



AA Screening and Natura Impact Statement

Knockanarragh Wind Farm Ltd.

Prepared by:

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N2Y7

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1.0 Introduction

1.1 Overview of the Proposed Development

The Proposed Development consists of the following elements, described in summary here and in more detail at Stage 2 in section 4.1:

- Turbines and associated infrastructure,
- Turbine delivery route,
- Cable route; and
- Habitat enhancements.
- The Proposed Development will be located west of the N52 National Road from Delvin to Clonmellon in the townlands of Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Ballinlig, Carnybrogan, Cavestown and Rosmead in County Westmeath and townland of Galboystown in Co. Meath. The Proposed Development is approximately 1 km southwest of the village of Clonmellon and c. 2.8 km northeast of Delvin, in Co. Westmeath (refer to **Figure 1** for location of the Proposed Development).
- Temporary accommodation works to facilitate turbine delivery is proposed within the following townlands: Robinstown Little, Robinstown Great, Clonarne, Moyleroe Little, Moyleroe Big, Mitchelstown, Castletowndelvin, Clonyn, Billistown, Cartenstown, Ballynacor, Hiskinstown, Williamstown (Rochford), Williamstown (Briscoe), Ballygillin, Reynella, Crosserdree, Tevrin, Killynan (Pratt), Killynan (Cooke), Mountrobert, Macetown, Rathconnell, and Ballagh.

The planning application for the Proposed Development will be submitted with a supporting Environmental Impact Assessment Report, based on, *inter alia*, ecology survey work undertaken between 2019 and 2022. Full detail of ecological survey is provided in Stage 2, refer to **Table 4-7**.

1.2 Relevant Legislation

The Habitats Directive (Council Directive 92/43/EEC (as amended) on the Conservation of Natural Habitats and of Wild Fauna and Flora) requires all Member States to establish a strict protection regime for species listed in Annex IV, both inside and outside European sites and forms the basis for the designation of Special Areas of Conservation (SACs) and a precursor designation Sites of Community Interest (SCI). Similarly, Special Protection Areas (SPAs) are classified under the Birds Directive (Council Directive 2009/147/EEC (as amended) on the Conservation of Wild Birds). Collectively, SACs, SCIs and SPAs and candidate sites are referred to as European Sites. The European Sites Network is the minimum required to conserve certain habitats and species which are listed in the Directives.

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment (AA) must be undertaken for any plan or project that is not directly connected with or necessary to the management of a Natura 2000 site but is likely to have a significant effect thereon, either individually or in combination with other plans or projects. An AA is an assessment of whether a project will, individually or in combination with any other plan or project, adversely effect the integrity of a European Site in view of the site's conservation objectives.

Article 6, paragraph 3 of the European Commission Habitats Directive 92/43/EEC ("the Habitats Directive") as defined above states that:-



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

1.2.1 Planning and Development Act 2000 (as amended)

These processes have been further enshrined in the Planning and Development Act 2000 (as amended), in sections 177T, 177U and 177V, which are as follows:

- s177T(1)(b) A Natura impact statement means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites.
- (2) Without prejudice to the generality of subsection (1), a Natura impact report or a Natura impact statement, as the case may be, shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites.
- 177U. — (1) A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site.
- (4) The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.
- s177U(5): The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is not required if it can be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site
- 177V. — (1) An appropriate assessment carried out under this Part shall include a determination by the competent authority under Article 6.3 of the Habitats Directive as to whether or not a draft Land use plan or proposed development would adversely affect the integrity of a European site and an appropriate assessment shall be carried out by the competent authority, in each case where it has made a determination under section 177U(4) that an appropriate assessment is required, before — ... (b) consent is given for the proposed development.
- 177V. – (2) In carrying out an appropriate assessment under *subsection (1)* the competent authority shall take into account each of the following matters: (a) the Natura impact report or Natura impact statement, as appropriate; (b) any supplemental information furnished in relation to any such report or statement; (c) if appropriate, any additional information sought by the authority and furnished by the



applicant in relation to a Natura impact statement; (d) any additional information furnished to the competent authority at its request in relation to a Natura impact report; (e) any information or advice obtained by the competent authority; (f) if appropriate, any written submissions or observations made to the competent authority in relation to the application for consent for proposed development; (g) any other relevant information.

1.3 Purpose of Report

The purpose of this Natura Impact Statement (NIS) is to provide the information for the competent authority, in this case An Bord Pleanála, to carry out a screening assessment and, if applicable, an Appropriate Assessment (AA) of the Proposed Development in accordance with and fulfilment of the requirements of Article 6 of the Habitats Directive.

1.4 Statement of Authority

Richard Arnold

This NIS has been reviewed by Richard Arnold BSc Mres MCIEEM Cenv. Richard has over 24 years of experience as a professional ecological consultant. This experience includes work on some of the largest development projects in the UK and Ireland, as well as some work in the Middle East. Richard has worked on projects in most development sectors, including pipelines, cable routes, railways, roads, urban regeneration, ports, power stations and renewable energy projects, such as wind farms, and at all stages of the development process, from design to completed development.

Jonathon Dunn

This NIS has been reviewed by Jonathon Dunn MA (Cantab.) MSc PhD MCIEEM. Jonathon also undertook habitat surveys, mammal surveys, bat surveys and co-ordinate the bird surveys. Jonathon has worked in the environmental sector since 2014 and joined SLR Consulting in 2021. Prior to working in environmental consultancy, he used to undertake research at Newcastle University on avian ecology and conservation. He holds a PhD in avian ecology from Newcastle University, a MSc in Ecology, Evolution and Conservation from Imperial College London and a MA (Cantab.) in Natural Sciences from the University of Cambridge. Jonathon has extensive experience managing bird surveys. Jonathon has worked on a wide variety of projects with a focus on wind farms.

Kathryn Robson

This NIS has been written by Kathryn Robson BSc Hons, MSc. Kathryn is a senior ecologist at SLR Consulting Ltd with 7 years of experience as a professional ecological consultant. Her project experience has primarily been in the renewable energy sector, mainly onshore wind farms, at all stages of the development process, from design to completion. Competent in undertaking most terrestrial ecology surveys, her survey experience has focussed on ornithology and bat surveys. Kathryn holds a MSc in Ecological Management and Conservation Biology and a BSc in Biological Sciences, both from Queen's University Belfast.

Sinéad Clifford

Habitat surveys, mammal surveys and the bat surveys (including call analysis) were undertaken by Sinéad Clifford BSc (Hons). Sinéad has worked in the environmental sector since 2015 and joined SLR Consulting in 2021. She holds a BSc. in Wildlife Biology from Institute of Technology Tralee, and a Certificate (Distinction) in Ecological Consultancy from Ecology Training UK (formerly Acorn Ecology). Sinéad has strong field skills, and regularly



carries out bat, ornithological, botanical and mammalian surveys. In addition, she has extensive experience managing bat surveys for large scale projects, including wind energy developments.

Michael Austin

The collision risk modelling report was written by Michael Austin. Mike is a Senior Consultant (in Ecology) with SLR. He has over 30 years' experience within ecology and ornithology, both in conservation and consultancy. He has experience of EcoW work at a number of sites (predominantly at wind farms but also in other sectors). He holds a CSCS card for working on construction sites. Mike has managed a wide range of major Environmental Impact Assessment projects for infrastructure developments throughout the UK, in particular within the renewables industry. Since 2007 Mike has project managed a range of major Environmental Impact Assessments for wind farms and other developments. In addition to this he is proficient in data management systems and GIS. Prior to joining SLR, he held a number of positions as a consultant within RPS Planning and Development and Ecology UK. Before joining the consultancy industry Mike worked within conservation on species recovery projects and habitat management, for RSPB and local wildlife trusts.

Ross Macklin

The aquatic ecology and fisheries reports (**Appendix 2**) were written by Ross Macklin PhD (in preparation) B.Sc. (Hons) MCIEEM., MIFM, Hdip GIS, Pdip IPM (Principal ecologist with Triturus Environmental Ltd). Ross is an ecologist with over 16 years' professional experience in Ireland. He specialises in freshwater fisheries ecology, biology and water quality. He has considerable experience in a wide range of ecological and environmental projects including EIAR, EclA, AA/NIS, CEMP reporting, as well as biodiversity, water quality monitoring, invasive species and fisheries management. He also has expert identification skills in macrophytes, freshwater invertebrates, protected aquatic habitats and protected aquatic species including freshwater pearl mussel.

Sharon Spratt

The Annex I habitat surveys and reports were undertaken and written by Sharon Spratt BSc (Hons), PhD, associate member of CIEEM and full member of Institution of Environmental Sciences (IES). Sharon has 14 years of post-graduate experience with specialisms in habitat mapping, botanical surveys and conservation management. At the time of the surveys, she was working as an independent field ecologist for the National Fen Survey of Ireland for the past two years. Sharon is also a county recorder with the Botanical Society of Britain and Ireland.

1.1.1.1 MKO Personnel

MKO personnel carried out bird surveys and wrote the baseline bird reports.

The year 1 report was prepared by Andrew O'Donoghue (B.Sc.) an Ornithologist with MKO and Project Director, Dervla O'Dowd (B.Sc.). The field surveys carried out from June 2019 to March 2020 were undertaken by Andrew O'Donoghue, Eric Dempsey, Declan Manley and Kristina O'Connor all of whom are competent experts in bird surveying.

The year 2 report was prepared by Patrick Manley (B.Sc.) a Project Ornithologist with MKO. The field surveys were undertaken by Athena Michaelides, Andrew O'Donoghue, Declan Manley, Kristina O'Connor, Niall McHugh, Peter Capsey and Paul Troake, all of whom are competent experts in bird surveying.

The year 3 report was prepared by Donnacha Woods (B.Sc., M.Sc.) a Project Ornithologist with MKO. The field surveys were undertaken by Kate Bismilla, Declan Manley, Tom Rea,



Niall McHugh, Ian Hynes and Laura Hynes, all of whom are competent experts in bird surveying.

2.0 Methodology

2.1 General Approach

The methodology used in this report is based on and in accordance with best practice guidance provided by the National Parks and Wildlife Service (NPWS, 2010a) the Office of the Planning Regulator (OPR, 2021) and EC Guidance (EC, 2018) (EC, 2020) (EC, 2021) on the application of Article 6 of the Habitats Directive. The 2021 EC guidance describes a series of stages and steps which should be completed when carrying out the assessment and these are followed here with the addition of sub-headings for further clarity. The assessment applies only to European Sites. More specifically, it only applies to the qualifying interest features of such sites i.e., the features which are the reason that the site was designated.

2.2 Stage One: Screening

The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in-combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives.

There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether a Stage Two AA must be undertaken by the competent authority on the implications of the proposed development for the conservation objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, a second stage AA will be required.

2.3 Stage Two: Appropriate Assessment

A Stage Two AA is a focused and detailed examination, analysis and evaluation carried out by the competent authority of the implications of the plan or project, alone and in-combination with other plans and projects, on the integrity of a European site in view of that site's conservation objectives. Case law has established that such an Appropriate Assessment, to be lawfully conducted, in summary:

- (i) must identify, in the light of the best scientific knowledge in the field, all aspects of the proposed development which can, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;
- (ii) must contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and
- (iii) may only include a determination that the proposed development will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of the identified potential effects. If adverse



impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three and, if necessary, stage four.

