the north of Clogh. A brickworks is located here as well as a community centre and primary school

As well as farm businesses, there are a small number of aggregate/quarrying companies/sites, and small family businesses in the vicinity including organic farms, livery and dog grooming. There is some equine activity, such as training and breeding, and pony trekking available in the wider area including an equine stud near Ballinakill. To the west is the town of Abbeyleix and located on the N77 which represented the main route to Cork before the completion of the M7.

A map showing all dwellings within 1km of the site is provided in Appendix 3.1. A further map showing all significant commercial activity, schools, holiday accommodation, tourism and recreational facilities etc. is provided in Appendix 3.2.

3.2.4.3 Significance

The upper elevations of Cooper's Hill and the Spink are largely unoccupied, with land cover which comprises of grazing or rough grazing land and commercial forestry. At lower elevations there are dairy enterprises and pockets of broadleaf woodland. These lower elevations include minor roads along which there has been a modest amount of individual development as noted above. The overwhelming majority of this development has been residential, although there are instances of family businesses such as vehicle workshops, equine businesses and dog grooming as well as, of course, farms. There is only a light level of recreation or tourism activity in terms of walking or accommodation, although a circular walking route of the Spink using local roads and tracks has been promoted. Another local walking route, the Slieve Margy Way, passes through The Swan to the east. A local walking festival was held at Knock in July 2016. There are also cycle routes. The surrounding area, particularly between Boleybeg and Ballinakill, contains diverse attractive countryside with expansive views.

3.2.4.4 Sensitivity

Concerns raised by local residents in previous submissions to wind farm development at the proposed site include visual and landscape, loss of local amenity, noise, shadow flicker, health, impacts on wildlife, water quality, equine and livestock, road use and widening, and possible impacts on property prices and tourism. Possible impacts relating to visual impact, noise, shadow flicker, biodiversity, traffic, safety and material impacts are addressed elsewhere in the EIS. It is understood that such concerns can be a cause of anxiety and that this in itself may have implications for the health of sensitive population subsets. This applies in particular to people whose livelihood depends, to some degree or another, on agriculture or equine activity, or on tourism which has a relationship with the quality of the local environmental resource, including perceptions of environmental quality. People who work night shifts or who have disabilities, including dependents, are among those population subsets that could be described as being sensitive. Children are not uniquely a sensitive subset of the population in this instance, but it is acknowledged that there are primary schools in the area, of which the nearest to the proposed development is Knock National School (approximately 1.3 kilometres north of Turbine 1).

The open land comprising the Spink and Coopers Hill receive light amenity (walking, cycling) with most activity being on-road/tracks given the nature of the terrain. As noted above, a circular walking route has been described in locally available publications, which uses these roads and tracks. There is currently a low level of tourism activity in the area, although Heywood Demesne is maintained by the OPW and receives small but regular numbers of visitors. The surrounding attractive countryside has potential for tourism activity.

Mount Nugent Stud, which is located at Ironmills to the east of Ballinakill, is involved in the breeding of thoroughbreds and is amongst the sensitive receptors located within 6km of the site of the proposed development. The local River Owenbeg is a tributary of the River Nore and, although lightly fished itself, is important for the spawning of salmon and trout.

3.3 Description of Likely Impacts

3.3.1 Construction Phase

3.3.1.1 Population sustainability and residential amenity

Construction of the proposed development is expected to last between 12 and 18 months with works to occur within daytime hours of 08.00 to 20.00 Monday to Friday and 08.00 to 18.00 hours on Saturday. Except for certain specific works, e.g. concrete pouring, and any possible emergency works, construction activity is not expected to occur outside of these hours or on Sunday. Construction works will generate noise, of which Chapter 10 (Noise) finds that noise levels at properties nearest to the proposed development will be below guideline limits. It remarks that noise levels will be transitional and temporary in nature and will diminish with distance. The chapter notes that the most significant contribution is likely to arise from lorry movements, particularly movements on uneven surfaces, during the construction phase. In this respect, site access will be provided by sealed local roads L7800 and L78001. Works or transport involving higher noise levels will be intermittent and below noise thresholds required for residential receptors at distances greater than 100m.

Chapter 13 (Transport & Access) notes that the construction phase is estimated to generate 176 trips of abnormal sized loads during the 12-18 month period, including the movement of abnormal sized turbines and cranes. In addition, it is estimated that 3,252 HGV trips and 4,683 van trips will be generated. The EIS concludes that the construction phase impacts at the nearest sensitive property (H03) to the north-east of the site access at Graiguenahown, and those along the L7800 access route (3 no. dwellings), are expected to be of a temporary nature and below reference criteria. Construction noise is not expected to be a significant impact for properties at more than 500m. No

significant effect on population sustainability is anticipated and impacts on residential amenity are expected to be slight to moderate negative, of a temporary nature with the specific impacts dictated by the proximity of individual residences to the site or access roads.

3.3.1.2 General amenity and well-being

Construction works will be temporary in nature. As discussed above, these are proposed to occur within daytime hours and not on Sundays. The proposed development will be located on private lands and lands in the ownership of Coillte, and no rights-of-way are affected during construction. The site will be appropriately fenced off with appropriate warning signs to prevent unauthorised access in accordance with health and safety requirements. There will be visual impacts during construction, but these will be temporary in nature and comparable to those of forestry harvesting operations already occurring periodically as noted in Chapter 8 (Landscape & Visual).

As discussed in the previous section, the construction phase is expected to generate 176 trips of abnormal size. The haul route of turbine components will proceed from the M9 and N78 onto the R430 and will require traffic management coordination with the local authority and Gardai. There will be a need for the temporary removal of minor obstacles such as road signs. Some local access restrictions may be required for the delivery of turbine components. Most of the projected 3,252 HGV trips will be used to carry aggregates to the site from existing quarries/sources identified in Chapter 13 (Transportation and Access) using the principal local roads of the R430 and R426. This will involve movements through the small communities of Swan or Boleybeg, but will not add appreciably to the existing volume of traffic on these roads. In all, construction traffic movements will have a slight to moderate negative impact of a temporary nature.

Existing tracks in the vicinity of the proposed development, including forestry tracks, are in generally good condition. These tracks will need to be widened to approximately 5m. In addition, a total of 7.4km of new access tracks will be constructed in and around the site.

The proposed development will be able to connect directly to the Laois-Kilkenny Grid Reinforcement Project which passes directly adjacent to the site. It will therefore not require the installation of a separate overhead transmission lines, but rather construction of a 203m² substation and two strain towers of up to 26.5m in height. Impacts in this respect are therefore less than for some other wind farm developments and the cumulative impact will be of slight significance.

Decommissioning of the site will involve removal of materials and transportation impacts, including abnormal loads. While the decommissioning of the project will largely be a reversal of the construction process, the intensity of works and number of vehicular trips is likely to be lower. It may not, for example, be necessary to remove all the aggregates used in track construction and foundations. The decommissioning impact will have a slight to moderate negative impact and be of a temporary nature.

3.3.1.3 Economic and employment

The proposed construction works will have a slight impact on agricultural or forestry activities on the site itself, but elsewhere, both within and in the vicinity of the subject site (including equine), these activities will be able to continue throughout the construction phase.

It is anticipated that pre-construction and construction activities will create a demand for around 53 jobs (around 1.5 jobs per MW). The low population density of the study area also sets the scope for construction employment opportunities, and it is likely that the more specialised workers will travel from outside of the study area. However, there will be a need for some workers to reside locally and this will create some demand for locally available accommodation in towns such as Portlaoise, Athy, Ballinakill or Abbeyleix.

Due to their proximity, lower transport costs and lower overheads (e.g. accommodation) local businesses will be well-placed to provide competitive tenders for less specialised construction works.

Up to 25% of the construction contract value (up to €15m) could enter the local economy. Sectors that could benefit include civil engineering companies, electrical service companies, quarries and concrete suppliers, steel reinforcing suppliers, road haulage operators, plant hire companies, ancillary workers (e.g. fencing, timber) and accommodation and catering. There are, for example, a number of existing quarries in the vicinity of the proposed development site. Altogether, the economic and employment impact is moderate positive, while being of a temporary nature. Eventual decommissioning is expected to require a lower level of economic input and employment.

3.3.2 Operational Phase

3.3.2.1 Population sustainability and residential amenity

Section 3.2.4 above noted that the study area is characterised by a low population density, recent declines and an older housing stock, but finds too that the age and employment profile is fairly typical of rural areas and for the county with a relatively high level of employment in agriculture and forestry.

The impact of wind farm developments on property values is the subject of speculation. A RICS/Oxford Brookes University study examined the impact of wind farms on property values on a number of sites in the UK. The study acknowledged that the potential impact of wind farms on property values is a complex and emotive subject. Inevitably, the potential for impacts at any one location depends on the influence of design and screening, as well as the context and character of the area in which the development is located, including aspects of population characteristics/stability, tourism, employment and landscape. The evidence from the RICS/Oxford Brookes study was that factors other than the presence of a wind farm, have a more significant impact on property values. Landscape and visual considerations are a factor. Chapter 8 (Landscape & Visual Assessment) of the EIS distinguishes both landscape and visual effects. For the latter, it assesses the relationship with receptor sensitivity for each of the various reference points at varying distances from the proposed development. Only 4 no. of 23 no. locations, i.e. LC1 2.54km to the northwest, LC5 1.05 to the south-east LC8 0.16km to the east and northeast, and LC9 0.32km to the west and north, have a visual impact that is assessed as being of substantial-moderate significance, of which only LC8 is considered to have a dominant presence, while others are somewhat screened or not in conflict with the surrounding terrain or landscape pattern. A small number of residential developments are contained within the distance associated with these points, but none within that of LC8.

Noise and shadow flicker impacts are addressed in the respective chapters of the EIS and found to be below significant levels. The assessment finds that operational noise levels for all properties, including those closest to the proposed development, are within the daytime and night-time limits of 45dB LA90 and 43dB LA90 respectively. The turbines will cease to rotate in high wind conditions above around 25m/sec and this will remove the risk of excess noise generation on such days. Chapter 11 (Shadow Flicker) confirms that this effect only applies during the operational phase. It notes that this impact is not anticipated to exceed 30 hours per annum and that the highest values of between 14.46 and 18.09 hours per annum would occur at the nearest properties under normal weather conditions. Notably, all three properties are economically involved in the proposed development. The other 30 no. properties within a ten rotor length diameter of the proposed development would all experience less than 30 hours of flicker per year with 21 no. receiving less than 10 hours per year. Mitigation measures are available to completely remove the risk of shadow flicker to below 30 minutes per day should this be required.

