BORD NA MÓNA

Naturally Driven

Derryadd Wind Farm

Environmental Scoping Report

August 2016

TOBIN CONSULTING ENGINEERS

TOBIN

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REPORT

PROJECT: Derryadd Wind Farm, Environmental Scoping Report

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1 INTRODUCTION

1.1 FUTURE USE OF CUTAWAY PEATLANDS

Bord na Móna Plc is a publically owned company, originally established in 1946 to develop and manage some of Ireland's extensive peat resources on an industrial scale.

In 2011, Bord na Móna published a 'Strategic Framework for The Future Use Of Peatlands'. The strategy establishes a framework for the on-going assessment of the company's approximately 80,000 hectares (ha) total land bank and provides for the formulation of appropriate strategies, policies and actions. The development of wind energy as an after use for cutaway peatlands is clearly indicated in this strategy.

To date, Bord na Móna have a number of commissioned wind farms that are supplying energy to the National Grid including Bellacorick Wind Farm in County Mayo, Mount Lucas Wind Farm in County Offaly and Bruckana Wind Farm, situated on the borders of counties Tipperary, Kilkenny and Laois. In addition, Bord na Móna were recently awarded a Grant of Planning Permission for Oweninny Wind Farm, County Mayo and are planning to submit an application for Cloncreen Wind Farm, County Offaly in 2016.

Bord na Móna Powergen Ltd. (hereafter referred to an Bord na Móna) now proposes to develop Derryadd Wind Farm, near Lanesborough, County Longford and has commenced the process of Environmental Impact Assessment. It is proposed that the Derryadd Wind Farm will be built on cutover and cutaway peatlands on Derryadd, Derryaroge and Lough Bannow bogs located in south County Longford. These bogs cover an area of 2,300ha in total, and it is estimated that between 20 and 30 turbines could be located across the proposed wind farm.

1.2 THE NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Bord na Móna and TOBIN Consulting Engineers (hereafter referred to as TOBIN) consider that the proposed development of the Derryadd Wind Farm has the potential, prior to design mitigation and other mitigation, to have significant effects on the environment, due to the potential size, scale and situation of the proposed development. The proposed development also exceeds the thresholds for completion of an Environmental Impact Statement (EIS), as detailed in the Planning and Development Regulations 2001 (as amended), Schedule 5, Part 2, Class 3(i). As such, it is not proposed to provide a report on the screening requirement for an EIS but to proceed on the basis of considering the potential effects of the wind farm development through the process of Environmental Impact Assessment. Bord na Móna proposes to accompany the Planning Application for the wind farm with an Environmental

Impact Statement.

The European Commission's, "*Guidance on EIA Scoping*" (EU 2001) notes the following in Part A of the guidance,

> "*EIA is a procedure required under the terms of European Union Directives 85/337/EEC and 97/11/EC on assessment of the effects of certain public and private projects on the environment. Article 2 of the Directive requires that*
>
> "*Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects*."
>
> *Article 8 then requires that*
>
> *"The results of consultations and information gathered pursuant to (the EIA procedure) must be taken into consideration in the development consent procedure".* "

In terms of legislative context, it is considered that the proposed development of Derryadd Wind Farm is subject to the requirements set out in the provisions of Part X of the Planning and Development Act 2000 (as amended by the Planning and Development (Amendment) Act 2010 (30/2010), s. 54, (S.I. No. 405 of 2010), the European Union (Environmental Impact Assessment) (Planning and Development) Regulations 2014 (S.I. No. 543 of 2014) reg. 2, the European Union (Environmental Impact Assessment and Habitats) Regulations 2011 (S.I. No. 473 of 2011) reg. 6, the European Union (Environmental Impact Assessment) (Planning and Development Act, 2000) Regulations 2012 (S.I. No. 419 of 2012) reg. 2(c), and the European Communities (Environmental Impact Assessment) (Amendment) Regulations 2006 (S.I. No. 659 of 2006) Regs. 2 and 4.

1.3 PURPOSE OF EIA SCOPING

The purpose of the scoping for the Environmental Impact Assessment is to provide a framework for the approach to be taken for the individual specialists evaluations, to identify environmental topics for which potential significant environmental impacts may arise, to provide a framework for the consultation process to take place with prescribed Statutory Bodies as part of the environmental assessment work, and as such, a structure for the preparation of the Environmental Impact Statement to be prepared and the information required to be included therein.

The European Commission's, "*Guidance on EIA Scoping*" (EU 2001) notes the following in Part

B of the guidance, as being the benefits of scoping:

- *"It helps ensure that the environmental information used for decision making provides a comprehensive picture of the important effects of the project, including issues of particular concern to affected groups and individuals;*
- *It helps focus resources on the important issues for decision-making and avoids wasted effort on issues of little relevance;*
- *It helps ensure that the environmental information provides a balanced view and is not burdened with irrelevant information;*
- *It stimulates early consultation between the developer and the competent authority, and with environmental authorities, other interested parties and the public, about the project and its environmental impacts;*
- *It helps effective planning, management and resourcing of the environmental studies;*
- *It should identify alternatives to the proposed project and mitigating measures which ought to be considered by the developer;*
- *It can identify other legislation or regulatory controls which may be relevant to the project and provide opportunities for the necessary assessment work for different control systems to be undertaken in parallel, thereby avoiding duplication of effort and costs for all concerned;*
- *It reduces the risk of delays caused by requests for further information after submission of the development consent application and the environmental information; and*
- *It reduces the risk of disagreement about impact assessment methods (baseline surveys, predictive methods and evaluation criteria) after submission of the environmental information.*

Due to the size of the proposed Derryadd site and it's potential to accommodate an estimated number of between 20 and 30 large turbines, the project will be initially directed into the pre-planning consultation phase with An Bord Pleanála utilising the Strategic Infrastructure Development process.

1.4 BORD NA MÓNA

Bord Na Móna is Ireland's leading environmentally responsible integrated utility service provider. Established in the 1940's to develop Ireland's peat resources, it is now active across a range of industries.

Bord na Móna owns 80,000 hectares of peatland, located mainly in the Irish Midlands. To date this land has been primarily used for peat harvesting for energy and for horticulture growing media. Many of these areas have now reached, or are reaching the cutaway stage and the

company must plan a range of new, integrated, wise and beneficial uses for these peatlands in consultation with the local communities and other interested stakeholders.

By 2030, Bord na Móna will cease harvesting energy peat however through the extensive Bord na Móna land assets it is planned to continue to produce energy through wind energy, biomass, solar, landfill gas and waste to energy and to continue the Horticulture section of the business as a supplier of growing media.

As noted above, the development of wind energy as an after use for cutaway peatlands is specifically identified in the Bord na Móna, 'Strategic Framework for The Future Use Of Peatlands', and it is on this basis that the proposed change of land use at the location of Derryadd Wind Farm is planned.

1.5 EIA TEAM

TOBIN have been engaged by Bord na Móna to coordinate the Environmental Impact Assessment and prepare the EIS for the proposed development. The relevant specialists included in the Study Team, who are both experienced and competent in their areas of expertise, are noted here:

- TOBIN staff will provide expertise in relation to Project Direction, Project Management, EIS Production and expertise in relation to the environmental evaluation of the following topics: Ecology & Ornithology, Soils & Geology, Hydrology & Hydrogeology, Flood Risk Assessment, Traffic, Socio- Economic and Air & Climate;
- Gavin & Doherty Geo-solutions – Geotechnical & Slope Stability Assessment;
- Stephen Dowds – Planning Consultant;
- Macro Works – Landscape & Visual Impact Consultants & Production of Photomontages;
- Enfonic Ltd. and AWN Consultants – Noise;
- TOBIN /Pager Power – Shadow Flicker;
- Compliance Engineering Ireland (CEI) – Telecommunications & Aviation Assessment; and
- Arch Consultancy – Cultural Heritage.

1.6 SCOPING REPORT STRUCTURE

Individual specialists will undertake their evaluations of the environment and the proposed development, including evaluation under following topics:

- Planning, Planning Policy & Wind Energy Policy;
- Human Environment/Socio Economic Assessment;
- Archaeology, Architectural and Cultural Heritage;
- Ecology & Ornithology;
- Hydrology, Hydrogeology and Water Quality;
- Soils, Geology, Geo-technics and Ground Stability;
- Air and Climate;
- Noise and Vibration;
- Landscape and Visual Impact Assessment;
- Shadow Flicker;
- Aviation, Telecommunications & Electromagnetic Interference; and
- Traffic and Transportation.

Initial constraints

Initial constraints work has begun in relation to mapping of known constraints including; Planning designations / preferred wind energy development areas per the Longford County Development Plan, Ground truthing of houses/ proximity of residential receptors, known and mapped archeological constraints, existing ecological data available for the site location, landscape character areas and telecoms and aviation constraints.

An initial high level desktop assessment of ecological constraints has been undertaken, using data from 2010, 2012, 2014, 2015 and 2016 field survey data. A precautionary approach was taken, however verification will take place following preliminary layout design with field visits to confirm locations of all turbines bases, roadways, lay down areas and other auxiliary infrastructure locations including cable trenches. Habitat valuation data was used where available.

A significant number of requests for communication data have already been issued to the relevant bodies as of June 2016 and the information is being returned from telecoms / aviation operators on an ad hoc basis, with many telecoms operators noting that they will be able to provide more valuable feedback when the turbine locations are known.

1.7 SELECTION OF THE OPTIMAL SITE

1.7.1 Selection of Candidate Sites

Bord na Móna conducted a technical review of potential candidate sites for wind energy projects, on land which is either cut away or will be cut away before 2021. This exercise reviewed a list of potentially 25 project sites, with a typical target capacity of between 50 MW and 100 MW, across

the entire land bank. A high proportion of these potential projects have had grid connection applications submitted to EirGrid, mainly in 2014, with two in previous years. The main aim of this study was to gauge the sites with the best potential to deliver a successful wind farm project by the early to mid-part of the next decade, i.e. 2020 - 2025. The ultimate end goal of the development team was to select a project to bring forward, for which preliminary engineering designs and a planning application would be prepared.

As part of the site selection process, known constraints were applied across the entire land bank to determine unsuitable areas for wind turbines. The constraints themselves are derived from various industry and regulatory guidelines and available Geographical Information Systems (GIS) datasets. This methodology was used to generate a list of potential sites for further consideration with the level of information currently available. These sites, identified as having a higher potential for wind farm development, were then brought forward for site-specific assessment, as detailed below.

1.7.2 Site-Specific Assessment

For the site-specific assessment of candidate sites, criteria were chosen which not only covered the broad range of issues which can arise in wind farm development, but also allowed for direct comparison of the candidate sites to each other to determine their relative suitability for wind farm development. The site-specific selection criteria and outline of basis for assessment for each criterion are listed in Table 1.1.

Criterion	Basis for Assessment
Grid Access/Capacity	Grid Access/Capacity means potential of the National Grid to accommodate future projects on the network. The proximity of the project to suitable grid nodes (i.e. those with spare capacity) should increase the likelihood of a project being selected for a grid connection offer.
County Development Plans and Zoning	County Development Plans typically indicate the areas of a county which are deemed preferred, open to consideration and not suitable for wind farm development. Bord na Móna has committed not to develop wind farms in areas deemed unsuitable.
Proximity to Houses	Refers to how close turbines are to residences.
Wind Resource Assessment	The available wind resource (i.e. wind speed) directly translates into how much electrical output comes from the site.
Environmental Sensitivity	Environmental Sensitivity is the ecological sensitivity of the site based on proximity to sensitive areas within or around the site.
Cumulative Impact	Depends on the landscape's capacity to absorb wind farm developments.
Aviation	Airspace control and use to be considered.
Land Use	Internal issue relating to the residual peat depth, production plans and alternative uses.
Communications Infrastructure	Telecoms masts and signals to be considered.
Flood Plain Analysis	Flood Plain Analysis assesses the wind farm's location in terms of historical flooding data.
Supporting Infrastructure	Sites with better road access require less modifications or upgrade to the local infrastructure to facilitate construction.

Table 1.1 Site-specific Selection Criteria

These site-specific assessments were conducted by Bord na Móna with input from relevant subject experts, where required. A score was awarded to each site under each criterion.

1.7.3 Site Selection Results

The site assessment scores for each criterion were determined and a shortlist of sites deemed suitable for a large-scale wind energy development was compiled. Of these sites, Derryadd scored very highly closely followed by other high-scoring sites that meet the relevant criteria'. Due to the close proximity of a potential grid connection, it was deemed that Derryadd should be progressed for detailed assessment and planning consideration.