2.3.1 Sources of Information

Sources of information for the assessment of the Proposed Development 'alone' include:

- Knockanarragh Wind Farm Ltd (2023) Knockanarragh Wind Farm Environmental Impact Report , especially Chapters 2, 5 and 7 (this includes all desktop study information);
- MKO (2021) Crowinstown – Year 1 bird survey report 2019-2020 (**Appendix 1**);
- MKO (2021) Crowinstown – Year 2 bird survey report 2020-2021 (**Appendix 1**);
- MKO (2022) Crowinstown – Year 3 bird survey report Apr 2021- Sep 2021 (**Appendix 1**);
- SLR (2023) Baseline Bat Report – Knockanarragh Wind Farm;
- Triturus (2023). Aquatic baseline report for Knockanarragh wind farm, Co. Westmeath. Report prepared by Triturus Environmental Ltd. for SLR Consulting. February 2023 (**Appendix 2**);
- Triturus (2023). Fisheries assessment of Knockanarragh wind farm, Co. Westmeath. Report prepared by Triturus Environmental Ltd. for SLR Consulting. February 2023 (**Appendix 2**);
- Sharon Spratt (2022). Knockanarragh Proposed Wind Farm – Fen Habitats Survey. November 2022 (**Appendix 3**);
- Knockanarragh Wind Farm Ltd (2023) Species and Habitat Management Plan (**Appendix 6**); and
- NPWS Protected Sites Map viewer;
- Site Synopses, Conservation Objectives and Standard Data Forms for European Sites¹.

Sources of information for the plans and projects for the “in combination” assessment were as above and also include:

- Bracklyn Wind Farm (2021), Natura Impact Statement²;
- Ballivor Wind Farm Development (2023) Natura Impact Statement³;
- Coole Wind Farm (2021) Natura Impact Statement⁴;
- Westmeath County Council Online Planning Portal⁵

¹ <https://www.npws.ie/protected-sites>

² Woodrow (2021) Bracklyn Wind Farm Natura Impact Statement

³ MKO (2023) Proposed Ballivor Wind Farm Development Natura Impact Statement

⁴ MKO (2021) Coole Wind Farm, Co. Westmeath Natura Impact Statement

⁵ <https://www.eplanning.ie/WestmeathCC/searchtypes>. Accessed November 2023



- Meath County Council Online Planning Portal⁶
- Westmeath County Development Plan 2021 - 2027⁷;
- Meath County Development Plan 2021 - 2027⁸;
- National Biodiversity Action Plan⁹; and
- Regional Spatial and Economic Strategy 2020-2032 (RSES)¹⁰.

2.4 Consultation

A consultation response of relevance to biodiversity was received from the Department of Housing, Local Government and Heritage and this was fully considered in the formation of this statement. The consultation response and how it has been addressed is provided in **Table 2-1**.

Table 2-1: Response to consultation comments

Consultee	Date of First Consultation	Consultee's Comments	Response
An Taisce	09/11/2022	No response.	None required
BirdWatch Ireland	09/11/2022	No response.	None required
Department of Agriculture, Food and the Marine	09/11/2022	No response.	None required
Department of Arts, Heritage, Regional and the Rural and Gaeltacht Affairs – Development Applications Unit (Nature Conservation)	09/11/2022	The Department recommends that bird survey should also include the use of avian radar systems to detect nocturnal migrating birds	The bird survey contractor, MKO, consulted with NPWS for every year throughout the bird surveys carried out between June 2019 to September 2021 (see Appendix 1 of this NIS). NPWS did not recommend the use of avian radar systems to detect nocturnal migrating birds and the use of such systems is not standard practice. Therefore, it was not done. NatureScot (2017) guidance states that: “SNH recommends that radar is only used to assess sites where there is likely to be high nocturnal activity of important species, especially if an SPA qualifying species is potentially affected”. Given the distance from the

⁶ <https://www.meath.ie/council/council-services/planning-and-building/planning-permission/view-or-search-planning-applications>. Accessed November 2023

⁷ <https://www.westmeathcoco.ie/en/ourservices/planning/developmentplans/countydevelopmentplan2021-2027/>

⁸ <https://www.meath.ie/council/council-services/planning-and-building/development-plans/meath-county-development-plan>

⁹ <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>

¹⁰

[https://www.nwra.ie/rses/#:~:text=Regional%20Spatial%20and%20Economic%20Strategy%202020%2D2032%20\(RSES\)&text=The%20RSES%20introduces%20the%20concept,we%20need%20effective%20regional%20planning.](https://www.nwra.ie/rses/#:~:text=Regional%20Spatial%20and%20Economic%20Strategy%202020%2D2032%20(RSES)&text=The%20RSES%20introduces%20the%20concept,we%20need%20effective%20regional%20planning.)



Consultee	Date of First Consultation	Consultee's Comments	Response
			<p>nearest SPA, the species that form its special conservation interest and the size of the populations recorded at that SPA, high levels of nocturnal activity by those species at the Proposed Development Site were not expected (see below for more details).</p> <p>Moreover, in our experience, it can be extremely difficult to obtain meaningful data from avian radar systems because they do not distinguish between species (Welcker et al., 2016; Schmaljohann, H. et al., 2008) and therefore does not distinguish between large flocks of small birds and small flocks of large birds. Therefore, it is concluded that the use of avian radar systems is not required or beneficial in respect of the Proposed Development.</p>
		<p>and also, separately, the use of avian acoustic sound meters to record and interpret sonograms to determine particular migratory and non-migratory species traversing the Proposed Development site.</p>	<p>As above, the bird survey contractor, MKO, consulted with NPWS throughout the bird survey period. Again, NPWS did not recommend the use of avian acoustic sound meters to detect nocturnal migrating birds and the use of such systems is not standard or best practice (see NatureScot 2017). Therefore, it was not done.</p> <p>Like radar, acoustic detectors (sound meters) suffer from limitations, as not all birds will call while flying. Similarly, abundance can be difficult to infer and crucially, it is difficult to tell where birds are flying in relation to potential turbine locations and at what heights. This means that acoustic detectors cannot provide meaningful information about the level of collision risk posed to nocturnal species. It is our view that the use of acoustic detectors is not required or beneficial in respect of the Proposed Development.</p>
		<p>Vantage point surveys conducted between dawn and dusk are limited and only provide half the picture, as considerable migration of passerines, geese, swans and other species (including other water birds) takes place at night.</p>	<p>Woodcock surveys were undertaken to search for roosting (displaying) woodcock and any other nocturnal species were also recorded, such as owls, if present. No species which are the qualifying/special conservation interest of the SPAs with an ecological connection to the Proposed Development were detected during these surveys.</p> <p>These SPAs are the River Boyne and River Blackwater SPA and Lough Derravaragh SPA, which are 4 km and 16 km from the Proposed Development</p>



Consultee	Date of First Consultation	Consultee's Comments	Response
			<p>site, respectively.</p> <p>They are designated for the following bird species: common kingfisher and, whooper swan, Eurasian pochard, tufted duck and Eurasian coot, respectively.</p> <p>Seven whooper swan flight lines were recorded, suggesting relatively minor levels of diurnal activity. Whooper swan have been shown to migrate at both day and night, but only at night in certain favourable conditions (Pennycuick, et al., 1996) and therefore nighttime movements will be fewer than those recorded during the day. In accordance with NatureScot (2017) guidance, we have applied a correction factor to the diurnal levels of whooper swan flight activity, which accounts for any regular nocturnal flight activity. The results of this have been assessed within this NIS.</p> <p>There was one record of this species breeding at Newtown Lough and no Eurasian coot were recorded during flight activity surveys. However, this species migrates almost exclusively at night (Wernham, et al 2002). The absence of diurnal observations means that it is not possible to apply a correction factor to account for any nocturnal activity and therefore calculate collision risk. Nevertheless, the potential for Eurasian coot mortality during the operation of the wind farm has been assessed within this NIS.</p> <p>Similarly, no pochard or tufted duck were recorded during any of the surveys. It is known that these species make local movements at night (Dirksen, Spaans and van der Winden 2000) however information on nocturnal migration is lacking; for example there are no records of these species from Ireland's network of night time recording locations (compared to 147 for coot), and only small numbers of tufted duck and pochard, respectively, from the UK records¹¹. Nevertheless, the potential for pochard and tufted duck mortality during the operation of the Proposed Development has been assessed</p>

¹¹ [\[Trektellen.org\]](https://www.trektellen.org/) - Totals



Consultee	Date of First Consultation	Consultee's Comments	Response
			<p>within this NIS.</p> <p>The DAU suggests that considerable passerine migration can take place at night. However, NatureScot (2017) guidance states that "it is generally considered that passerine species are not significantly impacted by wind farms". Moreover, the SPAs within 20km do not include passerine species as qualifying/special conservation interest. Therefore collision-related impacts on passerines have not been assessed with this NIS.</p> <p>There is evidence in the scientific literature (e.g. Welcker et al., 2016) which suggests that nocturnal migrants (especially passerines) do not have a higher collision risk with wind turbines than diurnal species, but rather appear to circumvent collision more effectively. This supports our approach to passerines in this NIS.</p>
		<p>Nine thousand EU Annex I Greenland white-fronted geese migrate to and from the Wexford Slob on their way to Greenland via Iceland. This potentially places the turbines in the proposed wind farm in the path of the migrating geese.</p>	<p>Wexford Harbour Slob SPA is c. 200 km southeast from the Proposed Development. Satellite tracking studies have shown that this species migrates in spring through Ireland from south to north to Iceland and onto Greenland, and then and then back again in autumn. Greenland white-fronted geese were a target species in the vantage point surveys undertaken at the WF site over two years and none were seen.</p> <p>For white fronted geese, a different race of the same species, the scientific literature indicates 67% of spring and 71% of migratory flights occurs during the day (Kölzsch et al., 2016) with the rest undertaken at night. Therefore, the complete absence of any Greenland white-fronted geese observations during the surveys confirms that any nocturnal flight activity will be negligible. Nevertheless, this possibility is considered further at Stage 1 of this NIS.</p>
		<p>Mitigation measures to document turbine bird strike/collisions must be adequate (including site visits and inspections).</p>	<p>There is evidence in the scientific literature (e.g. Welcker et al., 2016) which suggests that nocturnal migrants (especially passerines) do not have a higher collision risk with wind turbines than diurnal species, but rather appear to circumvent collision more effectively.</p>
		<p>Bat surveys need to account for species such as Leisler bat which mostly fly at a high altitude</p>	<p>We have undertaken an automated static detector survey 'at-height' to assess the activity of high-flying bat</p>



Consultee	Date of First Consultation	Consultee's Comments	Response
		therefore passive surveying at height should be undertaken.	species, such as Leisler's bat. This showed that Leisler's bat activity at height was generally comparable to or lower than that on the ground, indicating that ground level survey results are representative of at height activity.
		Any proposed mitigation measures to document turbine bat strikes/ collisions/ other fatalities including barotrauma must be adequate (including site visits and inspections).	We have proposed a suite of post-construction monitoring surveys to document any bird collisions and mitigation measures should bird collisions be recorded or suspected. Our proposed post-construction monitoring surveys for birds will also be extended for bats. This will include carcass searches using trained sniffer dogs, plus searcher efficiency and carcass removal trials, as recommended by NatureScot (2021) guidance.
		Lastly, the EIAR should also assess impacts on amber and red-listed species;	The EIAR has assessed impacts on amber- and red-listed species This is not relevant to this NIS.
		Areas of High Nature Value (HNV) land;	The EIAR has assessed impacts HNV land. This is not relevant to this NIS.
		compliance with Article 10 of the EU Habitats Directive in terms of protection of stepping stones and wildlife corridors in the landscape,	The EIAR has assessed impacts ecological stepping stones/wildlife corridors. we have recommended compensation and enhancement measures to ensure that the connectivity of the ecological network is not only maintained but enhanced. This is not relevant to this NIS.
		this is particularly important given the presence in the vicinity of the proposed wind farm of EU Annex II species marsh fritillary butterfly	The EIAR has assessed impacts on marsh fritillary butterfly. This is not relevant to this NIS as this species is not a Qualifying Interest of any nearby European site.
EPA	10/11/2022	No response	None required
Inland Fisheries Ireland (IFI)	10/11/2022	The site is adjacent to and may have potential to impact on a wide range of fisheries waters on the Rivers Stonyford, Athboy and Boyne including areas designated as SAC's, angling waters, adult holding areas, nursery and spawning waters, etc. forming parts of the Eastern River Basin District Many turbines are sited adjacent to a range of smaller water courses which act primarily as contributories to downstream habitat for juvenile salmonids,	The Proposed Development will cause no deterioration to named waterbodies. The effect of the Proposed Development on ecological receptors, including SACs has been fully assessed. Experienced aquatic ecologists Undertook baseline ecological and hydrological surveys in July 2022 following IFI guidance for wind farm developments including physico-chemical surveys, at the catchment level, to inform impact assessment of downstream fisheries and other aquatic receptors. In general, water