On the basis of the assessments of landscape and visual impacts, noise and shadow flicker, the potential for negative impacts on property or site values is confined to individual sellers' or purchasers' subjective perceptions. The Wind Energy Development Guidelines for Planning Authorities 2006 do not refer to property prices, but on the basis of assessments undertaken, the proposed development complies with the criteria in respect of, inter alia, noise and shadow flicker.

Therefore, it is reasonable to conclude that the likely residual impact on property values will be imperceptible.

With regard to population stability, each turbine will generate land rental payments to local landowners, thereby helping to provide a diversified source of income. There is no evidence that wind turbines pose any threat to the welfare of horses or livestock and therefore the proposed development will be able to coexist with existing agricultural, equine and forestry land uses both within the subject site and in the immediate vicinity. Furthermore, Chapter 6 (Water) of the EIS finds that the proposed development will have no impact on water quality or drinking water for human consumption or agricultural purposes.

The applicant has also committed to contributing €500 per annum towards the annual electricity costs of each household within a distance of ten rotor diameters (1,030m) of a proposed turbine where this household is not economically involved in the project. In addition, it is proposed that a community fund of €1,000 per annum per MW generated will be made available to local community groups. This could lead to a total of €35,200 per annum becoming available to fund community groups or projects. The fund will be administered by a committee set up by the applicant and will involve a percentage of the net profit being set aside for such purposes. Preference will be given to local groups or projects, thereby contributing to the vitality and viability of the local population. Although recipients would need to be decided at the time, it is noted that there are a variety of local community and sports organisations or clubs in the study area. This fund is a very positive impact with regard to the vitality of the local population, the significance of which will depend on the actual sums transferred.

3.3.2.2 *General amenity and well-being*

The Wind Energy Strategy for County Laois requires that no turbines will be permitted within 250m of an existing or permitted property and that those between 250m and 500m be considered subject to a noise assessment. An assessment of possible shadow flicker is required within a distance of 600m. Cumulative impacts are also to be taken into account.

The Wind Energy Strategy designated the proposed development site to be within a 'Preferred Area' and 'Areas Open for Consideration' for wind energy development. The strategy proposes that consideration is given to areas that are of "significant importance for recreation or tourism" in selecting appropriate locations for wind energy developments. In this respect, it is noted that the study area currently has only a light level of tourism activity as discussed in Section 3.2. There is potential for further tourism development which would be complemented by the presence of the surrounding pleasant countryside and the proximity of communities such as Abbeyleix and Durrow. Independent studies have shown that wind energy development and tourism are not incompatible.

A locally published circular walk which passes around Spink is discussed in Section 3.2. There is also a light level of walking activity, principally by local people using local roads and tracks. The proposed development itself will be located on private land and no rights-of-way are affected. Due to the potential for enhanced access around the site of the proposed development, it is proposed that the developer will seek to collaborate with land owners and other interested parties to facilitate responsible and safe public access for education or recreational purposes.

In terms of the specific impact of the development on tourism or amenity, Chapter 8 (Landscape & Visual Assessment) identifies the receiving landscape to be of low sensitivity and that the impact of the proposed development will be minor. This is consistent with the criteria for the designation of the subject site in the adopted Wind Energy Strategy as a 'Preferred Area' and 'Areas Open for Consideration'. Chapter 8 adds that there are only a few receptor locations where users, such as tourists or hill walkers, are likely to be highly attuned to the landscape. This assessment of residual impacts is interpreted here as being of imperceptible significance in terms of tourism visits, and to be of slight negative significance in the context of the low, but tangible level of local amenity activity.

There is no evidence that wind energy development has any impact on human health, including on persons with disabilities. However, concerns of possible visual, noise, water, biodiversity and other material impacts are addressed elsewhere in the EIS. They are acknowledged in this chapter to the extent that they can be a cause of potential anxiety in advance of the development and that this in turn can possibly affect human health and well-being. Section 3.2 identified some elevated levels of disability in Clogh, but noted that the type of disability is not identified by the statistics that are publicly available. There is though no evidence of any impact on persons with disabilities where wind energy development is consistent with the 2006 Wind Energy Development Guidelines. Reference can be made to Chapter 10 (Noise) and Chapter 11 (Shadow Flicker) which identify no exceedance of guidance levels due to the distance of the proposed development from private residences. Similarly, Chapter 6 (Water) of the EIS concludes that, with the implementation of all proposed mitigation measures, there will be no impact on local water quality or supplies for human consumption or agricultural activities.

In addition, wind turbines, like all machines, can emit a modest amount of electromagnetic radiation comparable to the levels from a diesel generator. There is no known risk to human beings from these emissions. Although the proposed turbines may potentially interfere with television signals, simple technological solutions exist to mitigate any such impacts (see Chapter 12). Power cables from each turbine will be buried. The proposed development will be able to connect directly to the Laois-Kilkenny Grid Reinforcement Project which passes directly adjacent to the site and will not require additional overhead transmission lines, but rather an on-site substation and two strain towers. The substation will be rendered in concrete and sand, securely fenced for health and safety, and screened to minimise visual impact.

Other possible concerns relate to lightening and ice accumulation. With respect to the former, appropriate protection measures will be incorporated in the turbine designs to ensure that lightning is conducted harmlessly down to earth. The rotor blades of the proposed turbine model are equipped with lightning receptors mounted in the blade. The turbine is grounded and shielded to protect against lightning. In the event of a lightning strike or an abnormal increase in voltage (overvoltage), the entire electrical and electronic equipment is protected by built-in energy absorbing components with surge protection in the electrical components.

In extremely cold conditions, ice can potentially build up on blades or other parts of the turbines, although such conditions are extremely unusual for Ireland. Modern turbines are fitted with anti-vibration sensors, which will detect any imbalance caused by the icing of the blades. The sensors will cause the turbine to idle until the blades have been de-iced prior to beginning operation. As all occupied/habitable properties in the vicinity of the proposed wind farm are located in excess of 500m from a proposed turbine, there is no likely impact in respect of ice throw.

3.3.2.3 Economic and employment

As noted above, the proposed development will be able to coexist with all existing land-based activities and enterprises, including agriculture, equine and forestry land uses and will have an imperceptible impact on tourism. The operation of the wind farm will be overseen by specialised maintenance teams, although there is potential for some activities to be performed by local personnel, providing local employment and associated benefits. Overall, the impact on the local economy and employment during the operational phase is expected to be slight positive.

3.4 Interactions

Section 3.3.2.2 discusses the value of the study area for amenity and the potential for future tourism development. In this respect, Chapter 8 (Landscape & Visual) identifies no evidence of recognised scenic views in close proximity of the site as identified in view/route designations, guide books, etc. A Landscape Character Assessment has also been prepared by Laois County Council, but does not provide any sensitivity ratings. The proposed development site is located within the extensive 'Hills

and Uplands' landscape character area occupying the southeast of the County. It is noted in the LCA that the Wind Energy Strategy has identified these upland areas for consideration in terms of future wind energy development. The assessment of the EIS is that the existing landscape is of low sensitivity and relatively robust in its capacity to absorb new development, and that the proposed development will have a minor physical impact without conflicting with the character of the productive rural landscape.

There is interaction too between the socio-economic assessment and those for Transportation and Access (Chapter 13), especially during the construction phase, Noise (Chapter 10) during both construction and operation, Shadow Flicker (Chapter 11) and Water (Chapter 6) during the operational phase. All of these potential interactions have been considered in this chapter and in the relevant chapters of the EIS and it is concluded that there is no likely significant impact.

3.5 Proposed Mitigation

To specifically address impacts of a socio-economic nature, it is proposed that:

- Information be made available to local residents and to visitors to the area to allow them to contact the wind farm operators directly in the event of any issues relating to construction (see also below) or operation.
- Specific mitigation measures are listed in individual chapters of the EIS dealing with aspects such as construction, traffic, noise, shadow flicker and landscape and visual.
- A Traffic Management Plan shall be agreed with the local authority as part of the Construction Management Plan in advance of the commencement of works;
- A designated contact point and coordinator will be put in place to manage construction works and access arrangements and to interface with the public and the local authority;
- A plan for the timing and routing of construction traffic to and from the site, along with directional signage and particular proposals for the delivery of abnormal loads;
- Diversions shall be implemented to facilitate continued public use of roads where temporary traffic restrictions have to be put in place;
- Traffic restrictions shall be kept to minimum duration and extent;
- Adequate signage shall be provided at entrances during the construction and operational phase to providing information on access and safety and also safety warning information;
- Maximum use of existing forest tracks, minimal use of new access tracks and appropriate reinstatement or landscaping.

3.6 References

Wind Energy Strategy for County Laois 2012-2018. Appendix 5, Laois County Development Plan 2012-2018.

Wind Energy Development Strategy 2007. Kilkenny County Development Plan 2014-2020, Appendix J.

Department of Communications, Climate Action and Environment (2015) White Paper on 'Ireland's Transition to a Low Carbon Energy Future 2015-2030

Department of Environment, Heritage and Local Government (2006) Wind Energy Development Guidelines for Planning Authorities.