Further details on the identification of Derryadd as the optimal site for the proposed development are presented under the individual site-selection criteria described below.

Grid Access/Capacity

Significant energy infrastructure exists in the local area, such as Lough Ree Power which is located to the west of Derryaroge Bog and its associated grid infrastructure in the form of 110kV pylons network (in particular, the Lanesborough/Richmond Line). The proposed wind farm connection will be assessed in the EIS.

County Development Plans and Zoning

County Development Plans and Wind Energy Strategies, where available, typically indicate the areas of a county which are zoned as preferred, open to consideration or not suitable for wind farm development. Bord na Móna has committed not to develop wind farms in areas deemed unsuitable.

Derryadd is one of a number of candidate sites that is located within an area deemed suitable or preferred for wind energy development by the relevant County Development Plans, and which therefore scored highly with regard to this criterion. Sites located within undesignated wind development areas or areas open for consideration scored lower.

Proximity to Houses

It was found that in general Bord Na Móna sites are surrounded by low density rural housing, and most sites have a relatively large proportion of their land area free from proximity issues. However, longer narrower sites had a larger proportion of their land area constrained out due to proximity issues to houses or population centres.

The Derryadd site measures approximately 2,300 hectares and is of sufficient size to accommodate a large-scale wind energy development, while maintaining the required set-back distance from houses in the surrounding area.

Wind Resource Assessment

Wind resource assessment is the process by which wind power developers estimate the future energy production of a wind farm. Accurate wind resource assessments are crucial to the successful development of wind farms

The Irish Wind Atlas, published by the Sustainable Energy Authority of Ireland (SEAI), uses long term weather model data to predict the long term average wind speeds in Ireland, and is used by wind developers and local authorities to determine the best locations for future wind farm development.

A review of Irish Wind Atlas datasets found that the more westerly sites have the highest mean wind speeds, while wind speeds in the midland bog groups are typically between 7 m/s and 8

m/s. These wind speeds are conducive to the development of a wind farm. The overall Derryadd Wind Farm site has two meteorological masts, one at Derryaroge Bog and a second at Lough Bannow Bog.

Environmental Sensitivity

Environmental sensitivity is a key factor in identifying suitable sites for wind farm development. The assessment of environmental sensitivity among the candidate sites included a review of proximity to Natura 2000 sites, biodiversity of the lands within the sites themselves, and acknowledgement of any other site-specific ecological data that has already been captured, for example, previously determined important populations of winter birds, bats or mammals.

Of the candidate sites, the Derryadd Wind Farm site was found to have a low ecological sensitivity and, therefore, scored high in this regard.

Cumulative Impact

Cumulative impact refers to the ability of the landscape and environs to absorb multiple wind farm developments. The landscape's capacity to absorb wind farm developments can be subjective and can vary from area to area.

Currently there are only a limited number of wind farm developments existing or with planning in the midlands area, with no permitted wind farms located in County Longford. The nearest wind farm to the Derryadd study area is the Bord na Móna/Coillte Sliabh Bawn Wind Farm located approximately 6 kilometres (km) north west of the nearest site boundary. This wind farm was under construction at the time of writing (August 2016). The Skrine Wind Farm in County Roscommon is located approximately 18.5km south west of the nearest site boundary. This site scored highly with regards to cumulative impact given the capacity of the receiving landscape.

Aviation

Abbeyshrule aerodrome is located approximately 15 km south east of the Derryadd Wind Farm site boundary. In this regard therefore, Derryadd did not score at the highly in the overall matrix. An Aviation/parachuting safeguard area will be included as part of the constraints in the design of the wind farm layout.

Land Use

The gross area of each bog was determined from the GIS database, and from information obtained as part of an internal consultation process and analysis of the GIS information available. This was mapped to provide an estimate, by 2020, of the net area available for wind farm development on each individual bog. This net area was then expressed as a percentage of the

total gross area of the bog, and a score applied to rank each bog in turn, relative to the other bogs under consideration.

Some bogs are predicted to be completely cutaway by 2020, with no other activities on site, and therefore more readily available for potential wind farm development. Other bogs may have areas predicted to have significant peat reserves remaining beyond 2020. In addition, some bogs may have areas allocated to other use. These factors may considerably reduce the net area available for wind farm development on that particular bog.

Derryadd obtained a medium score with regard to land use as parts of the site may still be operational in 2020. The site is in the full ownership of Bord na Móna.

Communications Infrastructure

Many of the sites have telecommunication point-to-point microwave signals crossing them and some sites have telecommunication masts located within the site boundaries. However, this issue can typically be overcome by engineered solutions, i.e. wind farm layout design or additional telecom relay masts. Planning permission has been granted on sites where significant telecommunications infrastructure is located. For this reason this criterion does not significantly impact on overall project viability. Nonetheless, Derryadd scored highly for this parameter.

Flood Plain Analysis

Flood Plain Analysis assesses the wind farm's location in terms of historical flooding data. The assessment methodology used this historical flooding data to consider the percentage area of a site which has previous flooded, the percentage area within one kilometre of a site which has previously flooded and recorded flooding points within one kilometre of a site. In addition, whether the site has pumped or gravity drainage systems is also considered.

No flooding issues were identified at the Derryadd Wind Farm site, which scored highly in this regard.

Supporting Infrastructure

The proximity of the existing road and electricity transmission network were considered in terms of ease of delivery of turbine components and relative cost of potential grid connection. Derryadd scored highly with regard to supporting infrastructure, in terms of road network and potential grid connection.

2 PROJECT DESCRIPTION

2.1 SITE LOCATION

The proposed development, known as Derryadd Wind Farm (See Figures 1 and 2, Appendix A) is located on three cutover bogs (Derryaroge, Derryadd and Lough Bannow) within the Mountdillon peat production bog group in Co. Longford. The three bogs have an area of approximately 2300 hectares in area and lie directly to the east of the R392 which runs from Lanesborough in the north to Ballymahon in the south.

The area is 12km long in the northwest/southwest direction and is approximately 4km wide in an east/west direction. The three bogs are surrounded by the towns and villages of Lanesborough, Derraghan, Keenagh and Killashee while the main urban centre in the region, Longford Town, is 9km to the northeast from its nearest point. Derryaroge Bog to the north is adjacent to the River Shannon and Lough Bannow Bog is immediately to the west of the Royal Canal which runs in a north south direction.

The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland. The landscape is predominately flat. The most significant feature in the surrounding landscape is ‘Bawn Mountain’ which is located 8km to the east of Lough Bannow Bog.

The significant energy infrastructure that exists in the local area is Lough Ree Power located to the west of Derryaroge bog, and its associated grid infrastructure in the form of 110kV pylons network (in particular the Lanesborough/Richmond line). The proposed development is in a suitable area for wind energy development as outlined in the Longford County Development Plan 2015 – 2021.

The environmental sensitivity of a site for its suitability for wind farm development is assessed at a high level by examining the nature of the on-site habitat and also the presence or absence of Natura and nationally designated sites in the vicinity or within a site.

Bord na Móna has carried out extensive and detailed habitat mapping of it lands over the last decade. The proposed development will be located in an area with Lough Ree to the west and south, the Royal Canal to the east, and the River Shannon to the north. Other sites of interest in the immediate vicinity are Fortwilliam Turlough, Cordara Turlough, Lough Slawn, Lough Bawn, Lough Bannow, Derrylough and Forthill Bog.

The land use/activities on the three bogs are a mixture of active peat extraction bare cutaway peat, re-vegetation of bare peat, and two existing wind monitoring masts on Derryaroge Bog and Lough Bannow Bog. These works form part of the Bord na Móna Mountdillon peat production facility in County Longford.

There are also a number of Bord na Móna rail lines that pass through the bogs facilitating the transportation of milled peat and ash.

2.2 THE PROPOSED DEVELOPMENT

It is proposed that the Derryadd Wind Farm will be built on cutaway peatlands on Derryadd, Derryaroge, and Lough Bannow bogs located in south Co. Longford. These bogs cover an area of 2,300 hectares in total, and it is estimated that between 20 and 30 turbines could be located across the proposed wind farm. The three bog areas on which the proposed wind farm will be located are surrounded by the towns and villages of Lanesborough, Derraghan, Keenagh and Killashee. The main urban centre in the region, Longford Town, is located approximately 9km to the northeast of the site.

The scale and layout of the proposed wind farm will be determined during the EIA process, however the following gives some detail as to the likely requirements;

- Estimated between 20 and 30 no. wind turbines will form part of the design;
- The turbine envelope and maximum tip height to be decided in the design & EIA process;
- Associated hardstandings at each turbine location;
- Potential Upgrading of existing access routes;
- Potential Construction of new internal site access routes;
- Upgrade of existing drainage system;
- Borrow pits;
- Electrical and communication cables, linking the turbines to proposed grid connection point;
- Related site works and ancillary development; and
- Civil works will be undertaken for those elements below, including but not limited to:
    - ❖ Access routes
    - ❖ Cable routes
    - ❖ Foundations
    - ❖ Borrow Pits/quarry potential

- ❖ Earthworks
- ❖ Peat Management Works
- ❖ Groundwater management, as required
- ❖ Drainage Design
- ❖ Overburden (Soils/Peat) Storage and management
- ❖ Temporary works design
- ❖ Site Reinstatement, to be aligned with the existing site rehabilitation plan (including erosion control).

2.2.1 Internal Access Route & Turbine Locations

The exact number of siting and scheme layout for the turbines will be decided as part of the design and EIA process.

In addition, the internal access route layout, access route types and construction methodologies will be designed and the location of the proposed entrance to the wind farm site will be confirmed. The initial layout design will be proposed by the design team in August 2016 and assessment of potential access points through which turbine components and construction related deliveries may be made will commence at that stage.

2.2.2 Wind Turbine Specifications

The exact rating and design of the proposed turbine, subject to completion of the statutory processes, will be subject to a competitive tender and will be detailed by the turbine manufacturer on award of the contract. However, the proposed turbines will be the typical three bladed, horizontal axis type.

Details of the maximum hub height, maximum rotor diameter, maximum tip height and the overall proposed capacity will be decided in the design and EIA process. The potential installed capacities for the wind turbines and the wind farm as a whole will be proposed as part of the design process.

2.2.3 Electrical / Mechanical Equipment

The main mechanical and electrical components associated with the development include the following:

- Turbine components (tower sections, nacelle, hub, rotor blades);
- 110kV Substation;
- Electrical cable;
- SCADA cable; and
- Main and assist cranes.

It is noted that two existing wind monitoring masts are in place in the vicinity, one at Derryaroge Bog and a second at Lough Bannow Bog.

2.2.4 Peat Management

It is proposed that a site investigation programme will be specified in conjunction with the requirements of the designers. The site investigation plan will provide detail on soils, geology, peat types and depths, and potential requirements for water management and drainage.

The nature and requirements of the potential peat management system will be informed by the information from the site investigation, site surveys and visits, and the evaluations undertaken by the multi disciplinary team.

2.2.5 Grid Connection

It is noted that significant energy infrastructure exists in the local area e.g. Lough Ree Power located to the west of Derryaroge Bog, and its associated grid infrastructure in the form of the 110kV pylons network, in particular the Lanesborough/Richmond line. Proposed connection point(s) and method of connection to the grid will be evaluated as part of the design and EIA process.

2.2.6 Decommissioning

It is proposed that the turbines may have a minimum design lifetime of approximately 20 years without replacement of major components, although they are expected to have a physical lifespan of up to 25 years. In certain circumstances, the developer may wish to replace turbines prior to the end of the design lifetime. Such a decision would be made on the merits of economic and technical factors at the time of assessment and undertaken in consultation with the local authorities.

Turbine design renders the decommissioning process as a straight forward process. In the decommissioning phase, cranes disassemble each turbine section and remove from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations will be covered by soils typical of the surrounding environment and then re-seeded or left to re-vegetate according to ecological requirements. Underground cables will be cut back at the turbine termination points and will either be recycled or left buried in situ (de-energised). It is proposed that site routes would remain to allow access through the site either for further alternative development of the site or for amenity purposes, as considered appropriate at the time.

Site materials will be recycled where practicable, or disposed of in accordance with current waste legislation and best practice guidelines. Based on current commodity prices, principally steel and copper, material costs achieved through recycling will exceed current financial costs associated with site decommissioning.

Decommissioning activities are assumed to be similar to construction activities, having similar type risks and sensitive receptors associated with them.

2.2.7 Rehabilitation/Concurrent or Future use of the site

Derryadd Wind Farm consists of an operational peat production facility and the transport of peat through the site will continue during the construction and operation of the wind farm for a period of time. Any areas of high biodiversity identified during the initial constraints study and the EIA site surveys will remain intact.