Consultee	Date of First Consultation	Consultee's Comments	Response
		<p>lampreys and other species as well as macrophytes, algae and macroinvertebrates which as drift form a significant part of the food supply to the downstream fisheries.</p> <p>IFI requests particular regard to the following:</p> <p>All natural watercourses which have to be traversed during site development and road construction works should be effectively bridged prior to commencement.</p> <p>If temporary crossing structures are required, IFI approval will be necessary as regards specification and timing of installation. Design and choice of temporary crossing structures must provide for passage of fish and macroinvertebrates, the requirement to protect important fish habitats e.g. spawning and over wintering areas, as well as preventing erosion and sedimentation. In certain circumstances, access for angling or commercial fishing purposes may also be required.</p> <p>No temporary crossing on any watercourse shall be installed without the approval of IFI as regards sizing, location, duration and timing.</p> <p>The preferred option is for clear span 'bridge type' structures on fisheries waters. The crossing of watercourses at natural fords is not permitted because of the amount of uncontrolled sedimentation that can be generated. The creation of fords on streams and rivers through the introduction of stone is prohibited.</p> <p>IFI has provided specific technical advice on temporary and permanent watercourse crossings and has indicated that no crossing shall be provided without their express approval.</p> <p>To minimise adverse impacts on the fisheries resource works in rivers, streams and watercourses should normally (except in exceptional circumstances and with the agreement of IFI) be</p>	<p>courses in the vicinity of the Proposed Development have been historically straightened and deepened and despite being within the River Boyne and River Blackwater cSAC, were not always of inherently high aquatic value.</p> <p>The mitigation/monitoring regime for the Proposed Development as pertains to aquatic ecology is described in section 5.9 and also in The Construction Environmental Plan (CEMP) (Appendix 5). All monitoring and mitigation measures adhere to the IFI requirements and will be implemented in full.</p>



Consultee	Date of First Consultation	Consultee's Comments	Response
		<p>carried out during the period July-September.</p> <p>It is essential that consultants assess and critically review the soil type and structure at the proposed turbine locations, and along the route of any proposed access track(s)/road(s) including areas where temporary or permanent stock piling of excavated material takes place. This is particularly important if the areas concerned contain peat soils.</p> <p>Systems should be put in place to ensure that there shall be no discharge of suspended solids or any other deleterious matter to watercourses during the construction / operational phase and during any landscaping works. A number of requirements for construction and operation were listed in relation to this concern. Request for pre-cast concrete wherever possible during construction to avoid alteration of pH of water.</p> <p>Biosecurity measures requested during construction phase to avoid spread of invasive species.</p> <p>No in-stream works without written approval of IFI.</p> <p>All works should also be carried out as per Guidelines:</p> <ul style="list-style-type: none"> • IFI's Guideline documents on protection of fisheries during construction work in and adjacent to waters (IFI, 2016) • Planning for watercourses in the urban environment (IFI, 2020) 	
Irish Peatland Conservation Council	10/11/2022	No response	None required
Irish Raptor Group	10/11/2022	No response	None required
Irish Red Grouse Association	10/11/2022	No response	None required
Irish Wildlife Trust	10/11/2022	No response	None required
Meath County Council (Environment	09/11/2022	Recommends Ecological Impact Assessment, Invasive Species Management Plan (ISMP) and	An ISMP and HASMP have been prepared and will be lodged with the planning application.



Consultee	Date of First Consultation	Consultee's Comments	Response
Department)		Habitat and Species Management Plan (HASMP) as part of EIA	
Waterways Ireland	10/11/2022	No response	None required
Westmeath County Council (Environment Department)	10/11/2022	No response	None required

3.0 Stage 1: Screening

3.1 Step 1: Management of European sites

The Proposed Development is the construction, operation and decommissioning of a proposed wind farm and ancillary infrastructure. Therefore, it is not connected with, or necessary for, the management of a European site.

3.2 Step 2, Part 1: Description of the Proposed Development

3.2.1 The Proposed Development

3.2.1.1 Turbines and Associated Infrastructure

The turbines and their associated infrastructure will consist of:

- 8 no. turbines across two clusters – the Northern Cluster consists of 3 no. turbines while the Southern Cluster consists of 5 no. turbines;
- Proposed 110 kV Substation at Clonmellon;
- 2 no. construction compounds to assist in the construction process of the Proposed Development one of which will be converted to a Maintenance Hub to facilitate the operational phase;
- 6 km of access tracks connecting the turbines to all associated and ancillary infrastructure; and
- 2 no. borrow pit to assist in the construction process of the project.

The townlands for this element of the Proposed Development include Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Carnybrogan, Cavestown and Rosmead, County Westmeath and Galboystown, Co. Meath. The layout of the site is shown in **Figure 1**.

The exact make and model of the turbine will be dictated by competitive tender process but will remain within the range listed below. The candidate turbines and the dimensions assessed set out in **Table 3-1**.

Table 3-1: Candidate Turbines and Dimensions

Turbine Type	Tip Height	Hub Height	Rotor Diameter	Foundation Size	Hardstand dimensions	Power Output
Type 1 Siemens	175	97.5	155	21.5	50m x 20m	6.6MW



Turbine Type	Tip Height	Hub Height	Rotor Diameter	Foundation Size	Hardstand dimensions	Power Output
Gamesa 155						
Type 2 (Vestas 162)	180	99	162	28.4	82m x 30m	7.2MW

3.2.1.2 Cable Route

Planning permission for the Proposed Cable Corridor from the Main Wind Farm Development Site to the Proposed Substation is also be sought as part of this planning application. The cable route will leave the Main Wind Farm Development Site and connect to the Proposed 110kv Substation at Clonmellon.

The electricity generated by the proposed wind turbines between the Northern and Southern Clusters will be collected at a medium voltage 33 kV cable circuits of buried cables which will follow on site access tracks to the access points along the L5542. A 33kV collector circuit cable will be embedded within the public roadway between the clusters along the L5542 until it meets the N52 where it will follow this road north in the direction of Clonmellon. At Clonmellon it will then follow the L6821 east to connect with the Proposed Substation. The electricity will be exported to the grid via the 110 kV overhead line at this location.

The Proposed Cable Corridor is shown in **Figure 1**.

3.2.1.3 Meteorological Mast

A temporary 102.5 m meteorological mast is present within the Proposed Development Site at Irish Transverse Mercator (ITM) coordinates 765840.87, 662795.77, and is assessed as part of the in-combination effects in Section 4.7.

3.2.1.4 Habitats and Species Management Plan

Included in the Proposed Development are measures to mitigate and compensate for impacts on biodiversity and to manage and enhance the biodiversity of the Proposed Development Site. For the avoidance of doubt, these measures are not related to being proposed in order to mitigate any adverse effects on a European Site. Instead, they are being proposed in order to mitigate likely significant effects on other key ornithological features as described in the Ornithological chapter.

3.2.2 The Proposed Development Site

3.2.2.1 Habitats

The dominant habitats within the boundaries of the Proposed Development Site are conifer plantation and improved agricultural grassland. D'arcy's Crossroads Stream and the Stonyford River are present along the western boundary of the Proposed Development Site.

Habitats (Annex I)

The Annex 1 habitat H7140 Transition mires and quaking bog was recorded within the Proposed Development Site. H7230 Alkaline fen was recorded adjacent to the western boundary of Proposed Development Site and approximately 525 m east of the Proposed Development site.



Possible ancient woodland (PAW) was also recorded within the Proposed Development Site. The three PAW habitats did not contain many of the indicator species typical of AW habitats (Perrin and Daly, 2010). Therefore, it is likely that the PAW areas are not of the confirmed ancient woodland type.

3.2.2.2 Species (Annex I birds and Annex II others)

Hen harrier (*Circus cyaneus*)

A single hen harrier was observed on two occasions during flight activity surveys in winter season 2019/20 and breeding season 2021. No evidence of hen harrier breeding within the Proposed Development or a 2 km buffer area was recorded.

Peregrine falcon (*Falco peregrinus*)

Peregrine falcon flight activity was low throughout the study period (June 2019 – September 2021, refer to **Appendix 1** for further details). A total of 3 flights, each of 1 individual were recorded. Two of these flights were recorded during the winter months and are likely to be birds following prey flocks as there was no evidence suggestive of roosting within of 2 km of the Proposed Development Site.

Merlin (*Falco columbarius*)

Individual merlin were recorded commuting within 500 m of the Proposed Development Site on two occasions during the study period (June 2019 – September 2021). Both observations were during the winter period. No breeding merlin were observed during breeding raptor surveys.

Whooper swan (*Cygnus cygnus*)

Whooper swan was observed commuting over the Proposed Development Site on seven occasions during the study period (June 2019 – September 2021). Observations ranged from a pair to 28 birds, and all flights were at potential collision height. This species was also recorded feeding and roosting within the Proposed Development Site.

Golden plover (*Pluvialis apricaria*)

During a flight activity survey in the winter of 2019/2020, a peak count of approximately 800 golden plover in one flock was observed within 500m of the Proposed Development Site boundary. No breeding golden plover were recorded within or nearby the Proposed Development Site. During the winter months this species was recorded feeding and roosting within the Proposed Development Site.

Wood sandpiper (*Tringa glareola*)

Wood sandpiper were recorded on only one occasion during a winter walkover survey within the Proposed Development Site. In October 2020, a bird was observed feeding within a flooded grass field.

Kingfisher (*Alcedo atthis*)

Kingfisher was recorded on one occasion during the wildfowl distribution surveys, conducted between 2019 and 2021 during both the breeding and winter seasons, within the Proposed Development Site. In October 2020, a kingfisher was observed commuting along a river approximately 600m to the west of the Proposed Development Site.



Marsh fritillary (*Euphydryas aurinia*)

Two marsh fritillary butterflies were recorded flying within the Proposed Development Site in May 2022. Furthermore, larvae and larval webs were recorded in abundance in the northern cluster of the Proposed Development Site during a larval web survey in October 2022.

White-clawed crayfish (*Austropotamobuis pallipes*)

A single juvenile white-clawed crayfish and white-clawed crayfish eDNA was recorded in the Athboy River (A4; see **Appendix 2** for site location). White-clawed crayfish were not recorded from any other sites during the survey and no crayfish remains were identified in other spraint sites.

Atlantic salmon (*Salmo salar*)

Atlantic salmon were recorded in low densities in Athboy River (A4; see **Appendix 2** for site location), D'arcy's Crossroads Stream (B5 & B6) and the Stonyford River (B9). This species was also recorded in medium density at site B7 on the Stonyford River. Furthermore, sites B3 on the D'arcy's Crossroads Stream and B6 on the Stonyford River were particularly high value salmonid nurseries.

Lamprey species (*Lampetra sp.*)

Lamprey ammocoetes are widespread in the vicinity of the Proposed Development Site, being recorded in the Athboy River (A4; see **Appendix 2** for site location), D'arcy's Crossroads Stream (B5 & B6) and the Stonyford River (B7 & B9). Overall, lamprey ammocoetes were recorded in low to medium densities.

Otter (*Lutra lutra*)

Despite widespread suitability, otter signs were only recorded at a total of three sites (see **Appendix 2** for site locations); B6 on the Stonyford River, and B3 and B5 on the D'arcy's Crossroads Stream. No breeding (holts) or resting (couch) areas were identified. All of these sites are within 1 km of the Proposed Development Site boundary, of which B5 is approximately 200 m from the western boundary.

3.2.2.3 Ecological Connections

A species that is a qualifying interest of a European Site within the Zone of Influence could use habitat within or in the vicinity of the Proposed Development Site. If such a species is present within the Proposed Development Site, it could be considered to be connected to the relevant European Site.

Ecological connectivity between the Proposed Development Site and the following European sites has been identified; River Boyne and River Blackwater cSAC and Lough Derravarragh SPA. The Proposed Development does not have ecological connectivity with any other European Site.