Location	Nature of Impact	Population subsets	Impact of the proposed scheme	Significance	Magnitude	Interactions	Mitigation proposed	Residual Impact
Residential amenity	Environmental impacts	Nearby residents within 1,030m	Potential for environmental impacts, especially noise and traffic	Moderate negative	Low	Noise, visual and traffic	See specific chapters	Slight to moderate temporary negative
General amenity	Environmental impacts	Visitors and local residents	Potential for environmental impacts, especially noise and traffic	Moderate negative	Medium	Noise, visual and traffic	See specific chapters	Slight to moderate temporary negative
Economic	Employment and purchases of local services	Local people and businesses	Opportunities for purchases of local services/supplies and for local employment	Moderate positive	Medium	-	n/a	Moderate temporary positive

Table 3.11A: Impacts Summary – CONSTRUCTION

Location	Nature of Impact	Population subsets	Impact of the proposed scheme	Significance	Magnitude	Interactions	Mitigation proposed	Residual Impact
Residential amenity	Property values.	Nearby residents within 1,030m	Potential for visual and environmental impacts	Slight negative	Low	Noise, visual and shadow Flicker	See specific chapters	Imperceptible
Population sustainability	Community fund	Local residents	Positive impact for local community groups/clubs.	Positive (dependent on sums transferred)	High	-	n/a	Positive
Tourism	Environmental impacts	Tourists and tourism services	Principally any adverse landscape and visual impacts	Slight negative	Medium	Noise, visual and shadow flicker	Conform to Landscape & Visual mitigation	Imperceptible
Amenity	Environmental impacts	Local people	Adverse impacts due to noise, shadow flicker or on landscape and visual.	Slight negative	Medium	Noise, visual and shadow flicker	Conform to mitigation proposals of respective chapters	Imperceptible to slight
Economic	Employment and purchases of local services	Local people and businesses	On-going maintenance and supplies	Slight positive	Low	-	n/a	Slight positive

Table 3.11B: Impacts Summary – OPERATION

Appendix 3.1: Map of Dwellings with within 1km of the Proposed Development Site

Laois County Council Planning Authority, Viewing Purposes Only

Tel: +353 (0) 46 333 300
 Fax: +353 (0) 46 333 300
 Email: enquiring@gaitech.ie

- Legend:**
- Location of proposed turbine
 - Ⓢ Dwelling Locations
 - Areas within 500m of a proposed turbine
 - Areas within 1000m of a proposed turbine

Date	Issue	Description	Drawn By

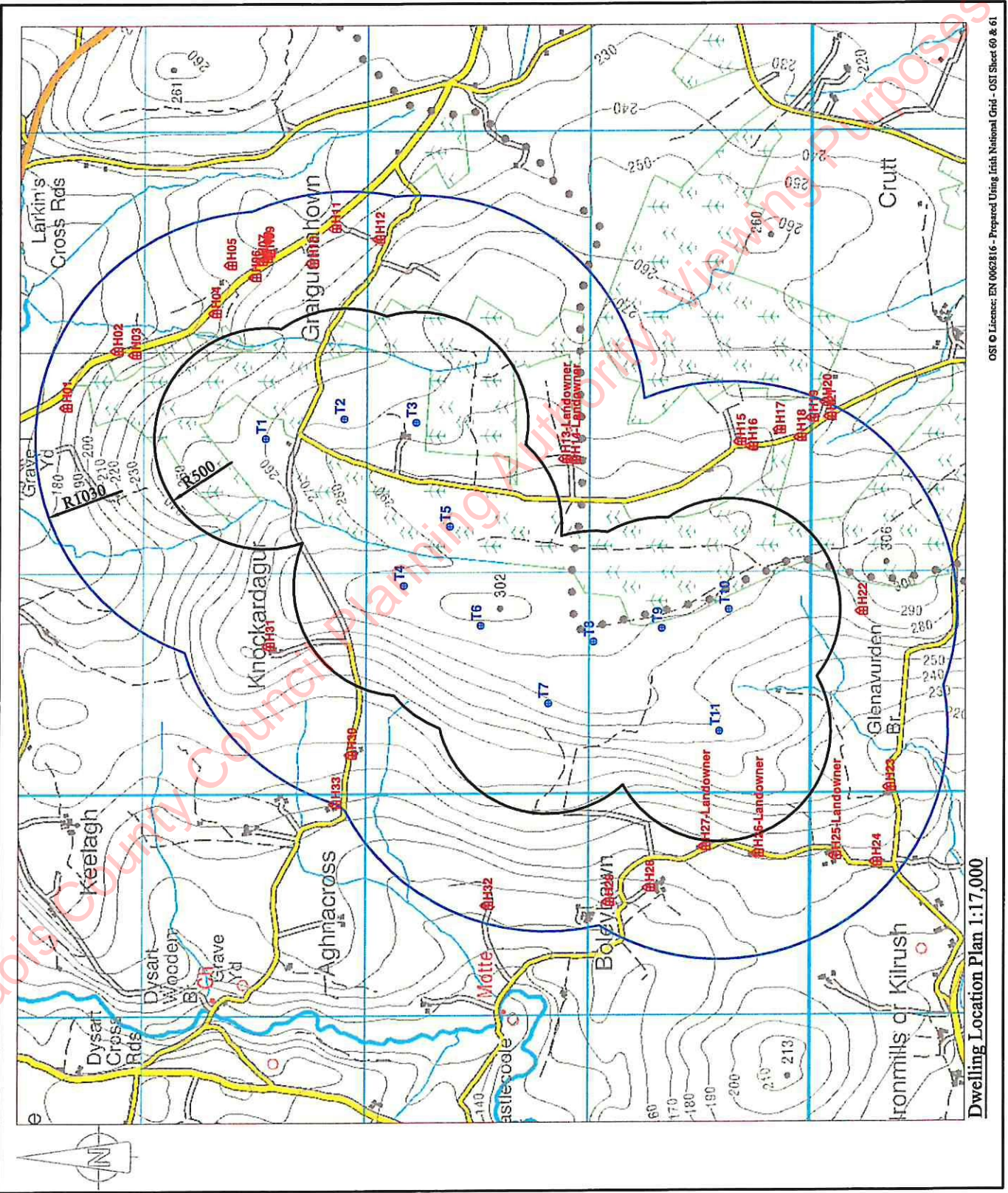
Gaitech Energy Services,
 Chandragan,
 Stradone,
 Co. Clonm.

Pinewoods Wind Farm

Pinewoods Wind Farm

Dwelling Location Map

Drawn No.	5226-1/CH/EP/SD/001	Revision No.	0
Scale	(A3) 1:17,000	Date	19/02/2016
Drawn By	C.M.P.	Checked By	S.D.
			D.S.



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Dwelling Location Plan 1:17,000

Appendix 3.2 - Significant Commercial Activity, Schools, Holiday Accommodation, Tourism and Recreational Facilities within 5km of the Proposed Development site.

Laois County Council Planning Authority, Viewing Purposes Only

- Legend:**
- 5km Boundary
 - ⊕ Wind Turbines
 - Built Up Areas (Containing Community Areas)
 - Local Businesses (Outside Built Up Areas)
 - Quarry
 - ★ Community Areas
 - ★ Public Houses
 - ★ Cooper's Hill Walk
 - ★ Sheela Merys Way
 - ★ Lairs Cycle Trail A

Item No.	Type	Name
1.	Community Area	Bullyclash GAA
2.	Community Area	GAA Right
3.	Community Area	Knock N.S.
4.	Community Area	Knock Community Centre
5.	Community Area	Knock Mill
6.	Community Area	Rossington Mill
7.	Community Area	Drynet Abbey Cemetery
8.	Community Area	Hywood Grange
9.	Community Area	Hywood Community School
10.	Community Area	Hywood GAA
11.	Community Area	Outside Millon
12.	Public House	Herdon's Pub
13.	Local Business	Glacia
14.	Local Business	Mount Park Farm
15.	Local Business	Watermill
16.	Local Business	Not Kells Co. Centre
17.	Local Business	Mount Nugent Stable
18.	Local Business	AM's Day Grounding
19.	Quarry	Ballinacorney
20.	Quarry	Ballinacorney
21.	Quarry	Ballinacorney
22.	Quarry	Ballinacorney
23.	Quarry	Ballinacorney
24.	Quarry	Ballinacorney