3 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 PROJECT SUMMARY

At the stage of the submission of the planning application and EIS, and arising out of the EIA process, the project description as per the application for planning approval will have been finalised.

In the case of a wind farm development, the final project proposal may have gone through a number of iterations during the EIA, including changes to design proposals, numbers of proposed turbines and turbine layouts.

It is proposed that the following EIA guidelines will be followed during the process:

- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, September 2003)";*
- *"Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002)"; and*
- *"Draft Guidelines on the Information to be contained in an EIS" (EPA, 2013)".*

3.2 THE SCOPING PROCESS

This current report will form the basis for the scoping process to be undertaken by the applicant's consultants on behalf of Bord na Móna, with the Planning Authority and the prescribed Statutory Bodies.

The scoping will allow statutory consultees to provide information, data or additional guidance from their governmental departments and will facilitate the iteration of the design and EIA process, to determine what the main potential significant effects might be and what sub topics the EIS should focus upon.

The project will be initially directed into the pre-planning consultation phase with An Bord Pleanála utilising the Strategic Infrastructure Development process. It is proposed that this Scoping Report will be used as a framework to facilitate statutory consultees to provide feedback into the EIA process.

3.3 BASELINE ASSESSMENT

Following an introduction to the EIS, the following information will also be presented:

- Description of the Existing Environment –a detailed description of the existing environment to allow the baseline conditions at the development site to be understood and existing areas of sensitivity to be recorded. As noted in the EPA Draft Guidelines on the Information to be contained in an EIS, "*in order to establish the characteristics of the receiving environment, against which the effects of the proposed project should be compared, it is important to identify changes that would occur without the project. This is often described as the do-nothing scenario, i.e. the evolution of the baseline without implementation of the project.*"

- Description of the proposed development, including site layout and infrastructural details, construction procedures and the materials required, the operational and maintenance phases in addition to the decommissioning and rehabilitation phases.

- Consideration of Alternatives – This provides a detailed assessment of alternatives considered in the selection of site location and site layout.

3.4 ASSESSMENT METHODOLOGY

In the case of each of the environmental topics, it is proposed that the following elements will be evaluated, and that the format of the EIS will follow the standard methodology and be presented in accordance the above mentioned legislation and guidelines. Individual chapter topics are discussed further below in this section. The development is assessed and described within each environmental topic in terms of:

- **Introduction-** includes a background to the assessment and describes the study methodology employed in carrying out the assessment.

- **Existing Environment –** Describes and assesses the existing environment in the context of the relevant environmental categories. This section also takes account of any other proposed and existing developments in the vicinity.

- **Potential Impacts** - Provides the description of the potential specific, direct and indirect impacts, associated with the development. This is done through reference to the magnitude, duration, consequences and significance of the impact associated with the construction and operation of the development. This section also considers cumulative impacts with other proposed or permitted developments.

- **Mitigation Measures** - A description of any remedial, or mitigation measures that have been incorporated into the design to offset or minimise identified potential adverse impacts.

Residual Impacts - Provides the description and assessment of the predicted residual impact associated with the development on the surrounding environment.

- **Conclusion –** Provides a summary of the salient points of the assessment chapter.

3.5 ASSESSMENT OF EFFECTS

The EIA will cover the environmental topics and will address the elements as outlined here below:

- The environmental constraints;
- Appropriate alternatives;
- Construction, operation and decommissioning phases;
- Direct and indirect impacts;
- Temporary, permanent and cumulative impacts;
- Short and long-term impacts; and
- The inter relationships between the landscape and humans, flora and fauna, soils, water, air, climate, material assets and cultural heritage.

3.6 SIGNIFICANT CRITERIA

The Draft Guidelines on the Information to be contained in an EIS (EPA, 2013) provides guidance in relation to the determination of the significance of effects.

"Significance of effects is usually understood to mean the importance of the outcome of the effects (the consequences of the change). Significance is determined by a combination of (objective) scientific and subjective (social) concerns.

Determination of significance relies on the professional judgement of competent experts who may place different emphases on the factors involved. As this can lead to differences of opinion, the EIS sets out the basis of these judgements so that the varying degrees of significance attributed to different factors can be understood.

Such judgements should be explicit and substantiated rather than presented as objective fact. This is best done using to agreed referable approaches, e.g. landscape impact assessment Guidelines which provide guidance on what constitutes a severe visual impact."

The guidance notes the importance of specialist guidance for each environmental topic, and the EIA will be informed by relevant guidance within each specialist field, which will be noted in the proposed scope for each environmental topic.

3.7 POTENTIAL MITIGATION

There are four established strategies for effects mitigation - avoidance, prevention, reduction and offsetting. As noted above, following the iteration of the design and EIA process, and following implementation of any design mitigation, the description of any remedial, or mitigation measures that have been incorporated into the design will be included to offset or minimise identified potential adverse impacts.

The Draft Guidelines on the Information to be contained in an EIS (EPA, 2013) highlight the most appropriate method for the application of mitigation and the possibility for the use of consultation in the design of the mitigation measures, to allow agreement during the design and EIA process:

> *"The efficiency of each (mitigation) is related to on the stage in the design process at which environmental considerations are taken into account (i.e. effects avoidance is most applicable at the earliest stages, prevention may be provided up to a much later stage, while remedy or offsetting may be the only option available for largely designed projects or for projects that cannot avoid significant effects due to their need to locate on a particular site)."*

> *"When impacts have been predicted and during the stage where mitigation measures are being considered, it can be useful to consult with the competent authorities or other bodies with responsibility for the relevant environmental characteristics. This can help to determine the practicality and acceptability of any mitigation measures that are being considered."*

3.8 NON-TECHNICAL SUMMARY (NTS)

This document provides an overview and summary of the main EIS using non-technical language. It is a standalone document which presents a clear and concise summary of the existing environment, characteristics of the proposed development, a clear outline of the potential significant impacts which could result from the proposed development and mitigation measures adopted into the design of the development to minimise impacts on the surrounding environment.

4 PLANNING POLICY

This planning assessment will evaluate the planning history and the planning and development context of the proposed wind farm development.

The evaluation will include a review of relevant European, national and local policy documentation, legislation, strategies and plans and local context of the project, including Regional Planning Guidelines, County Development Plans, Wind Energy Strategies and other appropriate renewable/wind energy development policies.

It is noted that Bord na Móna has undertaken initial public engagement in relation to the proposed Derryadd Wind Farm and, in the published material for that public engagement, Bord na Móna notes that it is committed to not developing wind farms in areas that are deemed unsuitable by the relevant county development plans for the area.

The planning assessment will include a review of the relevant planning and wind energy development policies including the Longford, Roscommon, Leitrim and Westmeath County Development Plans and a review of all relevant existing Planning Files and Reports.

Of note in relation to the project are the following governmental policies and reports:

- A review of the 2006 Wind Energy Development Guidelines;
- The publication by the government of an Energy White Paper entitled, “Ireland’s Transition to a Low Carbon Energy Future 2015-2030”;
- The “National Renewable Energy Action Plan-Ireland” (2010);
- The preparation of a ‘Renewable Electricity Policy and Development Framework’;
- The proposal by the government to undertake a Strategic Environmental Assessment (SEA) on the potential impact of renewable electricity; and
- The development of new Renewable Electricity support.

It is also noted that the Longford County Development Plan Preferred Area for Wind Energy development encompasses almost the entire Bord na Móna landholding in relation to the proposed Derryadd Wind Farm, see TOBIN Figure, Areas of Windfarm Potential -Preferred Locations, in Appendix A.

As noted in Section 1 above, significant energy infrastructure exists in the local area e.g. Lough Ree Power located to the west of Derryaroge Bog, and its associated grid infrastructure in the form of a 110kV pylons network, in particular the Lanesborough/Richmond line.

5 HUMAN ENVIRONMENT/SOCIO ECONOMIC ASSESSMENT

5.1 INTRODUCTION

A review of the current census data will be completed. The existing local population will be described and the projected change in the population, if any, of the study area will be assessed. This section will address in particular the effects of the development on nuisance and residential amenities in the surrounding area. Any impacts on recreational activities as a result of the development will be discussed in this chapter. In addition the positive economic impacts will be examined, as employment will be created during the construction phase of this project. This section will also consider public access, adjacent landowners / dwellings and local services such as existing electricity lines / masts on site.

5.2 STUDY AREA

The study area for the human beings assessment will include County level data in relation to Electoral Divisions. In addition the mapping in relation to residential receptors will include an area within 2.5km of the boundary of the proposed wind farm site.

5.3 SENSITIVE RECEPTORS

Properties within 2.5km of the boundary of the Bord na Móna lands will be mapped as potential constraints. Properties will include residential dwellings, commercial properties, derelict buildings, agricultural buildings and pre-planning infrastructure (including houses submitted for planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development. In addition, as part of the turbine layout design process, a 500m buffer will be extended from the location of any proposed turbines as an exclusion buffer. This will inform the turbine layout.

5.4 DESKTOP AND FIELD SURVEYS

The following information sources and references are of relevance in relation to the desktop study for the human beings assessment;

- EPA Guidelines - Information to be contained in Environmental Impact Statements 2002;
- Draft Guidelines on the Information to be contained in an EIS (EPA, 2013);
- IWEA Best Practice Guidelines for the Irish Wind Energy Industry 2012;
- IWEA Best Practise Principles in Community Engagement and Community Commitment 2013;

- OSI mapping and Aerial Photography to identify land use and possible amenity sites;
- Longford County Development Plan 2015-2021;
- Central Statistics Office (CSO) information; and
- Fáilte Ireland Information in relation to tourism amenity in conjunction with websites of relevant tourism sites and amenities for the area.

In June 2016, TOBIN undertook ground-truthing of houses in the vicinity of the proposed Derryadd Wind Farm. Houses within 2.5km were mapped using Geo-directory databases. Houses within 1km of the boundary of the proposed Derryadd Wind Farm were then further investigated using aerial imagery (Bing 2013 Imagery) to verify the An Post Geo-directory data. Following on from this verification process, field visits were commenced.

The Human Beings impact assessment evaluates the receiving environment/land use and includes analysis of local population patterns. The assessment also includes a review of appropriate demographic documentation and incorporates Census Reports and Electoral Division Information, Land use, Population, Employment and Planning Permissions. In addition the evaluation will provide details of Bord na Móna Community Benefit proposals and any consultation with regard to the same.

5.5 CUMULATIVE EFFECTS

Interactions of the environment of Human Beings with other environmental topics including Landscape and Traffic will be evaluated as part of the EIA.

6 ARCHAEOLOGICAL, ARCHITECTURAL & CULTURAL HERITAGE

6.1 INTRODUCTION

The purpose of the cultural heritage assessment will be to assess the potential impacts of the proposed wind farm on the surrounding archaeological, architectural and cultural heritage landscape. The assessment will be based on a comprehensive desktop study of the cultural heritage and archaeological data and a programme of field walking over the proposed development site.

6.2 STUDY AREA

The proposed development is located approximately 1km from Lanesborough, while the villages of Keenagh and Killashee lie to the southeast and east at distances of approximately 3km and 2km respectively. Derraghan is located adjacent to the western boundary of the site. The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland.

6.3 SENSITIVE RECEPTORS

As part of initial constraints work undertaken in June 2016, mapping has been undertaken of known and mapped cultural heritage features. Over 440 archaeological records (Record of Monuments and Places (RMPs)) and one structure of the National Inventory of Architectural Heritage (NIAH) are located within the boundary area of the proposed development.

6.4 DESKTOP AND FIELD SURVEYS

Ireland has ratified several European and International Conventions in relation to the protection of its cultural heritage. This assessment will comply with the following European and National legislative procedures:

- UNESCO World Heritage Convention, 1972;
- ICOMOS Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005;
- European Convention on the Protection of the Archaeological Heritage (Valletta Convention), Ratified by Ireland in 1997;
- European Convention on the Protection of the Architectural Heritage (Granada Convention), Ratified by Ireland in 1997;
- The European Landscape Convention 2000;
- SEA Directive (2001/42/EC);
- EIA Directive 85/337/EEC as amended by 97/11/EC, 2003/35/EC and 2009/31/EC;

- National Monuments Acts (1930-2004);
- Roads Act (1993);
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- Local Government (Planning and Development) Acts (2000-2001);
- The Architectural Heritage & Historic Properties Act, 1999;
- The Planning and Development Act 2000-2011; and
- The Planning and Development (Strategic Infrastructure) Act 2006.