3.2.2.4 Hydrology Connections

There is hydrological connectivity, via surface and ground water, between the Proposed Development Site and the River Boyne and River Blackwater cSAC and River Boyne and River Blackwater SPA. Refer to **Figure 3** for hydrological connectivity for further detail. The Proposed Development does not have hydrological connectivity with any other European Site.



3.3 Step 2, Part 2: Potential Impacts

The potential impacts associated with the construction and decommissioning phases of the Proposed Development are:

- Damage of habitats and flora during the construction/removal of infrastructure;
- Loss of habitats and reduction in home ranges of qualifying interest species;
- Displacement of qualifying interest species;
- Spread of non- native invasive species to European Sites;
- Disturbance of Annex 1 bird species and otter and their food sources by noise, visual, human disturbance during construction and decommissioning;
- Changes in hydrology and hydrogeology (water quality/ quantity); and
- Changes in air quality due to construction and site traffic.

The potential impacts associated with the operational phase of the Proposed Development are:

- Changes in hydrology and hydrogeology (water quality/ quantity), for instance due to accidental spillages of pollutants during maintenance;
- Mortality of bats and birds through collisions with wind turbines for the period of operation;
- Disturbance and displacement of birds from the area around the wind turbines for the period of operation;
- Reduction of prey availability for some raptors due to displacement of small birds by turbines for the period of operation;
- Disturbance and displacement of birds during routine maintenance operations; and
- Barrier effect, disruption of migratory or other routes used by birds due to avoidance of wind turbines for the period of operation.

3.4 Step 3: Identification of European Sites

DoEHLG (2009) guidelines recommend that a 15 km study area is adopted, but a case-by-case basis is undertaken when assessing the potential for source-receptor connectivity between a project and European Sites.

In this instance, an objective approach was undertaken using birds to establish an initial search area. Birds typically are the most mobile taxonomic group. Therefore, it is likely that ecologically connected sites at greatest remove from a project are those designated for birds i.e., SPAs.

In the absence of any specific European or Irish guidance in relation to establishing ecological connectivity to SPAs, NatureScot guidance (SNH, 2016) was consulted. This document provides guidance in relation to the identification of ecological connectivity between development sites and SPAs. The guidance takes into consideration the distances species may travel beyond the boundary of relevant SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects. It goes on to state that "in most cases the core range should be used when determining whether there is connectivity between the proposal and the qualifying Interests". Where SPAs and developments are separated by a greater distance



than the core foraging ranges for the SPAs listed Special Conservation Interest (SCI) species, there is no likely ecological connectivity to the development.

According to NatureScot guidance (SNH, 2016), the core foraging distances of wintering grey geese (greylag goose *Anser anser* and pink-footed goose *Anser brachyrhynchus*) from SPAs is 15-20 km. This represents the largest foraging range of all the species listed in this guidance document recorded in Ireland. It is acknowledged that information on core foraging ranges is not available for all Irish SCI species. In such cases, the 15-20 km core foraging range for grey geese has been adopted as a precautionary approach.

Thus, all European sites within 20 km from the Proposed Development were considered for source-receptor connectivity, using the approach recommended by the Office of the Planning Regulator's Practice Note PN01 and the Irish Wind Energy Association (IWEA) (2012) guidelines.

In some cases, hydrological connectivity beyond 20 km was also searched for using GIS to identify any European Sites downstream of the Proposed Development connected via watercourses.

The Zone of Influence (Zoi) was therefore categorised as 20 km, although may be smaller, or larger for some pathways and receptors, such as hydrological connection or migration pathways, refer to **Table 3-2**.

The Proposed Development Site is located within 20 km of the designated sites detailed in **Table 3-2**; the closest is the River Boyne and River Blackwater cSAC; there is a 1.93 ha overlap between the Proposed Development and the River Boyne and River Blackwater cSAC. However, no construction, operational or decommissioning works of any type will occur within the River Boyne and Blackwater cSAC, including this area of overlap. There is approximately 1 m between the edge of the proposed development footprint and the cSAC. The locations of these sites are shown in **Figure 2**.



Table 3-2: Designated Sites considered for Screening

Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
River Boyne and River Blackwater cSAC 002299	<p>Alkaline fens [7230]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p>	<p>This comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stonyford and Tremblestown Rivers. The site supports populations of several Annex II species and Annex 1 habitats.</p>	<p>To maintain the favourable conservation condition within the River Boyne and River Blackwater cSAC of:</p> <ul style="list-style-type: none"> Alkaline fens <p>To restore the favourable conservation condition within the River Boyne and River Blackwater cSAC of:</p> <ul style="list-style-type: none"> Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) River Lamprey Salmon Otter 	Overlap	<p>Hydrological</p> <p>Construction/ decommissioning of wind farm (including habitat creation) - release of suspended solid (and other) pollution – (Alkaline fens, Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>, river lamprey, salmon and otter).</p> <p>Possible link between the surface water levels in the Proposed Development Site and the alkaline fens within the cSAC. Although these areas are separated by the Stonyford River, water levels could be affected by new or temporary drainage and the introduction of hard surfaces within the Proposed Development Site.</p> <p>Hydrogeological</p> <p>Construction/ decommissioning of the Proposed Development (including habitat creation) - release of pollution into soil - aquatic interest features (Alkaline fens, Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>, river lamprey, salmon and otter).</p> <p>Possible link between the groundwater levels in the Proposed Development Site and the alkaline fens within the cSAC which could be affected by new or temporary drainage within the Proposed Development Site.</p> <p>Ecological</p>	Y



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
					<p>Construction/ decommissioning of the Proposed Development (including habitat creation) - physical injury to otter, physical damage to otter breeding/ resting/ foraging sites, disturbance/ displacement or reduction in foraging opportunities for otter.</p> <p>Fen habitats present within the Proposed Development Site may provide supporting habitat to those within the cSAC (e.g. exchange of plants and animals, supporting populations of mobile species). Loss or damage to fen habitats inside the Proposed Development Site could have knock-on effects for those in the cSAC.</p>	
River Boyne and River Blackwater SPA 004232	Kingfisher (<i>Alcedo atthis</i>) [A229]	This is SPA is a riverine site, supporting 15 pairs of kingfisher (NPWS, 2010b).	To maintain or restore the favourable conservation condition of the kingfisher population; given recent population declines nationally, it is assumed that the objective is to restore the population.	4.11	<p>Hydrological</p> <p>Construction/ decommissioning of the Proposed Development - release of suspended solid (and other pollutants) into waterways, such as, streams within the Proposed DevelopmentSite, D'arcy's Crossroads Stream and Stonyford River, all of which are upstream of the SPA - impacting prey for kingfisher and/or turbidity of the water impacting hunting efficiency of kingfisher.</p> <p>Hydrogeological</p> <p>Construction/ decommissioning of the Proposed Development - release of pollution into soil and eventually watercourse -impacting prey for kingfisher and/or turbidity of the water impacting hunting efficiency of kingfisher.</p> <p>Ecological</p>	Y



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
					This species was not recorded within 500 m of the Proposed Development Site. There are also no suitable watercourses for kingfisher within the Proposed Development Site. Therefore, there is no ecological connection.	
Girley (Drewstown) Bog SAC 002203	Degraded raised bogs still capable of natural regeneration [7120]	This SAC occurs within the larger raised bog system that is designated as Girley Bog NHA (001580) and consists of 32.26 ha of raised bog, for which it is designated.	To restore the favourable conservation condition of Degraded raised bogs still capable of natural regeneration in Girley (Drewstown) Bog SAC.	7.89	<p>Hydrological & Hydrogeological</p> <p>Raised bogs are typically rainwater fed, and so are not usually dependent on surface or groundwater from elsewhere.</p> <p>Furthermore, although Girley (Drewstown) Bog SAC is within the same sub-catchment (Boyne-SC-070) as the Proposed Development it is a considerable distance from the Proposed Development Site for hydrogeological links. A study of the watercourses revealed no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course.</p> <p>Ecological</p> <p>No ecological connectivity as the designated features are specifically habitats, therefore, no pathway.</p>	N
Lough Bane and Lough Glass cSAC 002120	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] White-clawed Crayfish (<i>Austropotamobius</i>)	This SAC comprises three lakes situated in a shallow valley. Lough Bane, the largest of the lakes, is a good example of a hard water marl lake. NPWS has a desire to	To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. in Lough Bane and Lough Glass SAC.	8.23	<p>Hydrological & Hydrogeological</p> <p>Although Lough Bane and Lough Glass SAC is within the same catchment as the Proposed Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site for hydrogeological links., and therefore there are no hydrogeological</p>	N



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
	<i>pallipes</i>) [1092]	see the White-clawed Crayfish population re-established in this SAC should habitat conditions be assessed as suitable.	To restore the favourable conservation condition of White-clawed Crayfish in Lough Bane and Lough Glass SAC.		links. A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course. Ecological No ecological connectivity as the designated feature, white-clawed crayfish, is an aquatic species and the SAC is over 700m from the nearest watercourse connected to the Proposed Development	
Lough Lene SAC 002121	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092]	This SAC is a deep (20 m maximum depth), clear, hard-water lake. Lough Lene had a notable population of White-clawed Crayfish but this species disappeared from the lough in 1987 following a suspected outbreak of crayfish fungus plague NPWS has a desire to see this species re-established should habitat conditions be assessed as suitable.	To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. in Lough Lene SAC. To restore the favourable conservation condition of White-clawed Crayfish in Lough Lene SAC.	9.72	Hydrological & Hydrogeological Although Lough Lene SAC is within the same catchment as the Proposed Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site for hydrogeological links, and therefore there are no hydrogeological links A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course. Ecological No ecological connectivity as the designated feature, white-clawed crayfish, is an aquatic species and the SAC is over 700m from the nearest watercourse connected to the Proposed Development.	N
White Lough, Ben Loughs and Lough Doo SAC	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i>	White Lough, Ben Loughs and Lough Doo SAC is comprised of four hard water	To maintain the favourable conservation condition within White Lough, Ben Loughs and	11.46	Hydrological & Hydrogeological Although White Lough, Ben Loughs and Lough Doo SAC is within the same catchment as the	N



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
001810	spp. [3140] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) [1092]	lakes in a small, poorly-drained valley. This site is of considerable conservation significance for its hard water lakes and for the occurrence of White-clawed Crayfish.	Lough Doo SAC of: <ul style="list-style-type: none"> • Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. • White-clawed Crayfish 		Proposed Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site for hydrogeological links and thus there are no links. A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course. Ecological No ecological connectivity as the designated feature, white-clawed crayfish, is an aquatic species and the SAC is over 700 m from the nearest watercourse connected to the Proposed Development.	
Lough Derravaragh SPA 004043	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Pochard (<i>Aythya ferina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125] Wetland and	Lough Derravaragh is one of the most important midland lakes for wintering waterfowl. It supports nationally important populations of four species (whooper swan, pochard, tufted duck and coot), and at times is used by the internationally important population of	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derravaragh	15.99	Hydrological & Hydrogeological There is no hydrological connectivity between Lough Derravaragh SPA and the Proposed Development. The SPA is within a different catchment (SPA is within Water Framework Directive (WFD) Catchment 27F Upper Shannon and the Project is within WFD Catchment 7 Boyne ¹²) and at a considerable distance from the Proposed Development site and so there are no hydrogeological links. Ecological Whooper swan was recorded within the 500 m	Y