GALETECH ENERGY SERVICES
 Ouland Energy Services
 Clontarf
 Co. Dublin

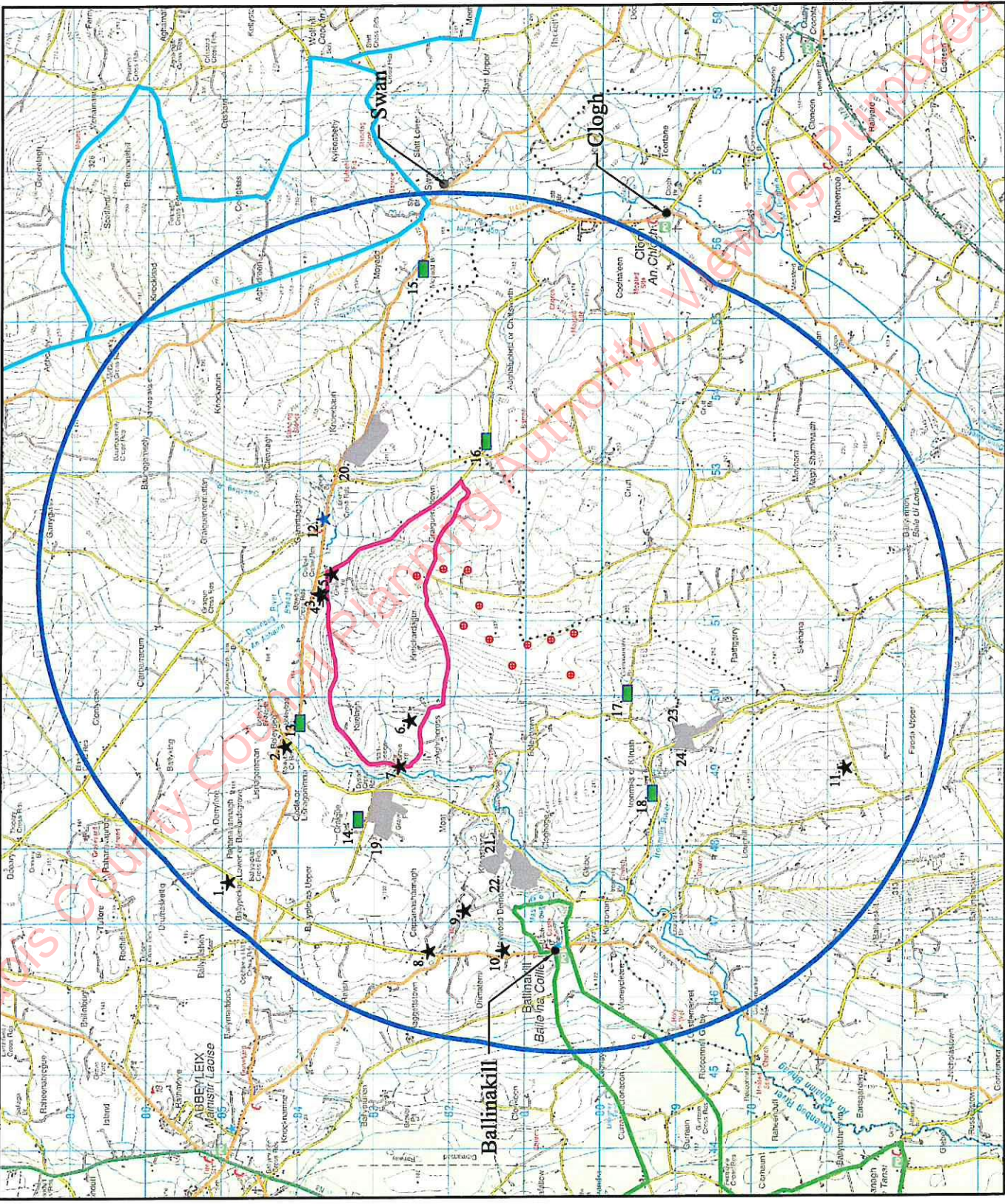
Pinewoods Wind Ltd

Pinewoods Wind Farm - Further Information Request

Human Beings and Community

Regarding Item 10 of Further Information Request

Project No.	20170112/P/DP/005	Form No.	00
Scale	(A3) 1:50,000	Date	12/01/2017
Issue No.	001	Author	CAJ
Rev.	001	Checker	D.S.



Let's Copy Only

Chapter 4: Flora & Fauna

Laois County Council Planning Authority, Viewing Purposes Only

4.1 Introduction

This chapter assesses the potential impacts of the proposed development on terrestrial and aquatic ecology. Areas designated for nature conservation are also considered, although a standalone Natura Impact Statement (NIS) has also been prepared.

The proposed development site lies approximately 3km east of Ballinakill, or approximately 8km south east of Abbeyleix in Co. Laois. The proposed development will consist of 11 no. wind turbines up to maximum tip height of 136.5m and all associated and ancillary works. A full description of the proposed development is provided in Chapter 2.

The subject site is located in an upland setting where coniferous plantation and agricultural grassland bordered by hedgerows dominate the landscape. The proposed development is within the River Nore catchment. There are two streams within the proposed development site, both tributaries of the Owenbeg River, a watercourse also known as the Owveg River which flows into the River Nore and also part of the River Barrow and River Nore SAC. At its closest, the River Barrow and River Nore SAC (Site Code: 002162) is located approximately 0.7km to the north of the main body of the proposed development (or 1.43 km overland hydrological distance). A proposed junction upgrade is located approximately 40m to the south of this designated site. The site synopsis for the River Barrow and River Nore SAC is provided in **Appendix 4.1**. The location of the proposed development site is presented in **Figure 4.1**.

The aim of this chapter is to identify features of ecological interest within the study area and specify the mitigation measures that will be used to ensure that significant impacts on these features do not occur. An evaluation is made of the scientific or conservation value of the sites identified and the potential for adverse impacts affecting designated sites following the implementation of appropriate mitigation. The objectives of this assessment were:

- To carry out a desktop study in order to determine the known ecology of the proposed development site and surrounding area;
- To carry out a baseline ecological survey of the proposed wind farm site to assess the status and importance of ecological interests present within the site;
- To predict the potential direct, indirect and cumulative likely significant impacts of the proposed development on designated conservation sites, flora and habitats and on fauna;
- To propose mitigation measures to inform the design, construction and operation of the wind farm so as to minimise potential impacts on ecology.

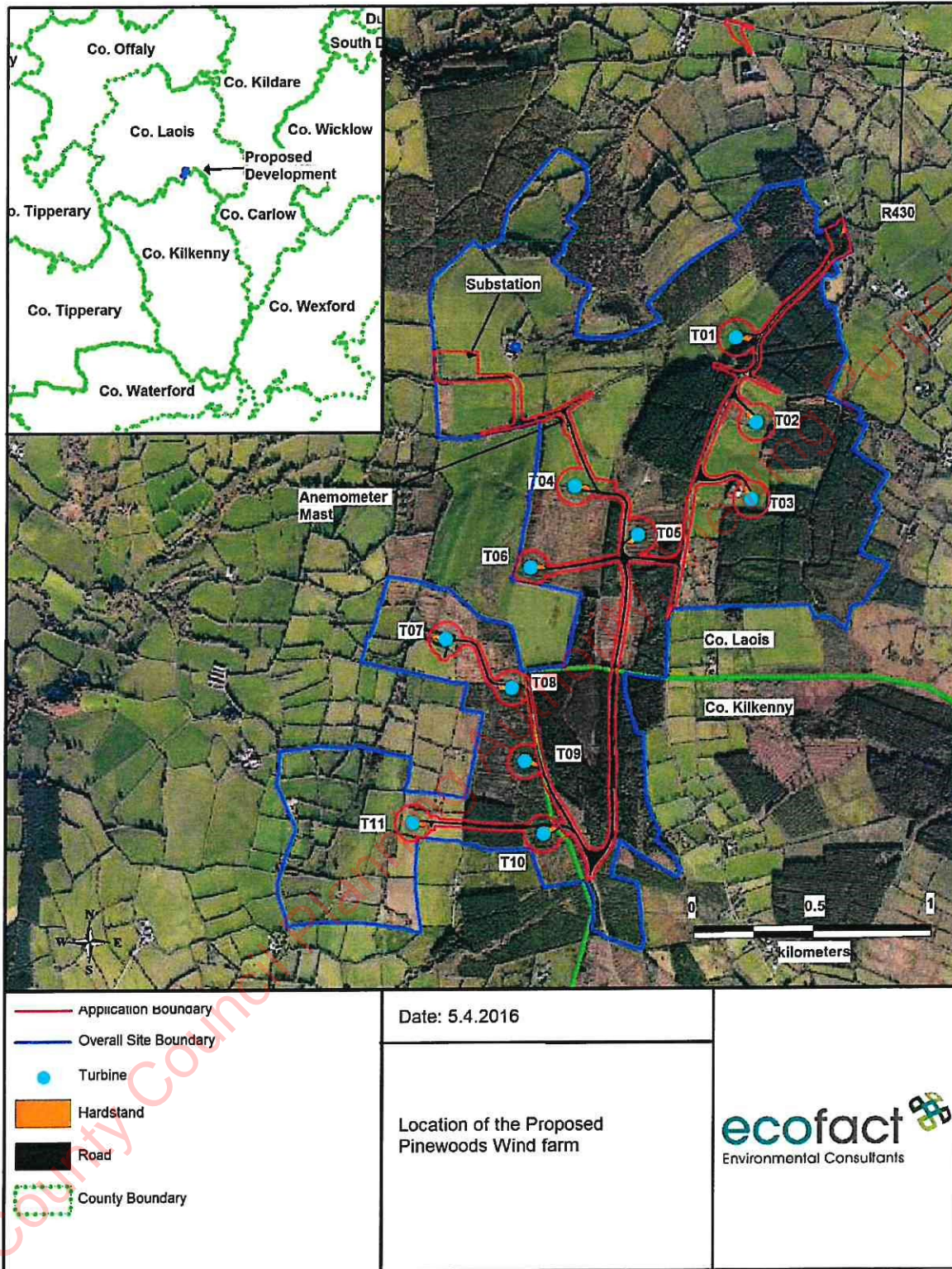


Figure 4.1: Site location map showing the boundary of the proposed development site near the Co. Laois/Co. Kilkenny border

4.2 Methodology

4.2.1 Guidelines and legislative context

The current assessment has been prepared taking account of the Environmental Protection Agency's (EPA) 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002) and 'Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)' (EPA, 2003) and also the 'Guidelines for Ecological Impact Assessment' (Institute of Ecology and Environmental Management, 2006). The Heritage Council publication 'Best Practice Guidance for Habitat Survey & Mapping' (Smith *et al.*, 2011) was also referenced for habitat mapping.

Cognisance of the European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989) and subsequent amendments, as well as the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. 296 of 2009) and the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) were taken into account when preparing this assessment.

Under the Fisheries (Consolidation) Act, 1959, it is an offence to disturb the bed of a river. Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters. Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as any substance that is liable to injure fish; to damage their spawning grounds; or the food of any fish; or to injure fish in their value as human food; or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.

A diversity of flora and fauna, rare at a national level, are protected under the provisions of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000; which includes the Flora Protection Order (1999). The Habitats Directive 1992 has been transposed into Irish legislation as the European Union (EU) (Natural Habitats) Regulations SI 94/1997 and amended in 1998 and 2005. It is the responsibility of each Member State to designate Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), both of which form part of the Natura 2000, a network of protected areas throughout the European Community. The Habitat Regulations have been updated in 2011 as the European Communities (Birds and Natural Habitats) Regulations 2011 to bring the Irish transposition of these regulations into line with the requirements of the EU Habitats Directive (1992). Article 6 paragraphs 3 and 4 of the EU Habitats Directive (1992) state that:

6(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial

consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

4.2.2 Desktop Review

A desktop review was carried out to identify features of ecological importance within the study area and surrounding region. The ecological assessment included designated and sensitive areas in the vicinity of the study area, to enable sufficient assessment to identify and quantify any significant impacts on the habitats, flora and fauna likely to arise from the construction and operation of the proposed development. Potential sites of conservation interest were identified prior to the field survey by an examination of Ordnance Survey (OS) aerial photography and OS maps (1:50,000, 1:10,560 or 6" and 1:2500 scale).

SACs, SPAs and Natural Heritage Areas and proposed NHAs (pNHAs) in the vicinity of the proposed development site were identified. This information was collated by accessing the website of the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht (DAHG).

The digital database of the New Atlas of the British and Irish Flora (Preston *et al.*, 2002) was consulted to assess the presence of rare plant species recorded from the 10km square in which the site is located. The online database hosted by the Irish National Biodiversity Data Centre (NBDC) (www.biodiversityireland.ie) was also utilised to assess the importance of the study area for mammals; likewise, 'Exploring Irish Mammals' (Hayden and Harrington, 2000) was consulted.