County Development Plans contain lists of cultural heritage sites including national monuments, recorded monuments and protected structures. The Longford County Development Plan 2015-2021, and other relevant County Development Plans, will be consulted in the compilation of this report. The published Code of Practice developed between the Department of Arts, Heritage and the Gaeltacht in co-operation with the National Museum of Ireland and Bord na Móna, will also be consulted in the compilation of this report. This publication details the Agreed Principles for the Protection of Wetland Archaeology in Bord Na Móna Bogs.

In addition, the interaction with visual impacts and settings will be evaluated and the inter-visibility and sensitivity analyses of possible heritage sites in relation to the proposed development.

Particular note will be taken of the Wetlands Survey and work carried out in by the wetland unit in this general area. The results of historical research, site visit recordings, accompanied by archaeological data and photographic reproductions will be described. This will be completed with assistance from the following:

- Record of Monuments and Places (RMP) for County Longford;
- Sites and Monuments Record (SMR) for County Longford;
- The Archaeological Inventory of County Longford;
- Topographical files of the National Museum of Ireland;
- Longford and Roscommon County Development Plans;
- National Inventory of Architectural Heritage;
- National and local documentary sources;
- First edition ordnance survey maps;
- Second edition ordnance survey maps;
- Third edition ordnance survey maps;
- Aerial photography; and
- Excavation bulletins.

6.5 CUMULATIVE EFFECTS

The existing environment and any potential impacts (including cumulative) will be detailed within the EIS chapter and appropriate mitigation measures proposed where necessary.

7 ECOLOGY & ORNITHOLOGY

7.1 INTRODUCTION

To date desktop research has been undertaken to identify ecological sensitivities within and surrounding the proposed development site. In addition, detailed bird surveys (including both Winter Bird Surveys and Breeding Bird Surveys) and habitat mapping have been carried out in the study area.

Both the desktop and field survey elements of the assessment will continue and be further developed throughout the lifetime of the project. Particular focus within the EIA will be paid to the possible effects of the proposed development on habitats and protected species. The proposed development infrastructure will attempt to avoid areas of deep peat or sensitive peat habitats including Ground Water Dependent Terrestrial Ecosystems (GWDTE). The proposed development will set out to ensure that the overall biodiversity of the site is maintained and enhanced where possible with meaningful and practical steps identified to mitigate any potential effects.

7.2 STUDY AREA

The proposed development is located approximately 1km from Lanesborough and close to the towns and villages of Keenagh, Derraghan and Killashee. The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland.

7.3 SENSITIVE RECEPTORS

Designated European Sites including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), as well as nationally important designations including Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are identified in Table 7.1 below. Lough Bawn pNHA overlaps the south-eastern tip of the proposed development. Additionally, Lough Bannow pNHA is located approximately 20m from the western boundary of the site. European Sites, designated within the Natura 2000 network, occurring within the zone of influence of the proposed development include Lough Ree SAC and SPA, Fortwilliam Turlough SAC, Ballykenny-Fishertown Bog SAC and SPA, Corbo Bog SAC and Brown Bog SAC.

Site Name	Separation distance	Qualifying Interests
European Sites within a 15km radius		
Lough Ree SAC (000440)	Approx 540 m west	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Degraded raised bogs still capable of natural regeneration [7120] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] *Lutra lutra* (Otter) [1355]
Lough Ree SPA (004064)	Approx 540 m west	Little Grebe (*Tachybaptus ruficollis*) [A004] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Goldeneye (*Bucephala clangula*) [A067] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]
Fortwilliam Turlough SAC (000448)	Approx 4km west	Turloughs
Lough Forbes SAC (001818)	Approx 4.4km northeast	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]
Ballykenny-Fishertown Bog SPA (004101)	Approx 4.4km northeast	Greenland White-fronted Goose (*Anser albifrons flavirostris*)
Corbo Bog SAC (002349)	Approx. 5.8km west	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]
Brown Bog SAC (002346)	Approx. 6km northeast	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]
Clooneen Bog SAC (002348)	Approx. 11km northeast	Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion*

		[7150] Bog woodland [91D0]
Nationally Important Sites with 5km		
Lough Bawn pNHA (001819)	Lies within the southern site boundary	Fen and raised bog, woodland
Royal Canal pNHA (002103)	Approx. 10m to the east, at proposed south eastern site access	Calcareous grassland, woodland/scrub, reed fringe, open water. Also Annex II listed Otter.
Lough Bannow pNHA (000449)	Approx. 140m south of the site boundary	Open water, swamp, reed fringe, woodland/scrub
Cordara Turlough pNHA (001821)	Approx. 2.7km southwest	Drained turlough, wildfowl.
Derry Lough pNHA (001444)	Approx. 2.7km south	Wet grassland, fen, fen woodland and open water, winter wildfowl.
Mount Jessop Bog NHA (001450)	Approx. 3.5km east	Raised bog
Forthill Bog NHA (001448)	Approx. 3.7km southwest	Raised bog
Lough Slawn pNHA (001443)	Approx. 5.6km southwest	Open water, reed fringe, peatland/fen

Table 7.1 Designated European Sites (SACs/SPAs) and nationally important sites (NHAs/pNHAs) within the zone of influence of the proposed development

7.4 DESKTOP AND FIELD SURVEY

7.4.1 Desktop Survey

Desk and field-based surveys will be undertaken to gather ecological baseline information in order to fully assess potential impacts on ecological features. As noted, a desktop survey encompassing a review of information and literature pertinent to the site of the proposed Derryadd Wind Farm, information pertaining to legislation/designations and other notable ecological records will be completed. This review will include reports on field work and surveys completed to date within the study area.

The assessment of the flora and fauna will be conducted under the relevant legislation applicable to the Republic of Ireland. These include:

- European Communities (Birds and Natural Habitats) regulations 2011 S.I. 477 of 2011;
- The EIA Directive (2015/52/EU);
- The Habitats Directive (92/43/EEC);
- The Birds Directive (2009/147/EC);
- The Water Framework Directive (2000/60/EC);
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act, 2000 (as amended);
- The Flora (Protection) Order 2015 S.I. 356 of 2015;

- Relevant fisheries legislation up to and including the Inland Fisheries Acts 1959-2010, as amended;
- Objectives relevant to ecology and biodiversity in the latest County Development Plans of the relevant Counties under the Project;
- Bird species of medium and high conservation concern listed in the publication Birds of Conservation Concern in Ireland 2014 – 2019; and
- Relevant policies in Actions for Biodiversity 2011-2016, Ireland's 2nd National Biodiversity Plan produced by the Department of Arts, Heritage and the Gaeltacht in 2011.

As part of the EIS consultation process, the following bodies will be contacted for records of protected species in the locality, to inform the impact assessment and Appropriate Assessment for the project:

- BirdWatch Ireland and local bird groups;
- Local Authority Heritage/Biodiversity Officers;
- Inland Fisheries Ireland;
- National Biodiversity Data Centre; and
- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Development Application Unit and National Parks and Wildlife Service.

7.4.2 Field Surveys

Baseline field surveys will include:

- Desk based constraints map, to be verified in the field during ecological walkover surveys;
- Habitat Mapping level 3 in accordance with Fossitt 2000;
- Ornithological Surveys including collision risk assessment - breeding and wintering bird Vantage Point Surveys, based on Scottish Natural Heritage Guidance1 and breeding bird transect surveys;
- Protected species walkover surveys (e.g. Badger, Pine-marten, common frog, etc);
- Bat surveys including monitoring from height at two separate locations at approximately 4m and 50m above ground height from June to November 2016;
- Marsh Fritillary Surveys (presence of marsh fritillary confirmed in June 2016); and
- Survey for terrestrial invasive species focusing on those listed on the Third Schedule, Part 1, of the European Communities (Birds and Natural Habitats) Regulations 2011, S.I. No. 477/2011.

[1] SNH (2014). Recommended bird survey methods to inform impact assessment of onshore wind farms – Guidance.

Habitat mapping surveys comprising both aerial/satellite imagery evaluations and also field survey for the proposed development, including the entirety of the construction works area, zone of influence outside of the works area; and all ancillary works, will be required. Focus will be given to the potential for habitats corresponding to Annex I listed habitats on the EU Habitats Directive (1992). Botanical surveys will focus on protected flora listed on Annex II of the EU Habitats Directive (1992) and on the Flora Protection Order (2015), as well as species listed on the Red Data List;

Wintering Bird Vantage Point (VP) surveys were undertaken over the 2014/15 and 2015/16 winter bird survey periods. Breeding bird VP and transect surveys commenced in 2015 and are continuing in 2016. Currently 11 VPs are being surveyed with a minimum of 36 hours per VP over the breeding bird survey period. Two transect surveys for the 2016 survey period will be carried out, one in May, and one in July to allow comparison with the 2015 breeding bird surveys.

At a minimum, each vantage point will be watched for a period of six hours duration per monthly site visits over a six month period, April-September 2016.

Known waterbird sites (i.e. lakes, turloughs, rivers etc.) in the local area surrounding each bog unit (and within, if applicable) will be checked and if birds are present the species and number of birds of each species will be recorded. Also any visible flight lines will be recorded and mapped for the report.

According to the findings of the surveys and overall ecological assessment, our Ecologists will design site appropriate ecological mitigation measures in agreement with Bord na Móna to minimise the impact of the proposed development on the ecological environment. These mitigation measures will be detailed within the ecology chapter of the EIS.

7.5 CUMULATIVE EFFECTS

Cumulative assessment and the impact on local ornithology, in conjunction with other nearby wind farm developments (if applicable), will be provided on all species of particular interest or concern.

7.6 APPROPRIATE ASSESSMENT

European Sites (Natura 2000), i.e. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), are classified under the European Union Birds Directive (2009/147EC) and Habitats Directive (92/43/EEC). The procedures that must be followed when considering

developments affecting a Natura 2000 site are specified in Articles 6(3) and 6(4) of Habitats Directive.

The proposed development lies along the Shannon River Corridor, with European sites to the north and south, potentially within the 'zone of influence' of the proposed development, where the potential for indirect and/or in combination impacts exists. The potential for significant adverse effects on any Natura 2000 sites from the proposed development alone or in combination with other plans or projects will be determined through the Appropriate Assessment process, under the requirements of Article 6 of the EU Habitats Directive, taking account of direction and rulings from the European Court of Justice and the following guidance documents:

- 'Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities' (DEHLG, 2010);
- 'Guidance document – Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (European Commission, 2000);
- 'Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (European Commission, 2002); and
- 'Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the Concepts of Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission' (European Commission, 2007).

The initial stage of the Appropriate Assessment process is the preparation of a Screening Report which identifies those Natura 2000 sites where there is the potential for significant adverse effects on the qualifying interests of these sites. This screening process will allow for the identification of which designated Natura 2000 sites require further detailed assessment within the Natura Impact Statement reporting process which will inform the overall Appropriate Assessment, to be completed by the designated Competent Authority.

8 HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

8.1 INTRODUCTION

A desk study shall be undertaken to acquire all published hydrological data for the proposed development site and surrounding area, including flood data and surface water quality data.

The proposed development will be located in an area with Lough Ree to the west and south, the Royal Canal to the east, and the River Shannon to the north. Other sites of interest in the immediate vicinity are Fortwilliam Turlough, Cordara Turlough, Lough Slawn, Lough Bawn, Lough Bannow, Derrylough and Forthill Bog.

The land use/activities on the three bogs are a mixture of active peat extraction, bare cutaway peat, re-vegetation of bare peat.

As derived from available mapping, Derryaroge Bog is in close proximity to the River Shannon, and the Royal Canal which runs in a north/south direction in close proximity to the eastern boundary of the site. TOBIN are very familiar with this river catchment as we are currently preparing the EIS for the Water Supply Project for the Eastern Midlands Region which will potentially source water from the Shannon.

8.2 STUDY AREA

The EIS study area, known as Derryadd Wind Farm, comprising of three Bord na Móna Bogs (Derryaroge, Derryadd and Lough Bannow Bogs) are shown in Figures 1 and 2, Appendix A.

Sites designated for nature conservation within 15km of the proposed development site include the Lough Ree SAC/SPA/pNHA (approximately 540m from the site), Mount Jessop pNHA (Site code 001450, approximately 3.5km northeast of the site) and the Fortwilliam Turlough SAC (site code:00448 , approximately 4km south of the site).

8.3 SENSITIVE RECEPTORS

There are currently no known sensitive receptors at the outset of the scoping process and prior to site investigation. This will be reviewed as further data is collected.