¹² <https://gis.epa.ie/EPAMaps/Water>



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
	Waterbirds [A999]	Greenland White-fronted goose which is based in the region.	SPA as a resource for the regularly occurring migratory waterbirds that utilise it.		<p>buffer of the Proposed Development site five times during bird surveys (once in non-breeding 2019/20 and four times in non-breeding 2020/21 seasons). It is not known if these birds from part of this or any SPA population however such a link cannot be excluded as birds may make local movements between sites during the winter.</p> <p>Although coot was not recorded within 500 m of the Proposed Development Site, this species is only known to fly at night and all bird surveys were undertaken during daylight hours. Therefore, the possibility that small numbers of coot associated with the SPA, either migrating or making local movements, passing through the Proposed Development Site could not be excluded.</p> <p>Similarly, tufted duck and pochard were not recorded within 500 m of the Proposed Development Site. However, both these species make local movements at night but information on nighttime migration is lacking. Therefore, the possibility that small numbers of tufted duck or pochard associated with the SPA, either migrating or making local movements, passing through the Proposed Development Site could not be excluded.</p> <p>On that basis, the potential ecological connections for these species are as follows:</p> <p>Construction/decommissioning and operation of the Proposed Development – disturbance/displacement of birds, including</p>	



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
					<p>barrier effects to migration flyways.</p> <p>Operation of the turbines – collision risk – commuting birds.</p> <p>Regarding waterbirds and wetland birds, the conservation objectives for this qualifying interest relates to the maintenance and restoration of the wetland habitat within the SPA. As detailed above, there is no hydrological or hydrogeological connectivity between the Proposed Development site and Lough Derravaragh SPA. Therefore, there is no ecological connection with this qualifying feature.</p>	
Killyconny Bog (Cloghbally) SAC 000006	<p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p>	<p>Killyconny Bog is a raised bog and is of considerable conservation value, being one of the largest extant areas of relatively intact raised bog in the north-east of the country. The site contains good examples of the E.U. Habitats Directive Annex I priority habitat active raised bog and the non-priority habitat degraded raised bog (capable of regeneration)</p>	<p>To restore the favourable conservation condition of Active raised bogs in Killyconny Bog (Cloghbally) SAC.</p> <p>The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established.</p>	16.33	<p>Hydrological & Hydrogeological</p> <p>Raised bogs are typically rainwater fed, and so are not usually dependent on groundwater from elsewhere.</p> <p>Furthermore, although Killyconny Bog (Cloghbally) SAC is within the same catchment as the Proposed Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site for hydrogeological links, and thus there are no hydrogeological links. A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course.</p> <p>Ecological</p> <p>No ecological connectivity as the designated features are specifically habitats, therefore, no</p>	N



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
					pathway.	
Mount Hevey Bog SAC 002342	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]		To restore the favourable conservation condition of Active raised bogs in Mount Hevey Bog SAC. The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established. Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Mount Hevey Bog SAC.	16.77	Hydrological & Hydrogeological Raised bogs are typically rainwater fed, and so are not usually dependent on surface or groundwater from elsewhere. Furthermore, although Mount Hevey Bog SAC is within the same catchment as the Proposed Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site and so there are no hydrogeological links. A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course. Ecological No ecological connectivity as the designated features are specifically habitats, therefore, no pathway.	N
Wooddown Bog SAC 002205	Degraded raised bogs still capable of natural regeneration [7120]	Wooddown Bog SAC occurs within the larger raised bog system that is designated as Wooddown Bog NHA (000694). The bog is intensively drained and	To restore the favourable conservation condition of Degraded raised bogs still capable of natural regeneration in Wooddown Bog SAC.	17.76	Hydrological & Hydrogeological Raised bogs are typically rainwater fed, and so are not usually dependent on surface or groundwater from elsewhere. Furthermore, although Wooddown Bog SAC is within the same catchment as the Proposed	N



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
		most of this drainage is associated with forestry.			Development (WFD 7 Boyne), it is within a different sub-catchment and at a considerable distance from the site and therefore there are no hydrogeological links. A study of the water courses reveals no hydrological connectivity as the SAC is situated upstream of the nearest potentially connected water course. Ecological No ecological connectivity as the designated features are specifically habitats, therefore, no pathway.	
Wexford Harbour and Slobs SPA 004076	Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Grey Heron (<i>Ardea cinerea</i>) [A028] Bewick's Swan (<i>Cygnus columbianus</i>)	The site is divided between the natural estuarine habitats of Wexford Harbour, the reclaimed polders known as the North and South 'Slobs', and the tidal section of the River Slaney. The site is of international importance for several species of waterbirds but also because it regularly supports more than 20,000 waterbirds. Wexford Harbour and Slobs is	To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.	Approx. 200 km	Hydrological & Hydrogeological There is no hydrological connectivity between Wexford Harbour and Slobs SPA and the Proposed Development site. The SPA is within a different catchment (SPA is within WFD Catchment 12 Slaney and Wexford Harbour and the Proposed Development is within WFD Catchment 7 Boyne ¹³) and at a considerable distance from the Proposed Development site and so there are no hydrogeological links. Ecological With respect to Greenland white-fronted goose, this species was not recorded during any of the diurnal bird surveys. The absence of any Greenland white-fronted geese observations	N

¹³ <https://gis.epa.ie/EPAMaps/Water>



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
	<p><i>bewickii</i>) [A037]</p> <p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</p> <p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Mallard (<i>Anas platyrhynchos</i>) [A053]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Scaup (<i>Aythya marila</i>) [A062]</p> <p>Goldeneye (<i>Bucephala clangula</i>) [A067]</p> <p>Red-breasted Merganser (<i>Mergus serrator</i>) [A069]</p> <p>Hen Harrier (<i>Circus cyaneus</i>) [A082]</p>	<p>one of the top three sites in the country for numbers and diversity of wintering birds.</p>			<p>during the day confirms that nocturnal flight activity is also negligible, based on evidence that most (c 70%) white-fronted geese movements are during the day (Kolzsch et al. 2016). Therefore, there is no perceptible ecological connectivity.</p> <p>Given the distance (approx. 200 km) between the SPA and the Proposed Development Site there is no perceptible ecological connection for the other qualifying interests.</p>	



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
	Coot (<i>Fulica atra</i>) [A125] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa</i>)					



Site name and code	Qualifying interests	Brief description	Conservation objectives in summary	Direct line distance to Proposed Development (km)	Connections (Source -Pathway – Receptor)	Considered further in screening (Y/N)
	<p><i>totanus</i>) [A162]</p> <p>Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</p> <p>Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]</p> <p>Little Tern (<i>Sterna albifrons</i>) [A195]</p> <p>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>Wetland and Waterbirds [A999]</p>					



3.5 Step 4: Likely Significant Effects

European sites which may be subject to Likely Significant Effects (LSE) from the Proposed Development are identified using the 'source-pathway-receptor' (S-P-R) conceptual model. The S-P-R model is a standard tool in environmental assessment to determine links between sensitive features and sources of impacts. In order for an effect to occur, all three elements of this mechanism must be in place. The absence of one of the elements of the mechanism means there is no likelihood for the effect to occur e.g. if there is no ecological pathway or functional link between the Proposed Development and the European site, there is no potential for impact and as such no potential for significant effects.

An impact may occur without having a significant effect. An impact is essentially the 'source' in the S-P-R assessment. It is the biophysical change caused to the environment by the project e.g., increase in sediment runoff due to ground disturbance. For the effect to be significant, the Qualifying Interests / Special Conservation Interests of the European site must be sensitive to the biophysical change, and this would undermine the conservation objectives for that QI/SCI.

The LSEs of the Proposed Development are described below. The European sites considered are those with an SPR link, as outlined in **Table 3-2**. However other pathways are also investigated.

3.5.1 For the Proposed Development 'Alone'

None of the SACs within 20 km have bats as a qualifying interest feature. Lesser horseshoe bat typically forages within 2.5 km of its roost (NPWS, 2018). Moreover, no lesser horseshoe bats were recorded foraging at the Proposed Development Site and it is outside the core range of this species in Ireland. Lesser horseshoe bat is the only Annex II bat species for which SACs are designated in Ireland (BCI, 2012). Therefore, Likely Significant Effects on SACs which only have Lesser horseshoe bat as a qualifying interest feature can be excluded.

Girley (Drawstown) Bog SAC, Killconny Bog (Cloghbally) SAC, Mount Hevey Bog SAC and Wooddown Bog SAC all have habitats only as qualifying interests. For all these SACs, there is no hydrogeological or hydrological connectivity between the SAC and the Proposed Development via the Boyne 07 catchment or surface water flows. Therefore, there is no potential for pollutants, nutrients or suspended solids generated during construction / decommissioning and operation to reach any of these SACs, and no potential for the Proposed Development to result in changes in groundwater levels. Likely Significant Effects on qualifying interest features of these SACs can therefore be excluded at this stage without further assessment or mitigation.

Furthermore, there is no hydrogeological or hydrological connection between Lough Bane and Lough Glass SAC, Lough Lene SAC and White Loughs, Ben Loughs and Lough Doo SAC. Therefore, Likely Significant Effects on habitat qualifying interests for these sites can also be excluded at this stage.

White-clawed crayfish is also a qualifying interest of Lough Bane and Lough Glass SAC, Lough Lene SAC and White Lough, Ben Loughs and Lough Doo SAC. However, there is no ecological connectivity between any of these three European sites and the Proposed Development Site as the designated feature, white-clawed crayfish, is an aquatic species and each of these SACs is at least 700m from the nearest watercourse connected to the Proposed Development. Therefore, Likely Significant Effects on white-clawed crayfish can be excluded at this stage without further assessment or mitigation.



The River Boyne and River Blackwater cSAC is directly adjacent to the western and northern boundary of the Proposed Development Site. In addition, there is an area of approximately 1.93 ha of the Proposed Development that overlaps with this cSAC. No construction, operational or decommissioning works of any kind will occur within the River Boyne and River Blackwater cSAC, including in this area of overlap. There is approximately 1 m between the edge of the proposed development footprint and the cSAC. There is approximately 1 m between the edge of the proposed development footprint and the cSAC. The Proposed Development has the potential to affect this cSAC in several ways.

Firstly, the Proposed Development Site is hydrologically connected to the cSAC. Therefore, without mitigation, suspended solids, nutrients and other pollutants generated during the construction, habitat creation and decommissioning of the Proposed Development could enter this riverine cSAC via run-off. This could negatively affect the cSAC's qualifying interests (alkaline fens, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, river lamprey, salmon and otter), all of which are sensitive to changes to water quality.

Secondly, there is the potential for the Proposed Development to affect water levels within the alkaline fens inside the cSAC through interrupting surface water flows or lowering ground water levels. Changes in the water level, even temporarily, could result in negative changes in the vegetation within the fen.

Thirdly, the fens and other wetland habitats within the Proposed Development site may be a supporting habitat for those within the cSAC, and therefore loss or damage to these undesignated habitats may have knock-on effects for those within the cSAC.

Fourthly, in the absence of mitigation, activities undertaken during the construction/ decommissioning of the Proposed Development could result in physical injury to otters, disturbance/ displacement, damage to holts/couches, and/or reduction in foraging opportunities for this species.

Fifthly, there is the potential for construction activity to result in the importation or spread of invasive non-native species within the Proposed Development site which may subsequently reach the cSAC.

The qualifying interest of the River Boyne and Blackwater SPA, located 4.11 distant, is kingfisher. This species was not recorded within 500 m of the Proposed Development site. Therefore, direct impacts to kingfisher are excluded at this stage without further assessment or mitigation. There is hydrological and hydrogeological connectivity between this SPA and the Project, and therefore suspended solids, nutrients and other pollutants, generated during the construction and/or decommissioning of the Proposed Development, could enter SPA watercourses. This could result in negative effects on the fish and aquatic insect populations upon which the kingfisher preys, or cloud waters making hunting difficult, or even impossible. Therefore, Likely Significant Effects on the qualifying interest of the River Boyne and Blackwater SPA cannot be excluded at this stage and will be subject to further assessment.

Lough Derravarragh SPA is located approximately 16 km west of the Proposed Development The designated features of this SPA are whooper swan, pochard, tufted duck, coot, and waterbirds and wetland birds.

Whooper swan was recorded within the 500 m buffer surrounding the outermost turbines five times during bird surveys (once in non-breeding 2019/20 and four times in non-breeding 2020/21 seasons). Coot was recorded breeding at Newtown Lough, which is just outside the Proposed Development Site, but was otherwise not recorded within 500 m of the Proposed Development Site. This species is known to migrate at night and all bird surveys were undertaken during daylight hours. Neither pochard nor tufted duck were recorded during the surveys but these species may also fly at night.