The NPWS publication 'Otter Survey of Ireland: 2004/2005' (Bailey & Rochford 2007) was reviewed, as were the COFORD publications 'The Irish Squirrel Survey 2007' (Carey *et al.* 2007) and the 'National Pine Marten Survey of Ireland 2005' (O' Mahony *et al.* 2006). A desk study of bat records from the study area was undertaken. Sources accessed included The Bat Conservation Trust's report 'Distribution Atlas of Bats in Britain and Ireland 1980-1999' (Richardson, 2000). The 'Irish Red Data Book 2: Vertebrates - Threatened Mammals, Birds, Amphibians and Fish in Ireland' (Whilde 1993) and the updated 'Irish Red List No. 3: Terrestrial Mammals' (Marnell *et al.* 2009) and 'Irish Red List No. 5: Fish, Reptiles and Amphibians' (King *et al.* 2011) were also reviewed.

The current chapter also draws extensively on an ecology assessment prepared as part of a previous EIS for a proposed wind farm on the subject site (IWCM, 2012). This included a previous 12-month bird survey of the site completed during the period October 2010 and September 2011 (Moran 2012, presented in **Appendix 4.2**) and a detailed bat survey completed during the period May 2012 to October 2012 (Woodrow & Nicholas 2012, presented in **Appendix 4.3**).

4.2.3 Field Survey Work

An updated habitat survey of the proposed development site was undertaken during July 2014. Information was recorded in relation to the primary habitats and land take to be directly affected by the proposed development, at a level corresponding with the Heritage Council publication 'Best Practice Guidance for Habitat Surveying and Mapping' (Smith *et al.*, 2011). Habitat mapping was aided by aerial photography and habitats recorded were classified according to Fossitt 'A Guide to Habitats in Ireland' (2000). A list of the dominant and notable plant species was taken for each habitat type. Plant species nomenclature follows Stace 'New Flora of the British Isles' (1997). While emphasis was placed on the habitats within the immediate area of the proposed development, habitats recorded from the overall study area (land boundary) were also considered as a potential impact zone.

Mammal surveys for protected species including badger and otter was undertaken during the period July to September 2014. Mammal surveys were undertaken to assess the locations of features such as badger setts and to propose appropriate mitigation measures for the protection where necessary. Mammal surveys were undertaken during the daytime and the site was walked and evidence of mammal activity (burrows, tracks, trails, footprints, hair etc.) was searched for. The surveys followed

standard methodology as outlined in 'Best Practice Guidance - Badger Surveys' by Scottish Natural Heritage (2003) and other guidance, including the book 'How to find and identify mammals' by Muir *et al* (2013).

The current assessment follows on from a previous bat survey of the site which was completed during 2012 (See **Appendix 4.3**). An updated bat survey was also undertaken as part of the current assessment during the months of June, July, August, September and October 2014 (daytime assessments, 5 nights' activity surveys with 2 observers). The surveys were completed with regard to the 'Bat Mitigation Guidelines for Ireland' by Kelleher & Marnell (2006), and the 'Wind Turbine/Wind Farm Development Bat Survey Guidelines' prepared by Bat Conservation Ireland (2012). The level of survey effort and the survey techniques employed were designed to allow a comprehensive understanding of the use of the site by bats. The survey included assessments of potential roost locations (including trees, buildings and bridges), and also bat activity surveys. The activity surveys included walkover transect surveys on the site itself and hand held bat detectors. Surveying commenced approximately 30 minutes before dusk each night, and continued until 3 hours after dusk. The activity surveys (with the exception of the October survey) were all undertaken during warm dry nights and were considered to be optimal survey periods.

A general extensive breeding bird survey of the site was carried out over four days between May and July 2014, to update the previous 12-month survey of the site (See **Appendix 4.2**). The survey approach took the Scottish Natural Heritage (2013) guidelines 'Recommended bird survey methods to inform impact assessment of onshore wind farms' into account, and provides an inventory of the species present on the site. A crepuscular (evening) ornithological survey of the site was carried out in late June 2014. The method used was based on Brown & Shepherd (1993). Transects used in the previous EIS survey were replicated to allow comparisons of results. Additional observations regarding birds were also made during other ecological surveys of the site which were completed as part of the overall ecological assessment of the site. All surveys were undertaken under ideal survey conditions, with dry, bright and calm conditions prevailing.

All watercourses/water bodies which could be affected directly (i.e. within the site) or indirectly (i.e. lie within 500 m of the site boundary) were assessed as part of the current assessment. Aquatic habitat assessments in relation to fish and aquatic ecological interests were carried out using the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). **Table 1** presents the watercourses surveyed as part of the current assessment of the proposed development study area. All the potentially affected watercourses were assessed in terms of:

- Stream width and depth and other physical characteristics;
- Substrate type, listing substrate fractions in order of dominance, i.e. large rocks, cobble, gravel, sand, mud etc;
- Flow type, listing percentage of riffle, glide and pool in the sampling area;
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampling site (as applicable) and on the bankside and
- Estimated cover by bankside vegetation, giving percentage shade of the sampling site.

The results of the physical habitat study were used in conjunction with the leaflet 'The Evaluation of habitat for Salmon and Trout' to assess habitat suitability for salmonids. This leaflet (Advisory leaflet No. 1) was produced by the Department of Agriculture for Northern Ireland Fisheries Division and was designed for use in the EU salmonid enhancement programme.

Electrical fishing assessments were then carried out at selected sites under authorisation from the Department of Communication, Energy and Natural Resources under Section 14 of the Fisheries Act

(1980). The purpose of this survey was to provide information on the presence of Annex II listed fish species (i.e. lampreys and salmon) and other fish (i.e. brown trout and eels) present at the selected sites. Sites were surveyed following the methodology outlined in the CFB guidance '*Methods for the Water Framework Directive - Electric fishing in wadable reaches*'. A portable electrical fishing unit (GFT backpack) was used during the assessment. A 20 minute semi-quantitative survey was carried out at Site 6 on the Owenbeg (Owveg) River. Five minute semi-quantitative surveys were carried out at the remainder of the sites (where feasible). Electrical fishing was not carried out at Site 3, Site 5, Site 8 and Site 9 given the nearly dry state and small size of these streams during September 2014.

Survey Site	NOS Grid Reference	Watercourse
1	S50191 79591	Moneycleare River (Ironmills River)
2	S49083 81403	Knockardagur Stream
3	S49829 82293	Knockardagur Stream
4	S51339 83633	Graiguenahown Stream
5	S51291 82312	Graiguenahown Stream
6	S51889 83704	Owenbeg River
7	S52092 82792	Knockbawn Stream
8	S52044 82173	Knockbawn Stream
9	S51947 79419	1 st order un-named tributary (EPA segment code 15_1085) of the Loan River

Table 4.1: Locations of the sites examined for the proposed development site during September 2014

Quantitative sampling of benthic (or bottom dwelling) aquatic macroinvertebrates was undertaken at Sites 2, 4 and 6 in Table 4.1 using kick-sampling (Toner *et al.*, 2005). The Quality Rating (Q) System (Toner *et al.*, 2005) was used to obtain a water quality rating for each site. The Small Streams Risk Score (SSRS; Walsh, 2005) was also utilised for smaller watercourses. Searches for White-clawed crayfish and Freshwater Pearl Mussel (FPM) were carried out using a bathyscope. General assessments of terrestrial invertebrates were undertaken, with a focus on screening habitats present for their suitability to support any rare or notable species.

No specific reptiles and amphibian survey was undertaken. However, suitable habitats and activity for these groups were recorded during the course of the site walkover and mammal / fisheries investigations.

4.2.4 Consultations

Preparation of this section included consultation, either directly or through publicly-available information, with:

- National Parks and Wildlife Service (NPWS);
- Inland Fisheries Ireland (IFI);
- Irish Peatland Conservation Council (IPCC);
- Geological Survey of Ireland (GSI);
- Botanical Society of the British Isles (BSBI);
- Birdwatch Ireland;

- Bat Conservation Ireland (BCI);
- British Trust for Ornithology (BTO)
- Environmental Protection Agency (EPA);
- National Biodiversity Data Centre (NBDC);
- Butterfly Ireland.

In response to the proposed development, the Development Applications Unit (DAU) of the National Parks and Wildlife Service of the Department of Department of Arts, Heritage and the Gaeltacht replied on the 31st May 2010 (Ref: G2010/152) with the following recommendations for the EIS:

- An ecological survey on the proposed development site carried out at appropriate times depending on the species being surveyed;
- An assessment of the impact of the development on flora, fauna and habitats, and in particular habitats listed on Annex I of the Habitats Directive, on areas important for birds, on species protected under the wildlife Acts of 1976 and 2000, on species listed on Annexes II and IV of the EC Habitats Directive (92/42/EEC) and on birds listed on Annex I of the EC Birds Directive (Council Directive 79/409 EEC);
- Suitable mitigation measures must be given where negative impacts are identified;
- Include mention of invasive alien species and methods required to ensure they are not accidentally introduced or spread during construction;
- An assessment of the impact on Natura 2000 sites and any other sites designated for nature conservation and appropriate mitigation measures if necessary with particular reference to the River Barrow and River Nore cSAC;
- Assessment of cumulative impacts with other plans or projects if applicable.

These recommendations have been recognised and addressed in this report. In addition, relevant documents recommended by the DAU in preparing this report have been used (e.g. Smith *et al.*, 2010). The DAU also recommended an Appropriate Assessment (AA) screening and if necessary AA be carried out for the proposed development. A separate AA has been prepared which considers effects of the proposed development on the Natura 2000 network.