8.4 DESKTOP AND FIELD SURVEYS

Consultations will be carried out with a number of statutory bodies including:

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on Natural Heritage Areas (NHAs), County Geological Sites (CGS) and any recorded

Landslide Events (from the historical landslide database) in the region of the study area will be requested;

- Irish Peatland Conservation Council;
- Inland Fisheries Ireland (IFI) Eastern River Basin District; and the
- Environmental Protection Agency (EPA).

8.5 HYDROLOGICAL ASSESSMENT

As part of the EIA, TOBIN will establish baseline/existing hydrological conditions, identify potential impacts and proposed appropriate mitigation measures. As detailed in the "Geological and Hydrogeological" section, TOBIN will also:

- Identify the existing surface water drainage characteristics of the site (including any natural or man-made drainage). A surface water feature survey/catchment assessment of the study area will be carried out to record all streams, rivers and lakes within the site boundary and surrounding area; and
- Establish baseline water quality across the site. Any historical water quality for this area will be reviewed and existing EPA water quality data will also be examined as part of the study including any available data relating to the river catchments in this area. Where required, surface water samples will be collected in order to provide a baseline set of water quality results for the area. Biological Assessments of the rivers will also be carried out, if required.

As part of the Flood Risk Assessment (further detailed below), TOBIN will also assess the potential for siltation as a result of the proposed development, particularly during the construction phase and propose mitigation measures for associated pollution control. Any existing siltation management practices will be reviewed as part of this assessment.

Groundwater Assessment:

Further to the groundwater assessment detailed in the "Geological and Hydrogeological" section, TOBIN will also carry out the following studies as part of the EIA:

- Aquifer assessment;
- Impact assessment on water schemes/water supplies.

Water Quality Assessment:

As detailed above and in the "Geological and Hydrogeological" section, TOBIN will complete the following as part of the EIA:

- Conduct water sampling (surface water and groundwater where possible) in accordance with industry standards;
- Establish baseline/existing conditions, identify potential impacts and propose appropriate mitigation measures.

Flood Risk Assessment (FRA):

Having reviewed the mapping produced in March 2012 as part of the OPW's Preliminary Flood Risk Assessment (PFRA), it is assumed that a site specific Flood Risk Assessment will be required. Based on the PFRA mapping, it is estimated that the primary source of flood risk at the site is fluvial, i.e. from rivers and streams. Due to the nature of the site, generally bog, pluvial flooding (ponding of rainwater) may also be an issue.

The Flood Risk Assessment completed for this project will include the following works:

- Review of available information, planning guidelines and historical flooding records;
- Topographical survey of site, including survey of smaller water courses;
- Assessment of hydrometric data (water levels and flows) for adjacent water bodies; and
- Assessment to take cognisance of climate change and the 1 in 100 year to 1 in 1000 year flood events.

The Flood Risk Assessment will be completed for the overall site and detailed within the EIS. This assessment shall include undertaking the following tasks:

1. A visual Inspection of site and watercourses by hydrologist;
2. Site Topographical Survey;
3. Site survey of watercourses for hydraulic modelling (excluding a survey of the Shannon for reasons explained below,);
4. A review of existing information and planning guidelines;
5. An assessment of historical flooding;
6. Estimation of the 100 and 1000 MRFS (Mid-Range Future Scenario) design flood events at the proposed Derryadd Wind Farm site, as recommended by *'The Planning System and Flood Risk Management Guidelines'*. The hydrological assessment of the site may include:
    i. Statistical estimation of design flood flow from available hydrometric data (following an initial review of the site it is not expected that there is any annual maxima flood data available for either watercourse);
    ii. Analysis of watercourses using the OPW's Flood Studies Update Portal; and
    iii. Estimation of design flood flow from catchment descriptors and rainfall.

7. Hydraulic Modelling, using HEC-RAS or similar, of watercourses for the 100 and 1000 year design flood events. Where possible, the model shall be calibrated against historical and gauged flow data if available from the OPW and EPA hydrometric station network in the vicinity of the site. Hydraulic modelling of the Shannon is not proposed;
8. Modelling and assessment of one flood risk solution proposed by the design team; and
9. Floodplain Mapping for the 100 and 1000 year MRFS design flood events for the watercourses.

Modelling of the River Shannon was completed in November 2014 by Jacobs, as part of the Shannon CFRAM Study. At this stage, it is not envisaged that additional modelling of the Shannon is likely to be required in order to carry out a site specific Flood Risk Assessment for the proposed wind farm.

TOBIN will complete the Flood Risk Assessment, Hydrological, Drainage & Surface Water Quality Impact Assessment (which will inform the Civil Design).

8.6 CUMULATIVE EFFECTS

Based on the evaluation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction of the proposed wind farm.

8.7 APPROPRIATE ASSESSMENT

European Sites (Natura 2000), i.e. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), are classified under the European Union Birds Directive (2009/147EC) and Habitats Directive (92/43/EEC). The procedures that must be followed when considering developments affecting a Natura 2000 site are specified in Articles 6(3) and 6(4) of Habitats Directive.

The proposed development lies along the Shannon River Corridor, with European sites to the north and south, potentially within the ‘zone of influence’ of the proposed development, where the potential for indirect and/or in combination impacts exists. The potential for significant adverse effects on any Natura 2000 sites from the proposed development alone or in combination with other plans or projects will be determined through the Appropriate Assessment process, under the requirements of Article 6 of the EU Habitats Directive, taking account of direction and rulings from the European Court of Justice and the following guidance documents:

- ‘Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities’ (DEHLG, 2010);
- ‘Guidance document – Managing Natura 2000 Sites: The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC’ (European Commission, 2000);
- ‘Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC’ (European Commission, 2002); and
- ‘Article 6(4) of the ‘Habitats Directive’ 92/43/EEC – Clarification of the Concepts of Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission’ (European Commission, 2007);

The initial stage of the Appropriate Assessment process is the preparation of a Screening Report which identifies those Natura 2000 sites where there is the potential for significant adverse effects on the qualifying interests of these sites. This screening process will allow for the identification of which designated Natura 2000 sites require further detailed assessment within the Natura Impact Statement reporting process which will inform the overall Appropriate Assessment, to be completed by the designated Competent Authority.

9 SOILS AND GEOLOGY, GEOTECHNICS AND GROUND STABILITY

9.1 INTRODUCTION

A desk study shall be undertaken to acquire all available topographic, geological, geotechnical and hydrogeological data (including geotechnical and site stability data) for the proposed development site and surrounding area. The desk study will include a geotechnical risk assessment to identify and mitigate potential issues that may arise during the construction stage (including karst risk and geomorphology features).

9.2 STUDY AREA

The EIS study area, known as Derryadd Wind Farm, comprises of three Bord na Móna Bogs (Derryaroge, Derryadd and Lough Bannow Bogs), located in County Longford.

9.3 SENSITIVE RECEPTORS

There are currently no known geological sensitive receptors at the outset of the scoping process and prior to site investigation. This will be reviewed as further data are collected.

9.4 DESKTOP AND FIELD SURVEY

Consultation will be undertaken and feedback requested from a number of statutory bodies;

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on proposed Natural Heritage Areas (pNHAs), County Geological Sites (CGS) and any recorded Landslide Events (from the historical landslide database) in the region of the study area will be requested;
- Irish Peatland Conservation Council;
- Inland Fisheries Ireland (IFI) –Eastern River Basin District;
- The Environmental Protection Agency (EPA);
- The Local Authority Environment Officer; and
- Scoping of geotechnical aspects of the EIA for peat sites will be agreed in conjunction with the multidisciplinary team, including but not limited to Geotechnical Engineer, Hydrogeologist, Hydrologist, Ecologist and the requirements of any and all of the design team as necessary e.g. Engineering designers deciding on access route types and construction methodologies.

The evaluation will include:

- Desk study of soils, subsoils, bedrock, geological maps and aerial photography;
- Geomorphology assessment and mapping will be undertaken of geomorphological features;
- Site Investigation works will be specified in conjunction with the requirements of the designers and undertaken during the summer period of 2016. The site investigation will provide detail on soils, geology, peat types and depths and potential requirements for water management and drainage. Investigations may include:
  - ❖ Trial pitting;
  - ❖ Cobra Probes;
  - ❖ Boreholes (drilling methods and depths to be determined as part of specification);
  - ❖ In-situ Standard Penetration Test (SPT) testing and sampling; and
  - ❖ Ground Water Monitoring Installation.
- The nature and requirements of the potential peat management will be informed by the information from the site investigation, site surveys and visits and the evaluations undertaken by the multi-disciplinary team:
  - ❖ Geohazard Mapping & Risk Assessment;
  - ❖ Complete Peat Assessment;
  - ❖ Assessment methodology of geotechnical considerations of peat sites to follow industry best practices guidance (e.g. Scottish Executive Guidelines, Peat Landslide Hazard and Risk Assessments Best Practice Guide for Proposed Electricity Generation Developments, 2006, IWEA Best Practice Guidelines for the Irish Wind Energy Industry, 2012); and
  - ❖ Stability Assessments (ground, slope and/or peat) – qualitative & quantitative assessments in accordance with industry standards – for the site for all stages of the project, with hazard assessment and proposed mitigation measures where appropriate
- Development of Geotechnical Risk register;
- Design of appropriate erosion and sediment control measures; development of erosion and sediment control procedures for implementation on site;
- Design and installation of monitoring wells, piezometers and surface hydrometric structures where required;
- Conduct preliminary geotechnical site investigations to inform the following:
  - ❖ Identify the depth of peat across the site & any required specialist peat parameters e.g. shear vane strength etc;
  - ❖ Access routes construction methodology;
  - ❖ Cable route construction methodology;
  - ❖ Foundation construction methodology;
  - ❖ Borrow Pits / quarry potential;

- ❖ Earthworks and Material Balance calculations (rock won on site in relation to rock fill required during construction of roads, hardstands, crane pads etc.);
- ❖ Peat Management Works;
- ❖ Groundwater management, as required;
- ❖ Drainage Design;
- ❖ Overburden (Soils/Peat) Storage and management;
- ❖ Temporary works design; and
- ❖ Site Reinstatement, to be aligned with the existing site rehabilitation plan (including erosion control).

- Geohazard Mapping & Risk Assessment; and
- Interpretation and reporting of all geological & geotechnical data with reference to data within the Geotechnical & Soil Stability Report.

9.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction of the proposed wind farm.

10 AIR AND CLIMATE

10.1 INTRODUCTION

The purpose of the Air Quality and Climate assessment will be to assess the potential impacts of the proposed wind farm on the Climate and Air environments. The development of renewable energy is identified as having the potential to be a clean form of energy production and as such to have a potential net beneficial effect on the Air Quality and Climate environments.

10.2 STUDY AREA

The proposed development is located approximately 1km from Lanesborough, while the villages and towns of Keenagh, Derryaghan and Killashee are located to the southeast, west and north east of the site respectively. The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland.

10.3 SENSITIVE RECEPTORS

A number of existing air quality (dust monitoring) locations exist in relation to the IPC licence requirements for peat extraction activities at the location of the Derryadd Wind Farm, which are used for the purpose of air quality monitoring. Measurement results from these locations will be reviewed and evaluated in order to assess the current environment in relation to sensitive (residential) receptors.

10.4 DESKTOP AND FIELD SURVEY

The climate assessment within the EIS will consist of a general overview of the climate for the Midlands Region. Specific meteorological data for the site will be obtained from the nearest meteorological and synoptic stations (data from Met Éireann). This information will provide historical and existing baseline information for the regional climate in this area.

Additional, albeit limited, meteorological information will also be obtained from the two on-site meteorological masts located at Derryaroge Bog and Lough Bannon Bog.

The positive effects that wind farm developments have on climate will also be discussed in this chapter, as well as a CO_2 balance calculation for the proposed development.

This air quality assessment will include the findings of a desk-based air quality assessment using available data from the Environmental Protection Agency in consideration of the Air Quality Standards Regulations, 2002 (SI No. 271 of 2002) and the EU Air Framework Directive.

As stated above, the air quality assessment will also utilise any dust deposition measurements which are available under the IPC licence requirements for peat extraction activities at the location of the Derryadd Wind Farm.

10.5 CUMULATIVE EFFECTS

It is not anticipated at this stage of EIA that the potential development of the proposed wind farm is likely to give rise to significant negative air quality or climatic effects. As the energy generation during the operational phase of a wind farm is undertaken without combustion, it is considered to have a net beneficial effect in terms of the air quality and climatic environment.

11 NOISE AND VIBRATION

11.1 INTRODUCTION

The purpose of the Noise and Vibration assessment will be to assess the potential impacts of the proposed wind farm to sensitive receptors in the surrounding environment.