The Proposed Development could cause displacement of whooper swan and breeding coot from nearby waterbodies or adjoining grassland due to disturbance during the construction and/or operational phase; this may be temporary or permanent. Disturbance effects during the operational phase may be less than during the construction phase, as species may become habituated to wind turbines and disturbance due to human activities would be considerably reduced.

Furthermore, individual turbines, or the wind farm as a whole, may present a barrier to the movement of birds, restricting or displacing birds from much larger areas. The effect this would have on a population, if affected, could be subtle, and may be difficult to predict. If birds must regularly fly over or around obstacles or are forced into suboptimal habitats, this may result in greater energy expenditure. By implication, this will reduce the efficiency with which they accumulate reserves, potentially affecting their survival or breeding success. However, logically, barrier effects can only be possible if birds are regularly flying through a site, or regularly using the habitats within a site.

The Proposed Development may also present a collision risk. Collision of a bird with turbine rotors is almost certain to result in the death of the bird. The frequency and likelihood of a collision occurring depends on several factors which include aspects of the size and behaviour of the bird (including their use of a site), the nature of the surrounding environment, and the structure and layout of the wind turbines. Since 2022, recorded collisions in Europe include a total of ten whooper swan, 34 coot, five tufted duck and three pochard (Dürr, 2023).

With regards to waterbirds and wetland birds, the conservation objectives for this qualifying interest relates to the maintenance and restoration of the wetland habitat within the SPA. There is no hydrological or hydrogeological connectivity between the Proposed Development Site and Lough Derravarragh. Therefore, there is no ecological connection and Likely Significant Effects on this qualifying interest can be excluded.

There is no hydrological connectivity between Lough Derravarragh SPA and the Proposed Development. There is also no hydrogeological link as the SPA is within a different catchment (Catchment 27F Upper Shannon) from the Proposed Development Site (Catchment 7 Boyne) and is a considerable distance away. Therefore, negative effects upon the habitats within the SPA can be excluded.

3.5.2 For the Proposed Development 'In Combination'

Pathways for potential in-combination effects have been identified for the following European sites:

- River Boyne and River Blackwater cSAC,
- River Boyne and River Blackwater SPA, and
- Lough Derravarragh SPA.
- There is the potential for other plans and projects, specifically any other land uses changes, to also impact upon the designated features of these European Sites. Therefore, Likely Significant Effects cannot be excluded for the River Boyne and River Blackwater cSAC, River Boyne and River Blackwater SPA and Lough Derravarragh SPA, when the Proposed Development is considered in combination with other plans and projects.

As set out in **Table 3-2** above there are no pathways for impacts between the Proposed Development Site and any other European Sites. Likely Significant Effects can be excluded



for all other European Sites for the Proposed Development in combination with other Plans and Projects.

3.6 Conclusions

Measures intended to avoid or reduce the harmful effects of the Proposed Development on European sites (i.e. 'mitigation measures') or best practice measures have not been taken into account during Stage 1: Screening.

There is a risk of suspended solids, nutrients and other pollutants reaching the River Boyne and River Blackwater SPA and River Boyne and River Blackwater cSAC, as these sites are hydrologically linked to the Proposed Development. This could result in negative effects on kingfisher, the qualifying interest of the River Boyne and River Blackwater SPA, and the following qualifying interests of the River Boyne and River Blackwater cSAC:

- Alkaline fens,
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*,
- River lamprey,
- Salmon, and
- Otter.

The alkaline fen habitat within the River Boyne and River Blackwater cSAC may also be impacted by changes to surface water levels or ground water levels. Furthermore, the possibility cannot be excluded that the Proposed Development could negatively affect whooper swan (and possibly coot, pochard and tufted duck), which are qualifying interests of Lough Derravarragh SPA, via disturbance, displacement or collision risk.

This AA Screening concludes that it cannot be excluded on the basis of objective evidence and in view of best scientific knowledge, that there will not be any likely significant effects from the construction, operation or decommissioning activities from the Proposed Development alone, and in combination with other plans or projects, on:

- River Boyne and River Blackwater cSAC,
- River Boyne and River Blackwater SPA, and
- Lough Derravarragh SPA.

This AA Screening also concludes that it can be excluded on the basis of objective evidence and in view of best scientific knowledge, that there will not be any likely significant effects from the Proposed Development alone, and in combination with other plans or projects, on any other European site including (without limitation) Girley (Drewstown) Bog SAC, Lough Bane and Lough Glass cSAC, Lough Lene SAC, White Lough, Ben Loughs and Lough Doo SAC, Killyconny Bog (Cloghbally) SAC, Mount Hevey Bog SAC, Wooddown Bog SAC 002205 and Wexford Harbour and Slobs SPA.



4.0 Stage 2: Appropriate Assessment

4.1 Step 1, Part 1: Information on the Proposed Development

4.1.1 Summary Description

The Proposed Development is located approximately 1 km southwest of the village of Clonmellon and c. 2.8 km northwest of Delvin, in Co. Westmeath. The Proposed Development location is shown in **Figure 1**.

4.1.2 Statutory Development Description

In accordance with Section 37E of the Planning and Development Act 2000, as amended, we, Knockanarragh Wind Farm Ltd. give notice of our intention to make an application to An Bord Pleanála for permission for a Proposed Development which will consist of an 8 no turbine wind farm development and associated works on land within the townlands of Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Ballinlig, Carnybrogan, Cavestown and Rosmead, County Westmeath and Galboystown, Co. Meath. The planning application area is approximately 115.81 ha in size.

The Proposed Development will consist of:

- Construction of 8 No. wind turbines with an overall ground to blade tip height of between 175m – 180m inclusive. The wind turbines will have a rotor diameter ranging from 155m to 162m inclusive and a hub height ranging from 97.5m to 99m inclusive. Each turbine will have individual output of between 6.6MW to 7.2MW inclusive.
- Construction of temporary crane hardstands and permanent turbine foundations.
- Construction of permanent internal site access roads including passing bays and all associated drainage infrastructure
- Construction of 1 no. permanent 110 kV electrical substation west of Clonmellon, Co Meath to include 2 no. control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tank, and all ancillary structures, bunding and works.
- Construction of 33kV underground electricity cabling, including joint bays and ancillary works, along the L5542 and N52 connecting the Main Wind Farm Development Site: to the Proposed 110kV Substation at Clonmellon.
- Construction of a section of 110kV electricity cabling between the Proposed 110kV Substation and the existing overhead line at Clonmellon, inclusive of 110kV interface masts.
- Construction of an internal collector cable circuit within the Main Wind Farm Development Site, including directional drilling of (125m) cabling between Turbine 5 and Turbine 8.
- Construction of two construction compounds with associated temporary site offices, parking areas, welfare facilities and security fencing.
- The use of the construction compound in the Southern Cluster as a maintenance hub to facilitate the operational phase of development.
- Development of two borrow pits for the purpose of stone extraction.



- Undergrounding of approximately 610 metres of existing 10 kV overhead electrical power line in the vicinity of Turbine 6.
- Development of an internal site drainage network and sediment control systems.
- Improvements to an existing site entrance off the L5542/Carnybrogan local road to include localised widening of the road and creation of a splayed entrance to facilitate the delivery of abnormal loads and turbine component deliveries. Improvements will include removal of existing vegetation to accommodate visibility splays.
- A new site entrance and slip road from the L5542/Carnybrogan local road to facilitate the delivery of abnormal loads and turbine component deliveries to northern part of the site.
- Road improvements to L5542/Carnybrogan local road to facilitate the delivery of abnormal loads and turbine component deliveries.
- A new site entrance to T8 from the N52 via an existing agricultural access within the townlands of Cavestown and Rosmead.
- A new site entrance from the L6821 to the Proposed 110 kV Substation at Clonmellon.
- Ancillary forestry felling of between 19.62ha and 20.09ha to facilitate construction of the development.
- All associated site development works including berms, landscaping, and soil excavation and the ongoing maintenance and management of the biodiversity measures in accordance with the Habitats and Species Management Plan.
- Measures for biodiversity enhancement including wader scrapes for snipe, stockproof fencing and other measures.
- The enhancement and replacement of hedgerows and broadleaf trees and the planting of new hedgerows and trees.
- A 35-year operational life for the Wind Turbines from the date of commissioning of the entire Proposed Development.

This planning application seeks a 10-year construction period and will be accompanied by an Environmental Impact Assessment Report (EIAR) which includes an assessment of the likely significant effects of the Proposed Development as a whole and in combination with the relevant off-site or secondary developments which will occur as a direct result of the Proposed Development, including connection to the national electricity grid.

A Natura Impact Statement (NIS) will also be submitted to the planning authority with the planning application.

The Proposed Development Site is located in close proximity to sites on the Record of Monument and Places (RMP sites, WM009-004, WM009-018 and ME023-010) and the following structures that are included on the Record of Protected Structures (009-048 and 009-03).

4.1.3 Existing Environment

The Proposed Development will be located west of the N52 National Road from Delvin to Clonmellon in the townlands of Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Ballinlig, Carnybrogan, Cavestown and Rosmead, County Westmeath and Galboystown, Co. Meath. The site location is approximately 1 km southwest of the village of Clonmellon and c.



2.8 km northeast of Delvin, in Co. Westmeath. The Proposed Development Site will be accessed directly from the L5542 and an existing agricultural entrance off the N52, a national primary road.

The area in which the Applicant has a beneficial interest in, includes approximately private plantation and mixed woodland. The Proposed Development predominantly consists of a mixture of agricultural land, primarily grazing, and forestry. Some of the forestry is on land that was previously used for peat extraction.

The land is generally flat to gently undulating, with a very gradual slope from c. 85 m AOD in to c. 106 m AOD. The lowest point is along Darcy's Crossroads Stream at the northwest boundary of the site.

There are several eskers running through the area, some of which show signs of having been locally used for sand and gravel extraction. There are no residential properties within the Proposed Development site. A protected structure is also present on the Proposed Development.

The site for the proposed substation is located on the western outskirts of Clonmellon town, c. 200m from its settlement boundary in the townland of Galboystown. The proposed substation is accessed by the L6821 via an existing agricultural access.

4.2 Detailed Description of the Proposed Development

The Proposed Development consists of the following elements:

- Turbines and associated infrastructure
- Access Tracks
- Internal electrical and communications cabling
- Drainage infrastructure
- Cable Corridor
- Substation
- Grid Connection
- Turbine delivery route

4.2.1.1 Turbines and Associated Infrastructure

The turbine and its associated infrastructure will consist of:

- 8 no turbines across two clusters – the Northern Cluster consists of 3 no. turbines (T1, T2 and T3) while the Southern Cluster consists of 5 no. turbines (T4, T5, T6, T7 and T8).
- Two no. construction compounds to facilitate the construction phase of the project.
- 2 no. borrow pits to meet the requirement construction material.
- 6km of access tracks connecting the turbines to all associated and ancillary infrastructure.

4.2.1.2 Wind Turbine Generation

The Proposed Development will primarily consist of a wind farm of 8 no. wind turbine generators (WTGs), with ancillary civil and electrical infrastructure.



- Each turbine will have individual power outputs of between **6.6 and 7.2MW**.
- Total power output of this project is between **52.8- 57.6 MW**.

4.2.1.3 Turbines

The proposed turbines will be within the following specifications:

- Turbine Type 1: Tip height of 175m, hub height of 97.5m and a rotor diameter of 155m. 6.6MW
- Turbine Type 2: Tip height of 180m, hub height of 99m and a rotor diameter of 162m. 7.2MW

Each candidate turbines fit within the following specifications:

- The turbines will be three bladed, horizontal access type.
- The turbines will have a height of between 175 - 180 m from top of foundation (at ground level) to blade tip height.
- The rotor diameter of the proposed turbines will be within the range of 155 - 162m (inclusive).
- The Hub height will be within the range of 97.5m - 99m (inclusive).

In terms of appearance, modern wind turbines from all main turbine manufacturers have evolved to share a common appearance and major characteristics with only minor cosmetic differences which differentiate one manufacturer from another.