The former Southern Regional Fisheries Board (now merged with other regional fisheries boards to form Inland Fisheries Ireland) replied in May 2010 with regard to the proposed development. The SRFB response included the following observations and comments:

- The waters in fisheries terms likely to be impacted act primarily as contributories to downstream habitat for juvenile salmonids and other species as well as macrophytes, algae and macroinvertebrates which a drift form a significant part of the food supply to the downstream fisheries of the Owenbeg catchment (Owenbeg catchment). They also, in the context of the proposed works have the potential to convey deleterious matter from those works such as concrete, silt, fuel, lubricating and hydraulic oils from construction plant and equipment downstream unless proper safeguards are in place;
- Stream structures should not damage fish habitat or create blockages to fish and macroinvertebrate passage;
- Pre-cast concrete should be used whenever possible, to eliminate the risk to all forms of aquatic life. When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from any water that may enter the drainage network for a period sufficient to cure the concrete;

- Silt traps should be constructed at locations that will intercept run-off to the drainage network and should not be constructed immediately adjacent to watercourses. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact so as to assist silt interception. All natural watercourses which have to be traversed during site development and road construction works should be effectively bridged prior to commencement;
- During the construction process and operation phase, natural flow paths should not be interrupted or diverted so as to give rise to create potential for erosion. Furthermore, excavation and installation of roads/access tracks should be undertaken so as not to result in the creation of preferential flow paths that may result in erosion;
- Where imported materials are used in road construction, these should be such as not to be liable to become crushed by vehicular movement, and lead to discharge of fine particles to downstream receiving waters;
- All oils and fuels should be stored in secure bunded areas, and particular care and attention should be taken during refuelling and maintenance operations on plant equipment. Where site works involve the discharge of drainage water to receiving rivers and streams, temporary oil interceptor facilities should be installed and maintained.

The observations and recommendations outlined by IFI have been acknowledged and have been incorporated into the mitigation measures to protect fish and fish habitats in watercourses draining the proposed development site.

4.2.5 Evaluation

The impact significance is a combined function of the value of the affected feature (its ecological importance), the type of impact and the magnitude of the impact. It is necessary to identify the value of ecological features within the study area in order to evaluate the significance and magnitude of possible impacts. The ecological field survey and impact assessment has been prepared in line with the following guidelines:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002);
- Advice Notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the United Kingdom (IEEM 2006).

Ecological survey results were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local. The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into three categories: high local importance - local importance - local value. The criteria used are shown in **Table 4.2**.

The sensitivity of birds at the proposed development site was determined using a scheme developed by Percival (2003). The sensitivity of a bird species can be defined as its ecological importance and nature conservation interest at the site being assessed. The sensitivity of birds was evaluated using determining factors set out in **Table 4.3**.

Importance	Criteria
International Importance	<p>'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</p> <p>Proposed Special Protection Area (pSPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).</p> <p>Features essential to maintaining the coherence of the Natura 2000 Network</p> <p>Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme) • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	<p>Site designated or proposed as a Natural Heritage Area (NHA).</p> <p>Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts.</p> <p>National Park.</p> <p>Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following:</p> <ul style="list-style-type: none"> • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	<p>Area of Special Amenity. Area subject to a Tree Preservation Order.</p> <p>Area of High Amenity, or equivalent, designated under the County Development Plan.</p> <p>Resident or regularly occurring populations (assessed to be important at the County level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National</p>

Importance	Criteria
	<p>importance.</p> <p>County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared.</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>
Local Importance (higher value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;</p> <p>Resident or regularly occurring populations (assessed to be important at the Local level) of the following:</p> <ul style="list-style-type: none"> • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; • Sites or features containing common or lower value habitats, including naturalised species that are essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	<p>Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;</p> <p>Sites or features containing non-native species that are of some importance in maintaining habitat links.</p>

Table 4.2: Criteria used to determine the value of ecological resources (taken from NRA, 2009)

Sensitivity	Determining Factor
Very high	Species that form the cited interest of SPA's and other statutorily protected Nature conservation areas.
High	Species that contribute to the integrity of an SPA but which are not cited as species for which the site is designated Ecologically sensitive species including: Divers, Common Scoter, Hen Harrier, Golden Eagle, Red-necked Phalarope, Roseate Tern and Chough Species present in nationally important numbers (>1% of Irish population).
Medium	Species on Annex I of the EC Birds Directive Species present in regionally important numbers (>1% regional (county)population Species on Bird Watch Ireland's red list of Birds of Conservation Concern
Low	Any other species of conservation interest, including species on Bird Watch Ireland's amber list of Birds of Conservation Concern not covered above

Table 4.3: Determination of sensitivity of birds (from Percival, 2003)

4.2.6 Assessment of Impact Type and Magnitude

Impact assessment takes account of both construction and operational impacts with reference to the potential for direct, indirect and synergistic impacts. The characterisation of impacts reflects the ecological structure and function upon which the key receptors depend. Detailed impact assessment takes into account the magnitude of impacts affecting populations or habitat extent. Identification of key receptors and the duration and timing of potential impacts is included. **Table 4.4** sets out the criteria for assessing impact magnitude. Impact types can be characterised as follows:

- **Cumulative Impact:** The addition of many small impacts to create one larger, more significant impact;
- **'Do-Nothing Impact':** The environment as it would be in the future should no development of any kind be carried out;
- **Indeterminable Impact:** When the full consequences of a change in the environment cannot be described;
- **Irreversible Impact:** When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost;
- **Residual Impact:** The degree of environmental change (impacts on integrity and conservation status of each of the key ecological receptors) that will occur after the proposed mitigation measures have taken effect. Account for uncertainty of mitigation;
- **Synergistic Impact:** Where the resultant impact is of greater significance than the sum of its constituents;
- **'Worst Case' Impact:** The impacts arising from a development in the case where mitigation measures substantially fail.

<i>Impact magnitude</i>	<i>Definition</i>
No change:	No discernible change in the ecology of the affected feature.
Imperceptible Impact:	An impact capable of measurement but without noticeable consequences.
Slight Impact:	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Impact:	An impact that alters the character of the environment that is consistent with existing and emerging trends.
Significant Impact:	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Profound Impact:	An impact which obliterates sensitive characteristics.

Table 4.4: Criteria for assessing impact magnitude (NRA, 2009)

The following terms are defined when quantifying duration:

- **Temporary:** up to 1 year;
- **Short-term:** from 1-7 years;
- **Medium-term:** 7-15 years;
- **Long-term:** 15-60 years;
- **Permanent:** over 60 years.

The magnitude of the possible impacts on birds that may occur on those species/populations recorded during the field surveys was determined by criteria in **Table 4.5**. The methodology

addresses this issue by quantifying the effect as far as possible, and expressing the size of that effect in relation to the existing baseline conditions. The assessments of magnitude and sensitivity lastly need to be brought together in order to determine the significance of the potential impact, and hence their acceptability in a planning context. The methodology achieves this by cross-tabulating the magnitude and sensitivity, using **Table 4.6** below, to give a prediction of the significance of each potential impact.

Magnitude	Description
Very high	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population/habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: < 1% population/ habitat lost

Table 4.5: Determination of magnitude of effects on birds (from Percival, 2003)

Significance		Sensitivity			
		Very high	High	Medium	Low
Magnitude	Very high	Very high	Very high	High	Medium
	High	Very high	Very high	Medium	Low
	Medium	Very high	High	Low	Very low
	Low	Medium	Low	Low	Very low
	Negligible	Low	Very low	Very low	Very low

Table 4.6: Significance matrix: combining magnitude and sensitivity to assess significance

4.2.7 Limitations of the current assessment

The preparation of the current assessment did not encounter any limitations with respect to the timing of survey or seasonality restrictions. Areas of dense scrub and conifer plantation were impenetrable and difficult to survey and the precise extent of drainage channels may not be fully illustrated in the habitat mapping. However, this was not thought to have comprised the survey or assessment.

Results of a 12-month bird survey of the site completed during the period October 2010 and September 2011 and a bat survey completed during the period May 2012 to October 2012 were used to prepare the current chapter. These baseline surveys were based on a similar site layout so the extent of these surveys was deemed relevant to the current plan. As noted in EPA (2002), the

environment is an extremely complex combination of natural and human factors, many of which are constantly changing. To this end, additional bird and bat surveys were completed in 2014 to augment to the former studies. It is noted that there was little change in the habitats and results between the initial survey in 2012 and the subsequent survey in 2014. The combination of these surveys is considered to provide an adequate description of the existing environment against which future changes can be measured.

4.3 Description of the Existing Environment

4.3.1 Designated Areas

Designated sites of ecological importance within 15km of the proposed development site are considered, including candidate Special Areas of Conservation (cSAC) and (SPAs) designated within the Natura 2000 network; as well as Natural Heritage Areas (NHA's). Enforcement of the protection of SPA's and SAC's in Ireland is provided by the transposition of the EU Habitats Directive (92/43/EEC) into Irish law, as the EC (Birds and Natural Habitats) Regulations (2011). Natura 2000 sites are also assessed in the accompanying Natura Impact Statement (NIS).

4.3.1.1 Designated Natura 2000 sites

SAC's are designated sites of international importance because of the presence of habitats or species that are of European importance, listed on the EU Habitats Directive (1992). SPA's for birds are designated based on the presence of internationally significant populations of bird species, listed in Annex I of the EU Birds Directive (1979), amended by the Birds Directive (2009/147/EC) which was adopted to clarify the suite of amendments which had been required to the original 1979 Directive. Both of these regulations have been superseded by the EC (Birds and Natural Habitats) Regulations (2011).

The designated Natura 2000 sites within the study area are summarised below. **Figure 4.2** presents the location of the proposed development and the locations of the designated Natura 2000 sites within 15km of the study area for SACs and SPAs. The Natura 2000 sites within a 15km radius are:

- River Barrow and River Nore SAC (Site Code: 002162);
- Ballyprior Grassland SAC (Site Code: 2256);
- Lisbigney Bog SAC (Site Code: 000869);
- River Nore SPA (Site Code: 004233).

Sites lying outside of a 15km radius were assessed and no pathways or connections between the proposed development and these additional designated sites were identified with regard to this EIS. A more detailed evaluation of the designated Natura 2000 sites within a 15km radius of the proposed development is provided in the separate NIS.

River Barrow and River Nore SAC (Site Code: 002162)

At its closest, the proposed development (junction upgrade) is located approximately 40m to the south of the River Barrow and River Nore SAC. This minor component of the proposed development is located ca. 130m to the east of the lower reach of the Graiguenahown Stream and ca. 180m south west of the Owenbeg River within the designation.