11.2 STUDY AREA

As detailed in Chapter 5 of this Scoping Report, all properties within 2.5km of the boundary of the Bord na Móna lands will be mapped as potential constraints. Properties will include residential dwellings, commercial properties, derelict buildings, agricultural buildings and pre-planning infrastructure (including houses submitted for planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development.

11.3 SENSITIVE RECEPTORS

A baseline noise monitoring survey will be completed at the proposed development site and at the most sensitive receptors adjacent to the site. This assessment will comply with the following standards;

- Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4) (EPA 2012) – Enforced by the EPA in May 2012; supersedes the EPA Environmental Noise Survey Guidance Document (EPA 2003);
- Description and Measurement of Environmental Noise - ISO 1996 (2003);
- Wind Energy Guidelines (DoE, 2006);
- Draft revision to the Wind Energy Guidelines (DoE 2013);
- Best Practice Guidelines for the Irish Wind Energy Industry – IWEA 2012;
- ETSU-R-97 specification for wind turbine noise assessment;
- Guidance Note on Noise Assessment of Wind Turbine Operations at EPA Licensed site (NG3)(where appropriate); and
- UK Institute of Acoustics, “A Good practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise” (2013).

11.4 DESKTOP AND FIELD SURVEY

The baseline work will characterise the noise climate existing in the area, and facilitate the quantification of potential noise impact which may arise from the proposed development. It is envisaged that the main noise impacts associated with the proposed development will be construction activity. The impact predictions will include the following:

- Noise and vibration during the Construction Phase; and

- Noise and vibration during the Operational Phase.

All measured noise levels and discussion of the relative noise contributors from the baseline assessments will feed into the modelling process. Noise modelling will be carried out in full accord with the following guidance documents:

- Irish Wind Farm Planning Guidelines issued by the Department of the Environment, Heritage and Local Government; and
- Best Practice Guidelines for the Irish Wind Energy Industry – IWEA 2012.

The modelling for the Noise and Vibration assessment will be carried out using the proprietary WindPro wind farm modelling package or similar. This software has separate but complimentary modules which cater specifically to the modelling of noise and vibration for proposed Wind Farm Applications.

11.5 CUMULATIVE EFFECTS

Due to the distance of the proposed Derryadd Wind Farm from other permitted wind farm developments and major infrastructure, it is not anticipated that cumulative noise will be a significant issue in the vicinity of the proposed development, However, the scoping stage of the EIA will confirm if potential cumulative wind farm noise can be scoped out, as expected, due to the distances involved to other developments.

12 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

12.1 INTRODUCTION

The proposed Landscape and Visual Impact Assessment (LVIA) Methodology for this project is outlined in the 'LVIA Processes' Figure provided below.

12.2 STUDY AREA

Following a detailed review of the study area, the County Development Plans for Counties Longford, Westmeath, Roscommon and Leitrim will be reviewed to inform the EIA in the context of the Landscape policies of those local authorities.

12.3 SENSITIVE RECEPTORS

Sensitive receptors as identified in the relevant County Development Plans will inform the selection of viewpoint assessment locations for the purpose of the landscape and visual impact assessment.

12.4 SURVEY METHODS

12.4.1 Desktop and Field Survey

A Landscape Character Assessment (LCA) of the study area/receiving environment will be prepared in accordance with standardised methods (Landscape Institute Guidelines for Landscape & Visual Impact Assessments (3rd Ed.) 2013, etc.), and DoEHLG approved methodologies including desktop reviews and site visits and preparation of reports.

Baseline studies will involve a comprehensive review of County Development Plans, policy documents and map data. In terms of the landscape baseline, this will principally focus on the relevant County Landscape Character Assessments (LCA), which will be used as the basis for a project specific LCA.

Through collaboration with the project Cultural Heritage Specialist, an Historic Landscape Character Assessment (HLCA) will also support the project LCA. It is expected that this cultural heritage 'layer' will strongly correspond with the physical landscape attributes and features of this bog area, particularly in relation to settlement patterns and lines of travel.

Visual baseline studies will focus on designated scenic views, settlements, transport routes and amenity areas.

Photomontages:

Photomontages will be produced that are fully compliant with the most recent SNH guidelines (2014).

In the case of Derryadd Wind Farm, it is anticipated that approximately 30 no. viewpoints will be required overall. From the experience of the project team in producing photomontages in lowland landscapes, views tend to be either contained (from within the lowlands) or, alternatively, vast panoramas (from isolated hills). It is imperative that base photography is captured in the clearest of viewing conditions, especially where existing turbines are contained within the view.

Assessment and Reporting:

In accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA-2013), which is the industry standard, a separate appraisal of landscape impacts and visual impacts will be provided. The Landscape and Visual Chapter will be supported by numerous in-text maps, graphics and images to aid the understanding of the reviewer. Where a project such as this requires the assessment of a considerable number of viewpoints (approximately 30 no.), the landscape specialist will provide the individual assessments as a separate appendix in order that the EIS Chapter does not become unwieldy and remains focused on the key findings of the appraisal.

The following tools will be used to inform the LVIA study for the Derryadd Wind Farm project:

Route Screening Analysis (RSA):

The project team landscape specialist has developed a 360° vehicle mounted photo-capture unit to gather imagery every second (approximately 15m intervals). The images are then synchronised with a 3D model of the proposed development for rapid analysis of screening levels. When used in vegetated lowland landscapes, RSA has shown actual visibility to be much less than indicated by traditional Zone of Theoretical Visibility (ZTV) maps (as much as 90% lower).

360° On-line Photomontage Viewer:

The project team strongly believe that the next imminent step in photomontage viewing for assessors and the public alike will be via a computer screen rather than the heavy volumes of costly photomontages placed in County Council Offices. This has already been recognised by Scottish Natural Heritage who require applicants to submit photomontages in a format that will be compatible with their own 360° viewer. With this in mind, the landscape specialist will shoot all photography in 360° and will develop an on-line photomontage viewer, which will be

calibrated to a 24 inch screen allowing the viewer to pan around the image as if turning their head. This resource has been found to be of particular benefit to the project team for design stage discussions as several options can be viewed in parallel.

'Pano-pod' Photomontage Display Units:

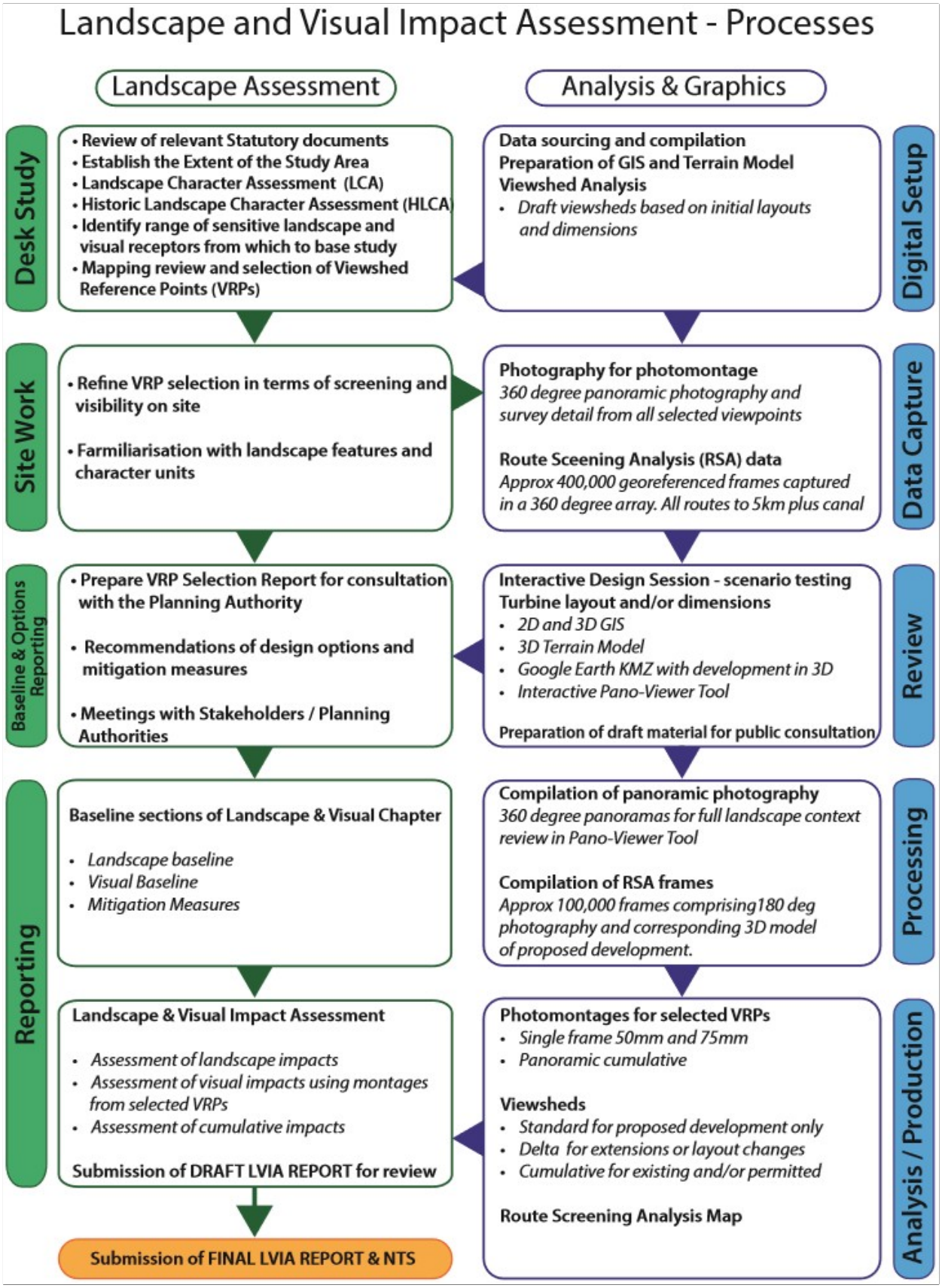
These unique viewing units have been designed to counter the limitations of viewing wide angle photomontages in flat projection (distortion and confusion). They allow the viewer to stand within a curved 180° backlit unit to experience a view of the proposed development as close to reality as possible. They will be used for public consultation events associated with the Derryadd Wind Farm project.

'Live Layout' Modelling:

Live Layout modelling is a highly efficient way of examining design options in real-time. This is most effective in a workshop scenario where a range of specialists can discuss likely effects with respect to their own disciplines as options evolve and are tested. Turbine layouts can be reviewed from a range of receptor locations 'toggling' between the 3D model and Google 'Street View' to give a sense of the reality of turbine moves. The project team will employ a similar process (incorporating a highly accurate GPS) when selecting viewpoints for the Derryadd Wind Farm project in the field, as it will allow the assessor to understand exactly where the proposed turbines will emerge in the view from any particular location within the study area.

12.5 IMPACT ASSESSMENT

The impact assessment will closely follow that indicated in the following flow chart:


Landscape and Visual Impact Assessment - Processes
Landscape Assessment
Analysis & Graphics
Desk Study
• Review of relevant Statutory documents
• Establish the Extent of the Study Area
• Landscape Character Assessment (LCA)
• Historic Landscape Character Assessment (HLCA)
• Identify range of sensitive landscape and visual receptors from which to base study
• Mapping review and selection of Viewshed Reference Points (VRPs)
Data sourcing and compilation
Preparation of GIS and Terrain Model
Viewshed Analysis
• Draft viewsheds based on initial layouts and dimensions
Digital Setup
Site Work
• Refine VRP selection in terms of screening and visibility on site
• Farmiliarisation with landscape features and character units
Photography for photomontage
360 degree panoramic photography and survey detail from all selected viewpoints
Route Sceening Analysis (RSA) data
Approx 400,000 georeferenced frames captured in a 360 degree array. All routes to 5km plus canal
Data Capture
Baseline & Options Reporting
• Prepare VRP Selection Report for consultation with the Planning Authority
• Recommendations of design options and mitigation measures
• Meetings with Stakeholders / Planning Authorities
Interactive Design Session - scenario testing
Turbine layout and/or dimensions
• 2D and 3D GIS
• 3D Terrain Model
• Google Earth KMZ with development in 3D
• Interactive Pano-Viewer Tool
Preparation of draft material for public consultation
Review
Reporting
Baseline sections of Landscape & Visual Chapter
• Landscape baseline
• Visual Baseline
• Mitigation Measures
Compilation of panoramic photography
360 degree panoramas for full landscape context review in Pano-Viewer Tool
Compilation of RSA frames
Approx 100,000 frames comprising180 deg photography and corresponding 3D model of proposed development.
Processing
Landscape & Visual Impact Assessment
• Assessment of landscape impacts
• Assessment of visual impacts using montages from selected VRPs
• Assessment of cumulative impacts
Submission of DRAFT LVIA REPORT for review
Photomontages for selected VRPs
• Single frame 50mm and 75mm
• Panoramic cumulative
Viewsheds
• Standard for proposed development only
• Delta for extensions or layout changes
• Cumulative for existing and/or permitted
Route Screening Analysis Map
Analysis / Production
Submission of FINAL LVIA REPORT & NTS

12.6 CUMULATIVE EFFECTS

Cumulative impacts will be assessed in accordance with the SNH guidance note for 'Assessing the cumulative impact of onshore wind energy developments' (2012) taking account of 'Combined Views' 'Succession Views' and 'Sequential Views'. The landscape specialist will use their own on-line viewer (see detailed description above) to compare 360° photography against corresponding 360° cumulative Wireframe images to aid the cumulative impact assessment.