4.2.2 Candidate Turbines

The exact make and model of the turbine will be dictated by competitive tender process but will remain within the range listed below. The dimensions of the proposed turbines will be within the range of the minimum and maximum permutations set out in **Table 4-1**. The minimum parameters are based on the Siemens Gamesa 155 and the maximum parameters are based on the Vestas 162. This NIS assesses all permutations within the range of the proposed dimensions

Table 4-1: Design Parameters to be Assessed

Turbine Type	Tip Height (m)	Hub Height (m)	Rotor Diameter (m)	Foundation Size (m)	Hardstand dimensions (m)	Power Output (mw)
Type 1 Siemens Gamesa 155	175	97.5	155	21.5	50m x 20m	6.6MW
Type 2 (Vestas 162)	180	99	162	28.4	82m x 30m	7.2MW

The specification of each candidate turbine is contained in [Appendix 4](#).

4.2.3 Turbine Layout

The turbine layout consists of 8 no turbines with:



- three turbines (no's 1-3) located within the northern part of the site. T1 and T2 are to be located within an existing agricultural land and T3 within mixed woodland / scrub with varying stages of maturity.
- Five turbines (no's 4-8) located within the southern part of the site. Of these T4, T5 and T7 are located within commercial forestry plantations at varying stages of maturity. T6 and T8 are to be located within existing agricultural land.

The layout of the Proposed Development has been designed to minimise the potential environmental effects of the wind turbines on the surrounding area, while at the same time maximising the energy yield of the wind resource which passes over the Proposed Development Site. The Proposed Site Layout Overview layout is shown in **Figure 1**. This layout reflects the outcome of an iterative design process. Further detail on the design approach, constraints and alternative layouts is documented in **Chapter 3 'Alternatives'** of the EIAR.

The turbines referenced from T1-T8 and coordinates in Irish Transverse Mercator [ITM] are provided in **Table 4-2**.

Table 4-2: Proposed Knockanarragh Wind Farm Turbine Coordinates

Turbine ID	X (ITM)	Y (ITM)	Elevation
1	663,167	768,111	88.53
2	662,685	767,779	89.09
3	663,199	767,677	85.38
4	662,666	766,152	93.27
5	662,296	765,756	91.79
6	662,816	765,770	91.43
7	662,561	765,415	90.05
8	662,003	765,242	85.71

4.2.3.1 Turbine Blades

The blades of a modern turbine are comprised of glass fibre-reinforced polyester. The blades of a turbine rotate between five and 15 revolutions per minute, dependent on wind speed and turbine make. A turbine begins generating electricity at a wind speed of approximately 3 to 4 m/s depending on the turbine type, with rated power generation at wind speeds of approximately 12 to 14 m/s.

Turbines are usually shut down at wind speeds greater than 25 m/s, although some machines are designed to operate up to 30 m/s. The yaw mechanism, controlled by a wind vane, turns the nacelle and blades into and out of the wind. Blades are pitched to match the wind conditions.

4.2.3.2 Turbine Tower and Foundation

The tower of a turbine is a conical steel tube, with multiple painted finishes. It is generally transported to the site in 4 to 5 sections. The first section is bolted to the steel base which is cast into a concrete foundation. The shape and size of the foundation may vary depending on the turbine manufacturer's specifications; however, the foundations will range from 21.5-28.4 metres in diameter, 2.5m in depth, and will be gravity-based foundations composed of reinforced concrete. All foundations will be located below ground level.



The initial tower section will then be bolted to 6m concrete plinth at the top of the top foundation, and subsequent sections will then be lifted into place and connected together. The initial base section of the tower is 5m in diameter, tapering to between 3 to 4 metres at the top where it is attached to the nacelle. It is accessed by a galvanised steel staircase and a steel hatch door which will be kept locked except during maintenance.

Turbine Colour

Turbines have multiple painted coatings which protect against corrosion. The colour of the turbines will be white, off white or light grey to blend into the sky background in accordance with the Wind Energy Development Guidelines for Planning Authorities 2006, or as determined by An Bord Pleanála.

4.2.3.3 Power Output

The Proposed Development will have an estimated installed capacity of 52.8MW (SG 155) to 57.6MW (V162) depending on the final turbine technology installed. Turbines of the exact same make, model and dimensions can have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle. A rated capacity has been used below to calculate the power output of the Proposed Development. Assuming an installed capacity of **52.8- 57.6** MW, the Proposed Development has the potential to produce approximately **152,634 (SG155) to 166,510 (V162)** MWh (megawatt hours) of electricity per year, based on the following calculation:

$A \times B \times C =$ megawatt hours of electricity produced per year

Where:

- A = the number of hours in a year: 8760 hours
- B = the capacity factor, which takes into account the intermittent nature of wind, the availability of wind turbines and array losses. The capacity factor of 33% is applied here
- C = rated capacity of the wind farm: 52.8 MW (SG 155) or 57.6 MW (V162)

The 152,634 (SG155) to 166,510 (V162) MWh of electricity produced by the Proposed Development would be sufficient to supply approximately 33,037 to 39,645 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity.¹⁴

According to the 2022 Census of Ireland, there are a total of 34,087 private households within County Westmeath and 72,977 in County Meath. Based on a capacity factor of 33%, the Proposed Development would therefore produce enough electricity for the equivalent of 96% to 116% of households in County Westmeath and 45% to 54% of Meath as per the Housing stock of the 2022 Census. The projected housing stock for 2027 of Co. Meath and Co. Westmeath is 91,320 and 39,070.

County	No. of Private Households	MWh of electricity produced	% of Private where Energy Demand is met
Co.	34,087	33,037 to 39,645	96% - 116%

¹⁴ March 2017 CER Review of Typical Consumption Figures Decision



County	No. of Private Households	MWh of electricity produced	% of Private where Energy Demand is met
Westmeath		Households	
Co. Meath	72,977	33,037 to 39,645 Households	45% - 54%

4.2.3.4 Turbine Colour

Turbines have multiple painted coatings which protect against corrosion. The colour of the turbines will be white, off white or light grey to blend into the sky background in accordance with the Wind Energy Development Guidelines for Planning Authorities 2006, or as determined by An Bord Pleanála.

4.2.3.5 Turbine Delivery Route, Access Tracks and Hardstandings

Turbine Delivery Route (TDR)

Turbine delivery will be from Dublin port. The turbine delivery route will leave Dublin Port and join with the M50 motorway via the Dublin Port Tunnel. The route will continue along the M50, exiting at Junction 7 to the M4 to Mullingar then exiting Junction 16 northbound on the N4 on to the N52 and L5542 to the site.

A TDR Assessment was carried out and swept paths for all the node points along the route were completed. The turbine delivery route assessed as part of this project is found in **Figure 1**.

A turbine delivery route selection and assessment were carried out to identify the optimum delivery route to the sites. Further consideration of this route selection assessment is found in **Chapter 14** and **Appendix 14.1** of the EIAR.

Internal Access Tracks

Approximately 6 kilometres of new internal access tracks will require construction as part of the Proposed Development. There are no proposed track upgrades as all tracks to the turbines and other site infrastructures will be on new tracks.

Figure 1 illustrates the internal access tracks within the Proposed Site Layout Overview. The proposed internal site track layout will permit access for vehicles during the construction phase, for maintenance during the operational phase, and for vehicles to decommission the turbines at the end of the life of the development.

All access tracks will be approximately 5 m wide. The tracks will be finished with a well graded aggregate. Existing drainage infrastructure will be maintained and upgraded where necessary. The full track construction (at formation level) will extend up to 11m wide to allow for cable trenches and surface water drainage ditches. Additional clearance may be required above ground level to allow for turbine oversail/swept path during turbine delivery. Gradients will be limited to no more than 1 in 12 (8%) and a stone layer provided, so as to provide suitable traction for turbine delivery vehicles and other larger indivisible loads.

It is anticipated that the stone required for the construction of all new internal access roads will be sourced from on site borrow pits. In the event that borrow pit does not contain sufficient material, this will be sought from quarries in the vicinity of the site.



Access track formation will consist of a proposed minimum 500m hard core on a geotextile membrane. The construction methodology for newly constructed tracks will be as follows:

- the formation will be prepared to receive the geotextile membrane.
- stone will be placed and compacted in layers to a proposed minimum 500 mm depth.
- a drainage ditch will be formed along the sides of the track (which will depend on the adjacent topography and track design).
- surplus excavated material will be placed in a continuous mound along the side of the tracks to blend into the surrounding landscape and will be grass seeded.

Table 4-3: Internal Access Tracks Details

Proposed Development	Length (m)	Surface Width (m)	Average soil/Peat Depth (m)	Depth to firm Subsoil/Rock (m)	Depth of Sub soil to be excavated (m)	Volume of Topsoil to be excavated (m ³)	Volume of subsoil to be excavated (m ³)	Total Volume to be excavated (m ³)
New Site Access Road	6030	5m	0.3	0.5	0.5	58,200	149,200	207,400

Construction Material Required

The total amount of construction material required is as follows:

1. Total Topsoil Excavated = 58,200m³
2. Total Subsoil CUT = 149,200m³
3. Total Subsoil (General Fill) = 32,200m³ (which is obtained from (2))
4. Total Aggregate Import/Borrow Pit = 76,734m³
 - a) Approximately 50% of topsoil could be re-used in dressing embankments and the remainder (approx. 29,000m³) can be used in bunds around crane pads, thickening of verges, and ideally used as visual bunds/screening.
 - b) With 32,200m³ (3) put back into the construction you would be left with circa 117,000m³ to lose on site.

Table 4-4: Indicative Aggregate Requirement

Location	Aggregate (m ³)
Access Tracks	22,160.00
Turbine Bases	7,259.68
Hardstandings and Laydowns	18,920.00
cv Substation	16,280
TCC	3,614.50
Misc	8,500.00



Total	76,734
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The aggregate (4) is based on 0.5m thick construction of tracks and pads, turbines bases, the temporary and ops compounds.

It is assumed that 10,000m³ concrete is imported to the site in all scenarios, i.e. where the borrow pits are / are not productive.

4.2.4 Borrow Pits

The Proposed Development will include two borrow pits within the main wind farm site.

The borrow pits are sized on the basis of a 35,000m³ requirement. The Proposed Development will provide 2 no. borrow pits of 90 x 90m accommodating 5m excavation of rock/aggregate.

4.2.5 Watercourse Crossings

Within the Proposed Development there are two existing crossings. One existing crossing is over an arterial drainage channel, and the other over a field drain. These crossings are between Turbines 1 and 3 and will be upgraded. There is a requirement for 2 no. new proposed culverted crossings over a field ditch approaching Turbine 2. This will be installed as part of the track construction works.

Culverts are designed to cater the correct loadings imposed from construction vehicles.

The two proposed new culverts over the field drains will be culverted with a 900 mm pipe. To upgrade the existing crossing over the arterial drainage drain, the Section 50 consent from the Office of Public Works (OPW) will be required. The upgraded crossing structure will retain the existing hydraulic profile to mitigate any impact on the local drainage and flood risk.

4.2.5.1 Grid Connection / Cable Route

Planning permission for this associated cable route from the Proposed Development Site to the permanent 110kV electrical substation which will be constructed off-site west of Clonmellon, Co Meath, is also being sought as part of this application.

Electricity transmitted between the turbines will be at 33kV. The cable route will leave the Main Wind Farm site and connect to the proposed 110kV substation at Clonmellon. It will comprise 3.85km underground electrical cabling.

This will require 33kV underground electricity cabling along the N52 connecting the Main Wind Farm Site to the proposed 110 kV electrical substation and construction of a section of 110kV electricity cabling to the existing overhead line at Clonmellon, inclusive of interface mast.

During the consultation and scoping processes for the Proposed Development, searches of existing utility services were carried out to identify areas where existing major assets exist such as high-voltage electricity cables are gas mains. Private utilities and telecommunications companies were also consulted during this period to inform the proposed design.