The principal component of the proposed development (turbines, hardstands, etc.) lies ca. 770m to the south of the River Barrow and River Nore SAC (or 1.43 km hydrological distance), where the Owenbeg River is part of the designation. The proposed development is also located ca. 1.14km to the east and 5.5km to the west of the River Barrow and River Nore cSAC, but the latter distance refers to a part of the Dinin (north) River within the designation, a subcatchment of the River Nore that would not be affected by the proposal. The Graiguenahown Stream and the Knockbaun Stream are two first order watercourses which rise within the proposed development boundary and flow

north into the Owenbeg River. The Knockardagur Stream, another tributary of the Owenbeg River drains the western component of the proposed development. The southern extent of the site is upslope of the Moneycleare River (also known as the Ironmills River) which also flows into the Owenbeg River. The site synopsis for the River Barrow and River Nore SAC is provided in **Appendix 4.1**.

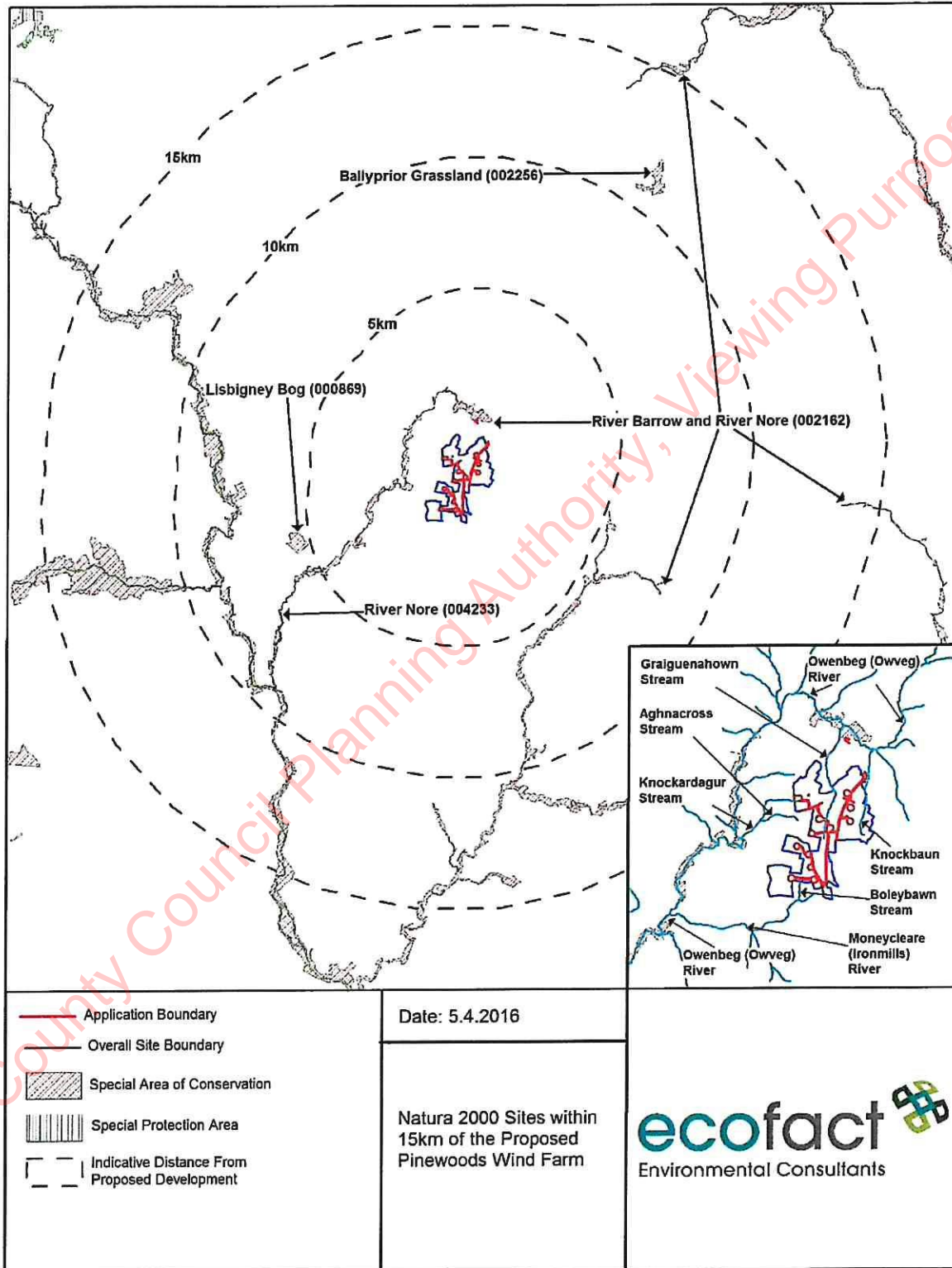


Figure 4.2: Map showing the Special Areas of Conservation and Special Protection Areas within 15km of the proposed Pinewoods Wind Farm site

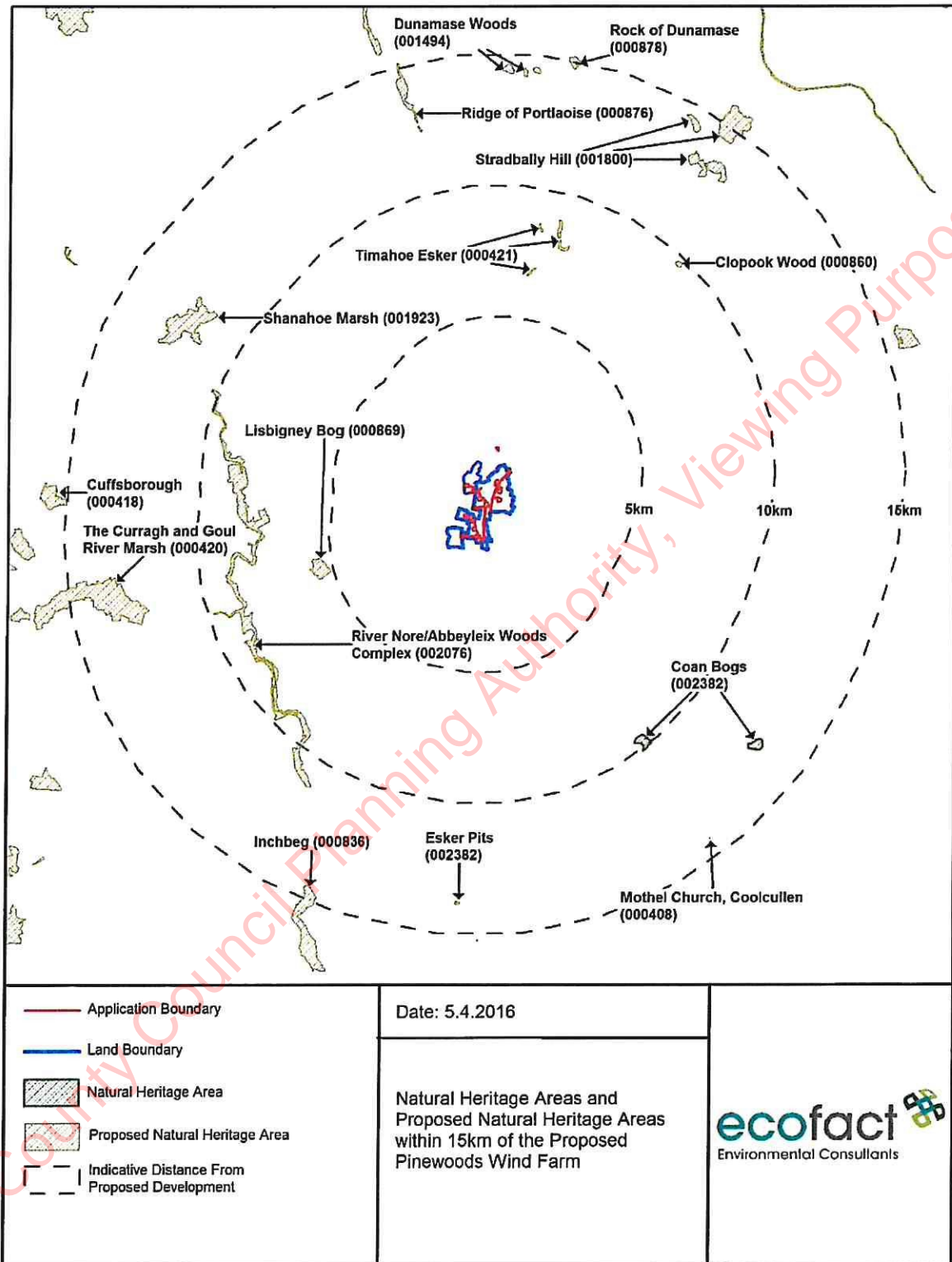


Figure 4.3: Map showing the Natural Heritage Areas and Proposed Natural Heritage Areas within 15km of the proposed Pinewoods Wind Farm site

The River Barrow and River Nore SAC (Site Code: 002162) is selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive, 1992. The site is also selected as a SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the Habitats Directive. As well as habitats, the SAC has been selected due to the presence of invertebrate, fish and mammal species which are listed under Annex II of the EU Habitats Directive, including freshwater pearl mussel (*Margaritifera margaritifera* and its hardwater form *M. durrovensis*), freshwater crayfish (*Austropotamobius pallipes*), Atlantic salmon (*Salmo salar*), twaite shad (*Alosa fallax fallax*), the three Irish Lamprey species - sea (*Petromyzon marinus*), brook (*Lampetra planeri*) and river (*Lampetra fluviatilis*), the Desmoulin's whorl snail *Vertigo moulinsiana* and Eurasian otter (*Lutra lutra*). The qualifying interests of the River Barrow and Nore SAC are presented in Table 4.2 and are discussed individually below. The NPWS details the conservation objectives of the River Barrow and River Nore SAC (NPWS, 2011).

Evaluation: The River Barrow and River Nore SAC is evaluated as being of International Importance for the conservation of habitats and species listed on Annex II of the EU Habitats Directive.