13 SHADOW FLICKER

13.1 INTRODUCTION

The purpose of the Shadow Flicker assessment will be to assess the potential impacts of the proposed wind farm to sensitive receptors in the surrounding environment.

13.2 STUDY AREA

The turbine envelope and layout has not yet been finalised and as such the study area in relation to Shadow Flicker will be guided by the proposed infrastructure layout.

13.3 SENSITIVE RECEPTORS

The envelope within which sensitive receptors will be evaluated will be determined by the size, scale and layout of the final wind farm.

13.4 DESKTOP AND FIELD SURVEY

The extent and impact of Shadow Cast Analysis and Shadow Flicker depends on the relative positions and orientation of nearby houses and wind turbines, the presence of windows facing on to the proposed wind farm, the absence/presence of vegetation or other obstructions between the houses and the wind farm etc. This will be assessed as part of the EIA.

Windpro Computer Modelling software will be employed, for this element of the assessment, through the use of the shadow module. This facilitates calculation and documentation of flickering effects in terms of hours per year during which a specific receptor or an area would be exposed to flickering from nearby turbine rotors.

For each receptor or area maximum minutes per day are calculated. SHADOW can calculate the Worst Case results (sun always shining in daytime, turbines always rotating and wind direction "worst case") or the "real expected values", based on assumptions on solar statistics and operating hours divided by wind direction. Calculations can be made either for a set of shadow recipients (e.g. windows) or for a user defined area.

13.5 CUMULATIVE EFFECTS

Results will be presented in the form of calendars, cumulated hours with flicker or, for the area calculation, as maps of flicker hour isolines.

14 AVIATION, TELECOMMUNICATIONS & ELECTROMAGNETIC INTERFERENCE

14.1 INTRODUCTION

This chapter will detail the telecommunications baseline environment of the proposed development site and identify the possibility of interference occurring to TV and radio transmissions as a result of the wind turbine implementation.

14.2 STUDY AREA

The Telecoms and Aviation Consultants will identify operators of telecoms and aviation assets and determine, through consultation with them, whether there is potential interaction or interference with the assets within the study area as a result of the potential development.

14.3 SENSITIVE RECEPTORS

As part of the study of potential impact to telecommunications and aviation operators by the Derryadd Wind Farm, many of the identified stakeholders have been approached in advance of turbine details being made available. Whilst many organisations will not respond to such approaches without the details of the turbines, some organisations have already performed an initial analysis and responded with some draft details. A list of the consultees contacted as part of the Derryadd Wind Farm *"Aviation, Telecommunications and Electromagnetic Interference"* assessment is included in Appendix B.

14.4 DESKTOP AND FIELD SURVEY

The Television and Radio Impact Assessment will include:

- Identification of sources of local TV and radio reception;
- Identification of local telecommunications transmitters;
- Site surveying of telecommunications infrastructure including a microwave link survey;
- Determining if the turbines are in the path between the receptors and transmitter;
- Liaison with RTÉ as required to assess impacts and address any queries or issues should they arise;
- Carrying out an baseline interference assessment; and
- Providing recommendations for pre and post construction monitoring.

The Radar, Telecommunications and Aviation Impact Assessment will include:

- Identification of local telecommunications and aviation microwave links;

- Desktop assessment of all identified aviation infrastructure and aviation routes which could potentially be impacted by the proposed development;
- Liaison with all relevant Radar, Telecommunications and Aviation operators to assess impacts and address any queries or issues should they arise;
- Determining if the turbines are in the path between the receptors and transmitter;
- Examining the interference scenario;
- Identification of predicted impacts;
- Mitigation Studies;
- Measurement of existing electromagnetic environment and statement regarding future compliance to relevant regulations; and
- Providing recommendations for pre and post construction monitoring.

14.5 CUMULATIVE EFFECTS

The potential for cumulative impacts is considered as negligible because the interference that is generated from a wind turbine is directly related to the presence of that turbine in the path of television or communication link signal and less likely to be generated from multiple cumulative reflections.

15 TRAFFIC AND TRANSPORTATION

15.1 INTRODUCTION

The purpose of the traffic impact assessment will be to assess the potential impacts of the proposed wind farm on the surrounding roads and potential sensitive receptors. The potential requirement for construction stage traffic management will be assessed as part of the EIA process.

15.2 STUDY AREA

The proposed development is located approximately 1km from Lanesborough, while the villages of Keenagh and Killashee lie to the southeast and east at distances of approximately 3km and 2km respectively. The village of Derraghan is located immediately west of the study area. The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland.

15.3 SENSITIVE RECEPTORS

As detailed in Section 5, sensitive receptors in the vicinity of the proposed Derryadd Wind Farm will be identified as part of the scoping and EIA process.

15.4 DESKTOP AND FIELD SURVEY

The primary traffic related impact caused by a wind farm generally occurs during the construction stage of the project. As such, the traffic assessment within the EIS will focus on the impacts that will be associated with the construction of the Derryadd Wind Farm. From the site investigation works, the quality of the materials that will be arising from excavations will be considered and peat/overburden will be side casted or deposited in a peat repository (if required). The presence of sand and gravel on-site is also noted and it is expected that this will be exploited in order to minimise traffic movements to and from the site. The wind farm will also be designed such that all surplus excavated materials will be used on-site for landscaping purposes thereby minimising the volume of materials leaving the site, reducing the cost of disposal and minimising the construction traffic.

Using aerial photography and mapping, haul routes will be identified for the construction process. These haul routes will be confirmed by undertaking a site visit and driving the proposed haul routes. A qualitative assessment of the proposed haul routes will be carried out identifying pinch points, tight bends, poor pavement conditions etc. and the haul routes will be revised where necessary. Swept path analysis will be undertaken by the traffic specialists to inform the assessment,

The traffic team will also look at traffic access to the site from the public road network, including existing sightlines and advise on any limitations. They will consider if the existing site access is appropriate for construction and work vehicles to enter and exit the site in a safe manner.

Using information on the project construction methodology, an estimate of the number of vehicles (both light and heavy vehicles) that would be generated by the construction phase, will be produced. These estimates can be used to assess the impact on the road network in numerical terms and will also feed into other EIS chapters such as noise and air quality. The Road/Traffic Sections of Longford and Roscommon County Councils will be consulted and relevant information will be taken into consideration.

The Traffic Chapter of the EIS will be completed, taking into consideration the information generated during the processes described above, identifying impacts and proposing mitigation measures where appropriate.

Typically, wind farms are located in rural areas and this poses challenges for the delivery of abnormal load turbine components to site. The proposed Derryadd Wind Farm is no different in this respect and so one of the key roads and traffic issues will be identifying a suitable haul route for the successful and safe delivery of turbine components to site.

Traffic management measures will be considered to ensure that any increase in activity along the public road network during construction does not result in an increase in safety hazards.

15.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction.

16 CONSULTATION

16.1 SCOPING CONSULTATIONS

Following the anticipated initial design of the Derryadd Wind Farm layout and turbine locations in August 2016, it is proposed that the project team will commence consultation with the bodies listed below, in order to allow sufficient time for receipt of meaningful feedback.

It is also proposed to consult with An Bord Pleanála prior to submission of a planning application for the development.

Consultee
Longford County Council – Planning, Environment, Roads
Roscommon County Council - Planning, Environment, Roads
Department of Communications, Climate Action and Environment
Inland Fisheries Ireland
Geological Survey of Ireland
Transport Infrastructure Ireland
An Taisce
BirdWatch Ireland
Teagasc
The Heritage Council
Department of Transport, Tourism & Sport
Irish Raptor Study Group
Fáilte Ireland
Waterways Ireland
Department of the Arts, Heritage & Gaeltacht
Environmental Protection Agency
National Parks and Wildlife Service
Health & Safety Authority
Sustainable Energy Authority of Ireland
Irish Wildlife Trust

Consultee
Irish Peatland Conservation Council
HSE West
ISPCA (Longford office)
Bat Conservation Ireland
Department of Agriculture, Marine and Food
Commission for Energy Regulation
Midlands Energy Agency
TowerCom Ltd
Mosaic (Meteor)
Irish Aviation Authority
Eircom (Radio Division)
Airspeed
Department of Defence/ An Garda Siochana (Comms)
Netshare Ireland/Vodafone
Tetra Ireland Communications Ltd
Imagine
BT Communications Ireland Ltd
Three (Hutchison 3G Ireland Ltd)
UPC
ESB Telecom services
ESB Telecoms
Mosaic (02 & Three combined)
Broadcasting Authority of Ireland
RTE NL /2RN
Digiweb
Sigma
Lanesborough Fire Station
National Ambulance Service
Three (02)

Consultee
EOBO Ltd (Bbnet)
Ripplecom
Northern Sound Longford
Shannonside Radio
iradio athlone
Magnet
RNLI
Coastguard
Onwave broadband
Premier broadband
Eurona Arden broadband
Abbeyshrule aerodrome
Trim Airfield
Pure Telecom (Sio)
Q Sat (Sio)
Europasat
Knock Airport
Shannon Airport

16.2 PUBLIC CONSULTATIONS

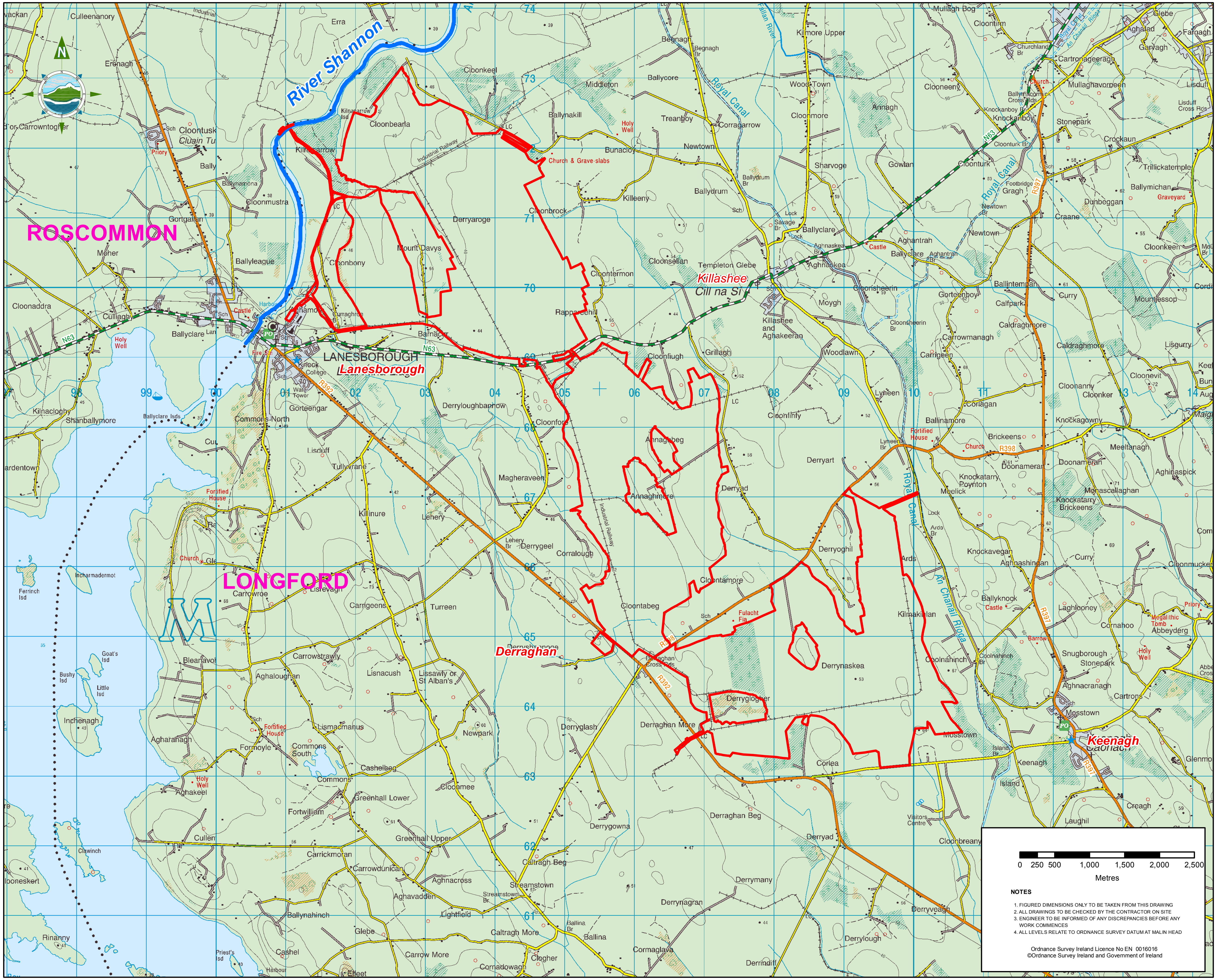
In January 2016, Bord na Móna conducted initial public consultation events at four locations in the vicinity of the proposed Derryadd Wind Farm to facilitate engagement with the local communities. In September/October 2016, it is proposed to conduct a second round of public consultation events at four locations to further consult with the local communities.

As part of its ongoing engagement during the year, Bord na Móna has arranged site visits to its existing Mount Lucas Wind Farm for local residents adjacent to the proposed Derryadd Wind Farm, and it is also proposed to establish an Engagement Forum which will have an independent chairperson and will consist of members of the local communities.

TOBIN will be providing assistance and direction as needed as part of the public engagement, particularly in relation to the topic of Community Benefit Schemes that may be operated by Bord na Móna.

APPENDIX A

Figures 1 and 2 - Site Location/Study Area Map
"Preferred Locations", County Development Plan



Legend

Study Area

A	AUG 2016	Information Issue	GF	ST
Issue	Date	Description	By	Chkd.

Client:

BORD NA MÓNA
Naturally Driven

Project:

DERRYADD WINDFARM

Title:

Site Location Plan

Scale @ A3: 1:50,000

Prepared by: G.Fil
Checked: S. Tinnelly
Date: August 2016

Project Director: D. Grehan

TOBIN
Patrick J. Tobin & Co. Ltd.

Consulting, Civil and Structural Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: info@tobin.ie
www.tobin.ie

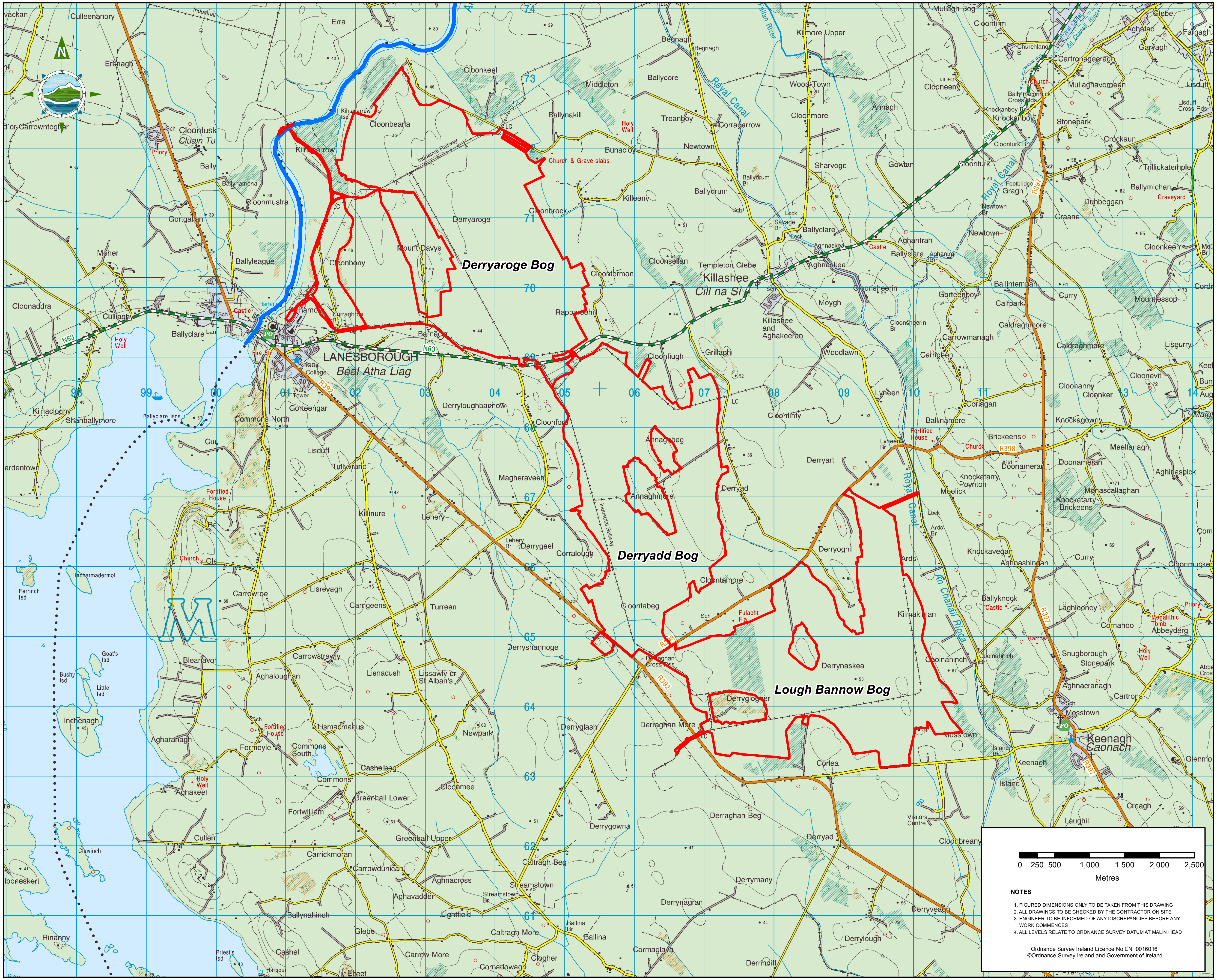
8057-Figure 1

Issue: A

0 250 500 1,000 1,500 2,000 2,500
Metres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD



Legend

Study Area

A	AUG 2016	Information Issue	GF	ST
Issue	Date	Description	By	Chkd.

Client:

BORD NA MÓNA
Naturally Driven

Project:

DERRYADD WINDFARM

Title:

Site Boundary Map

Scale @ A3: 1:50,000

Prepared by: G.Fil
Checked: S. Tinnelly
Date: August 2016

Project Director: D. Grehan

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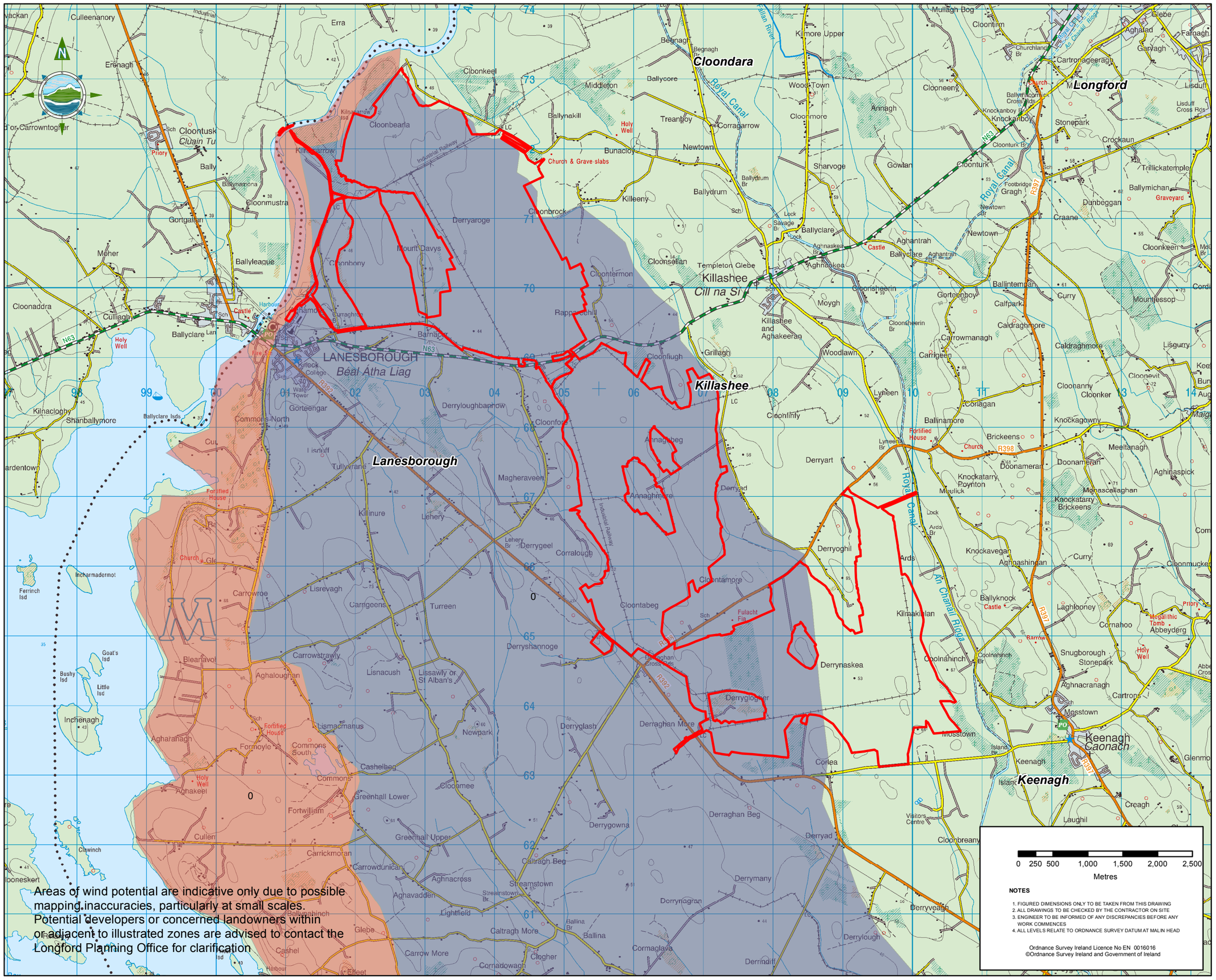
8057-Figure 2

Issue: A

0 250 500 1,000 1,500 2,000 2,500
Metres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD



Legend

- Study Area

County Development Plan

- Preferred Locations
- Non-Preferable Locations

Issue	Date	Description	By	Chkd.
A	June 2016	Information Issue	MN	ST

Client: Bord na Móna — Naturally Driven

Project: DERRYADD WINDFARM

Title: County Development Plan

Scale @ A3: 1:50,000

Prepared by:	Checked:	Date:
M. Nolan	S. Tinnelly	June 2016

Project Director: D. Grehan

0 250 500 1,000 1,500 2,000 2,500

Metres

NOTES

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8057-1002

Issue: A

APPENDIX B

List of “Aviation, Telecommunications and Electromagnetic Interference” Consultees

DERRYADD WIND FARM

"AVIATION, TELECOMMUNICATIONS AND ELECTROMAGNETIC INTERFERENCE" CONSULTATION LIST, 2016

Organisation
TOWERCOM
Meteor (MOSAIC)
Irish Aviation Authority
Eircom/Eir
Airspeed
Department of defence
Netshare Ireland/vodafone
Tetra Ireland
IMAGINE
BT
THREE (H3G)
UPC
Garda Siochana
ESB Telecom services
ESB Telecoms
MOSAIC (02 & Three combined)
BAI
RTENL /2RN
Digiweb
Dublin airport / Cork airport (DAA)
Sigma
Longford fire station
National Ambulance Service
Three (02)
EOBO Ltd (Bbnet)
Ripplecom
Northern Sound Longford
Shannonside
iradio Athlone
Magnet
RNLI
Coastguard
Onwave broadband
Premier broadband
Eurona Arden broadband
Abbeyshrule aerodrome
Trim Airfield
Pure Telecom
Q Sat
Europasat

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