Ballyprior Grassland SAC (Site Code: 002256)

Ballyprior Grassland SAC is located approximately 11.1km north east of the proposed development site. There are no overland hydrological connections between this designated site and the proposed development site. Ballyprior Grassland SAC consists of a limestone plateau supporting open calcareous grassland with occasional rocky scarps and valleys, but with little surface water and no streams. An estimated 35 hectares, 45% of the site area, consists of the Annex 1 priority habitat, orchid-rich calcareous grassland, which supports a rich diversity of both calcicole and calcifuge species, the latter occurring on mineral poor drift. The site has an exceptionally rich mycoflora and this is a better indication of grassland quality (in terms of continuity, lack of disturbance and low nutrient status) than the vascular flora. The Irish Hare, *Lepus timidus hibernicus* recorded as occurring in the site. This sub-species is listed in Annex III of the Bern Convention and in the Red Data Book as Internationally Important. It is legally protected by the Wildlife Act (1976).

Evaluation: Ballyprior Grassland SAC is evaluated as being of International Importance.

Lisbigney Bog SAC (Site Code: 000869)

Lisbigney Bog SAC comprises a small wetland situated c.5 km north-east of Durrow. The principal habitat is fen, with reed swamp, wet grassland, pools and scrub also occurring. At present, the site is not used for any particular activity other than light grazing. The site supports a population of the Annex II snail *Vertigo moulinsiana*. The site contains a small though significant example of *Cladium mariscus* fen. Similar habitat in this part of the country is scarce. All recently surveyed sites with confirmed populations of this species are considered important.

Evaluation: Lisbigney Bog SAC is evaluated as being of International Importance for the conservation of habitats and species listed on Annex I of the EU Habitats Directive.

River Nore SPA (Site Code: 004233)

The River Nore SPA is a long linear site located approximately 4km south-west of the proposed development. It includes the following river sections: the lower reaches of the Owenbeg River, the River Nore from the bridge at Townparks, (north-west of Borris-in-Ossory) to Coolnamuck (approximately 3km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera Bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island Co. Kilkenny. The site includes the river channel and marginal vegetation. The

River Nore support nationally important numbers of Kingfisher *Alcedo atthis*. Other species which occur within the site include *Cygnus olor*, *Anas platyrhynchos*, *Phalacrocorax carbo*, *Ardea cinerea*, *Gallinula chloropus*, *Gallinago gallinago* and *Riparia riparia*.

Evaluation: The River Nore SPA is evaluated as being of International Importance.

4.3.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

Sites of national ecological importance in the Republic of Ireland are designated as Natural Heritage Areas (NHA's) or proposed Natural Heritage Areas (pNHA's). NHA and pNHA sites within a 15km radius of the proposed development site have been identified. The locations of these sites are shown in **Figure 4.3**. The NHA and pNHA sites include:

- Lisbigney Bog pNHA (Site Code: 000869) located approximately 5.1km west of the proposed development site;
- Timahoe Esker pNHA (Site Code: 000421) located approximately 6.5km north of the proposed development site;
- River Nore/Abbeyleix Woods Complex pNHA (Site Code: 002076) located approximately 7km west of the proposed development site;
- Coan Bogs NHA (Site Code: 002382) located approximately 9km south east of the proposed development site;
- Shanahoe Marsh pNHA (Site Code: 001923) located approximately 11.5km north west of the proposed development site;
- The Curragh and Goul River Marsh pNHA (Site Code: 000420) located approximately 12 km west of the proposed development site;
- Stradbally Hill pNHA (Site Code: 001800) located approximately 12.5km north east of the proposed development site;
- Ridge of Portlaoise pNHA (Site Code: 000876) located approximately 12.5km north of the proposed development site;
- Esker Pits pNHA (Site Code: 002382) located approximately 13km south of the proposed development site;
- Inchbeg pNHA (Site Code: 000836) located approximately 14km south west of the proposed development site;
- Mothel Church pNHA (Site Code: 000408) located approximately 14km south east of the proposed development site;
- Cuffsborough pNHA (Site Code: 00418) located approximately 15km west of the proposed development site;
- Dumanase Woods pNHA (Site Code: 001494) located approximately 14.5km north of the proposed development site.

The only site which lies within 5km of the proposed development is Lisbigney Bog pNHA. This site is designated for the presence of fen, reed swamp, wet grassland, pools and scrub. The site is also co-designated within Lisbigney Bog cSAC. The other NHA/pNHA sites are considered to lie outside of the potential impact zone of the proposed development and no pathways or connections between the proposed development site and these designations are identified.

Evaluation: All NHA and pNHA sites are evaluated as being of National Importance.

4.3.2 Flora

The different habitat types (as classified according to Fossitt, 2000) recorded from within the proposed development site are listed in **Table 4.5** and described individually below. The habitat code according to Fossitt (2000) is in brackets after the habitat name. A list of plant species recorded by habitat is provided in each habitat description. Habitat survey and mapping followed the Heritage Council guidelines (Smith *et al.*, 2011). The evaluation of the ecological importance of the habitats recorded from the site follows the NRA (2009) guidelines. A list of plant species by habitat is provided in **Appendix 4.5, Table A5.1**. Habitats identified as key ecological receptors recorded from within the study area are presented in **Table 4.6**. Habitat mapping for the proposed development site is presented in **Figures 4.4a and 4.4b**.

The general proposed development area can be described as elevated, and rated as 'marginal' from an agricultural point of view. The proposed development site is dominated by commercially planted coniferous forestry and agricultural grassland; habitats which are evaluated as being of Local Importance, Lower Value with respect to botanical diversity. The field survey included an assessment of the overall site and the proposed turbines and associated infrastructure. Proposed turbines T05, T06, T08, T09 and T10 would be located in commercial forestry, the latter three alongside existing tracks. The remainder of the proposed turbines would be located in grassland habitats and some adjacent to commercial forestry/hedgerows.

Habitat Code	Habitat name
WD4	Conifer plantation
WD5	Scattered Trees & Parkland
WL1	Hedgerows
WL2	Treelines
WS1	Scrub
GA1	Improved agricultural grassland
GS4	Wet grassland
FW1	Eroding / Upland watercourse
FW4	Drainage Ditch
BL2	Earth Banks
BL3	Buildings & Artificial Surfaces
ED2	Spoil & Bare Ground

Table 4.5: List of the habitat types recorded from the proposed Pinewoods Wind Farm site (according to Fossitt, 2000) with corresponding Annex I habitats identified

4.3.2.1 Conifer plantation (WD4)

The proposed development site is predominantly under commercial conifer plantation, where approximately 2km² of the proposed development site has been planted. These areas of non-native trees were found to be dominated by Sitka Spruce *Picea sitchensis*, Lodgepole Pine *Pinus contorta*, with Larch *Larix* spp. also recorded. Within the forestry patches of Ling *Calluna vulgaris* and Hare's-tail Cottongrass *Eriophorum vaginatum* were found in areas where there had been peatland habitat prior to afforestation. Plants more typical of mineral soils such as Oxeye Daisy *Leucanthemum vulgare*, Common Knapweed *Centaurea nigra* and Creeping Buttercup *Ranunculus repens* were found in drier areas. Ditches and wet ground had Rushes *Juncus* sp. while there were broad-leaved native trees also such as Hawthorn *Crataegus monogyna*, Rowan *Sorbus aucuparia* and Willow *Salix*

sp. Areas of more recently planted woodland had a larger broad-leaved component than older stands.

Evaluation: The coniferous plantations within the study area are evaluated as being of low local importance with regard to ecological interests, as they are species poor with relatively poor understory vegetation and they also are too wet on the ground to support badger or other ground dwelling mammals. This habitat is rated as Local Importance, Lower Value with regard to botanical and habitat diversity.

4.3.2.2 Improved agricultural grassland (GA1)

This habitat was recorded from the northern portion of the study area where agricultural intensity was low, and also from the south western extent of the site where this habitat dominates. Much of the improved grassland within the study area was on shallow soils with poor drainage. Most of these fields are used for cattle grazing. Plant species present included Timothy *Phleum pratense*, Sweet-vern Grass *Anthoxanthum odoratum*, Meadow Fox-tail *Alopecurus geniculatus*, Yorkshire fog *Holcus lanatus*, and soft rush *Juncus effusus* frequent in wetter areas.

Evaluation: This habitat type is common in the surrounding countryside; species that occur are all common in the wider countryside. The habitat is managed to varying degree within the study area. Intensive agricultural grasslands are of low biodiversity value due to high nutrient inputs and low species diversity. Overall, this habitat is rated as being of Local Importance, Lower Value only.

4.3.2.3 Wet grassland (GS4)

Abandoned agricultural pasture and lands where there is low level maintenance occur within the study area was classified as wet grassland. These areas are dominated by soft rush with gorse also encroaching occurring. Occasional Cuckoo-flower *Cardamine pratensis*, Lesser Spearwort *Ranunculus acris* and Meadowsweet *Filipendula ulmaria*. In one very small area, on the brow of a hill to the north, an emergent heath vegetation is apparent, with Ling, Lousewort *Pedicularis sylvatica* and Tormentil *Potentilla erecta*.

Evaluation: Overall, this habitat is also rated as being of Local Importance, Lower Value only.

4.3.2.3 Hedgerows (WL1)

Hedgerows occur at various locations within the site, and were more frequently associated with the improved agricultural landscape at the south western extent of the site. Hedgerow habitats were found to be dominated by Willow scrub and Hawthorn *Crataegus monogyna*, with Blackthorn (*Prunus spinosa*), Gorse *Ulex europaeus* and Bramble *Rubus fruticosus* agg. also occurring. Vegetation along the base of the hedgerows can be dense and diverse, with the community of Bilberry *Vaccinium myrtillus*, Common Haircap *Polytrichum commune* and Wood-sorrel *Oxalis acetosella* being particularly characteristic at this elevation.

Evaluation: Hedgerow habitats can act as wildlife corridors for bird and mammal species. Hedgerows are evaluated as being of Local Importance, Higher Value with respect to wildlife connectivity; however, hedgerow habitats within the study area are poorly connected.

4.3.2.4 Treelines (WL2)

Treelines were infrequently recorded from within the study area as field boundaries greater than 5m in height. A few isolated treelines occur at the south western extent of the site and were dominated by Ash *Fraxinus excelsior*, Rowan *Sorbus aucuparia* with Oak *Quercus* sp. occasional. Treelines to the north of the site were dominated by mature Sycamore *Acer pseudoplatanus* and Horse chestnut *Aesculus hippocastanum*.

Evaluation: Treelines of native species including ash may be of some use to birdlife for feeding and nesting purposes and also for mammal species, due to the insect diversity associated with the