Cable trenching will be carried out with the aid of single lane closure on the N52 and temporary closure of the L5542. A traffic management plan will be prepared and agreed with the TII/ RDO and Westmeath County Council prior to commencement of works. Due to



the length of cabling within the road corridor (ca 3.85 km), these works could be conducted over a 6-month period of time (ca 26 weeks). The approach will plan the works to ensure minimal impacts on road users and the general public.

4.2.6 Electricity Substation, Control Buildings and Associated Compound

It is proposed to construct one electricity substation and this substation will provide a connection point between the proposed wind farm and the national grid.

The dimensions of the proposed substation compound will be 101 metres by 122 metres and will include 2 no. substation control buildings and electrical components necessary to export electricity generated from the wind farm to the National Grid. One building will be the Customer Switchgear Room (the IPP Building) and will be operated and maintained by the Applicant. The other building will be the Transmission System Operator (TSO) 'Control Building' (the Eirgrid Building) and will be operated and maintained by EirGrid.

The substation compound will be surrounded by a 2.6 metres high steel palisade fence and internal fences will also be provided to segregate different areas within the main substation compound. Elevations and sections for the substation compound are shown on the Planning Drawings. Lighting will be required on site, and this will be provided by lighting poles located around the substation and exterior wall mounted lights on the control buildings.

The IPP Building will measure 17.83 metres by 7.6 metres and will have an overall height of 6.0 metres (above ground). It will house switchgear, associated electrical equipment and apparatus, storage and welfare facilities. The external finish will be nap plaster.

The EirGrid Building will measure 25 metres by 18 metres and will have an overall height of 8.55m.

It will contain a control room, associated electrical equipment and apparatus and will also include storage and welfare facilities. The construction and electrical components of the substation will be to EirGrid specifications. It will be comprised of a control room, a battery room, a generator room, a mess room and a workshop / storage room. The external finish will be nap plaster.

Staff welfare facilities will be provided in the control building and there will be a small water requirement for occasional toilet flushing and hand washing. It is proposed to install a rainwater harvesting system as the source of water for toilet facilities and this rainwater harvesting tank will be installed adjacent to the control buildings. Toilets will drain to a sealed cess tank for routine emptying, cleaning and maintenance.

4.2.7 Electrical Cabling

4.2.7.1 Internal electrical and communications cabling

Internal electrical and communications cabling will be provided as an integrated part of the Northern and Southern Cluster. The internal electrical cabling will connect to the Substation at Clonmellon. A 110 kV cable will link the proposed substation with the OHL west of Clonmellon.

The electricity generated from wind turbines between the Northern and Southern Clusters will be collected at a medium voltage 33 kV cable circuits of buried cables which will follow on site access tracks to the access points along the L5542. A 33kV collector circuit cable will be embedded within the public roadway between the clusters along the L5542 until it meets the N52 where it will follow this road north in the direction of Clonmellon. At Clonmellon it will then follow the L6821 east to connect with the off-site substation. The



electricity will be exported to the grid via the 110 kV overhead line at this location. Internal collector circuit cable routes are shown in the planning application drawings.

4.2.8 Width and Depth of Trench Along Road

4.2.8.1 Cable Installation

Typical 33kV cable trench detail for installation along existing / proposed access track and for installation along a public road is shown on the associated Planning Drawings. The minimum width of the cable trenches for the 33kV cable trench will be 0.6m and the minimum depth will be 1.248m.

Typical 110kV cable trench detail for the section of 110kV electricity cabling between the 110kV substation and the existing overhead line at Clonmellon, inclusive of interface mast, is shown on the associated Planning Drawings. The minimum width of the cable trenches for the 33kV cable trench will be 0.705m and the minimum depth will be 1.314m.

The specifications for cables and cable installation will be in accordance with EirGrid requirements. A description of cable installation works is found within the CEMP which is contained in **Appendix 5**.

4.2.8.2 Joint Bays

Joint bays are precast concrete chamber buildings where cables are joined to form one continuous cable. Locations of joint bays are specified by Eirgrid at detailed design stage. Therefore, joint bay drawings will not be included as part of this planning application, but it is assumed that a joint bay will be required at locations of tight angles (typically 90 degree bends) and every 1000m. For the purposes of this assessment, 4 no joint bays will be located in public roads.

A joint bay will be constructed in pits. Each joint bay will be approximately 4.5 m x 1.8 m x 1.2 m deep. A reinforced concrete slab will be constructed in the bay to accommodate the jointing enclosure.

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

4.2.9 Traffic Management

4.2.9.1 Wind Farm

Access to the wind farm will be facilitated as follows:

- Construction and operational access for T1, T2 and T3 via local road L5542 which passes through the townland of Carnybrogan, approximately 2 km south west of the town of Clonmellon. (**Site Entrance 1**)
- Construction and operational access for T4, T5, T6, T7 proposed via the local road L5542 (**Site Entrance 2**)
- Construction and operational access to T8 via the N52 within the townlands of Cavestown and Rosmead. (**Site Entrance 3**)
- Construction and operational access to the proposed 110kV substation from the L6821. (**Site Entrance 4**)



4.2.9.2 Turbine Delivery Route

The port of entry for AILs has been identified as Dublin Port, with a route via the M50 and M4 to the N52. Delvin Junction. Turbine deliveries would exit the M4 at this location and head toward Delving via the N52.

A report has been prepared to identify the works to be carried out along the Turbine Delivery Route (TDR) to facilitate the delivery of the Wind Turbine Components (WTC) to the site of the proposed Knockanarragh Wind Farm without any obstructions from street furniture, natural elements and utilities along the route.

A total of 15 nodes have been identified and swept paths run at these locations. Two out of the 15 nodes do not require any works to be carried out on them. Where potential obstructions are foreseen at nodes, mitigatory measures are proposed in the form of temporary removals, relocations and trimming to achieve oversail and passage of WTCs. Aerial photographs and street view images showing possible obstructions have been obtained from Google Maps.

The swept paths and comments shown below are for a 55m trailer carrying an 81m length turbine blade.

4.2.9.3 Traffic Management During Construction

A Construction Traffic Management Plan (CTMP) for the proposed development has been prepared and included as **Appendix 14.3** of the EIAR. The purpose of the CTMP is to outline the areas for consideration when preparing the programme of works and when undertaking the Site construction. It is to be used during the construction phase of the Proposed Development

Peat management

Peat has been observed within the Planning Application site following an assessment and walkover of the existing environment. Further information on soils, soil and peat management can be found in **Chapter 06 Land Soils and Geology**.

4.2.9.4 Drainage

The proposed drainage system will be based on two key methods. The first method will involve keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around drainage features, and diverting clean surface runoff around excavations and construction areas. The second method will involve collecting any drainage water from works area that might carry silts or sediments, and to route them towards settlement ponds prior to controlled diffuse release over vegetated natural surfaces.

Further details on the hydrology and drainage are contained in **Chapter 07 Water** of the EIAR and in the accompanying planning drawings.

4.3 Tree Felling and Replant Lands

Some of the proposed development site comprises mixed woodland and forestry plantation. Felling of between 19.62ha and 20.09ha of forestry is required within and around the wind farm infrastructure to facilitate construction. The Felling area proposed is the minimum necessary to construct the proposed development and will provide necessary mitigation where required.

Tree felling will be subject to a felling licence application to the Forest Service within Department of Agriculture prior to construction.



The Forest Service policy requires that a copy of the planning permission for a wind farm is submitted with a felling licence application, therefore, the felling licence cannot be applied for until planning permission is received for the proposed development site. The licence will include the provision of relevant replant lands to be planted in view of the proposed tree felling on the site.

The construction methodology for tree clearance will follow the specifications set out in the Forest Service Forestry Standards and Procedures Manual (2015¹⁵) and Felling and Reforestation Policy (2017¹⁶).

Before harvesting works commence on site, all personnel, particularly machine operators, will be made aware of the following and will have copies of the relevant documentation including:

- The felling plan, surface water management, construction management, emergency plans and any contingency plans;
- Environmental issues relating to the site;
- The outer perimeter of all buffer and exclusion zones;
- All health and safety issues relating to the site.

The proposed method of tree felling near infrastructure will be limited to:

- A 5m felling buffer along all infrastructure/access tracks
- A 10 m buffers surrounding hard standings and compounds;
- A 6 m corridor for buried cables on private lands;
- A 50 m separation distance between turbine blade tip and bat habitat feature as per the requirements of NatureScot Guidance.

Replacement replanting of forestry in Ireland is subject to licence in compliance with the Forestry Act 2014 (as amended). The consent for such replanting is covered by the Forestry Regulations 2017 (S.I. no. 191 of 2017).

It is proposed to fell between 19.62ha and 20.09ha hectares of forest to facilitate the Proposed Development. Replant lands are required and this replanting of forestry can occur anywhere in the state, subject to licence. Potential replanting sites will be subject to a separate application.

Chapter 13 of the EIAR contains a high-level environmental assessment of requirements with respect to forestry.

4.3.1 Habitat and Species Management Plan

The Proposed Development includes measures to mitigate and compensate for effects on biodiversity and provide an overall enhancement. These compensation measures are not required or intended to address adverse effects on the integrity of any European site. They include the construction of wader scrapes for snipe and the replacement of hedgerows, plus the management of created and retained habitats, including wetland and fen within the

¹⁵ Department of Agriculture, Food and the Marine: Forestry Standards and Procedures Manual. Available at: https://www.forestryervices.ie/wp-content/uploads/2019/05/Forestry_Standards_and_Procedures_Manual_2015.pdf

¹⁶ Department of Agriculture, Food and the Marine. Felling and Reforestation Policy (2017). Available at: <https://www.teagasc.ie/media/website/crops/forestry/advice/Felling-and-Reforestation-Policy.pdf>



Proposed Development Site boundary. Please also refer to [Appendix 7](#), Habitat and Species Management Plan for further detail.

4.3.2 Construction of the Proposed Development

It is envisaged that the construction period will take place over a period of 18-24 months. This would commence with discharge of any pre commencement conditions, followed by site preparation work, turbine foundation construction and turbine erection. This would be followed by construction of Substation and grid connection.

The main activities will include:

- off-site highway works;
- site establishment (construction compounds);
- construction of access tracks and crane pads;
- turbine foundation construction;
- substation civil and electrical works;
- cable delivery and installation;
- turbine delivery and erection;
- wind farm commissioning; and
- reinstatement/restoration.

The main construction works which are expected to generate the most vehicle trips to the site will be undertaken during months 5 to 11, with the final 5 months of the construction programme accommodating the wind turbine deliveries and erection.

Table 4-5: Indicative Construction Programme

Construction Activity	Months																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site establishment & felling	█	█	█	█	█													
Access tracks		█	█	█	█	█	█											
Turbine foundations					█	█	█	█	█	█	█							
Concrete pour					█	█	█	█	█	█								
Substation & compound		█	█	█	█	█	█	█	█	█	█	█	█					
Cable laying					█	█	█	█	█	█								
Wind Turbine Erection & Grid Connection												█	█	█	█	█		
Reinstatement															█	█	█	█



4.3.2.1 CEMP

The CEMP sets out the key environmental management measures associated with the construction, operation, and decommissioning of the Proposed Development, to ensure that during these phases of the development, the environment is protected, and any potential impacts are minimised. In the event that An Bord Pleanála (ABP) decides to grant approval for the Proposed Development, the final CEMP will be updated to include the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by ABP.

The CEMP is included as **Appendix 5** of this report.

4.3.3 Cable Route Electrical Works

Electrical works for construction of the will be carried out in tandem to the wind farm construction sequenced activities. A description of construction techniques for the cable route is contained within the **CEMP** in **Appendix 5**.

During the construction stage of the Proposed Development, records of services such as water mains, sewers, gas mains and other power cables will be obtained from the relevant service providers ahead of construction works to ensure that all new developments between the period of assessment and pre-construction is captured. Where required, cable detection tools, ground penetrating radar, and slit trenches will be used as appropriate to find the exact locations of existing services. The final locations of the cable routes within the public roads and on the verge along the public road will be selected following these investigatory works to minimise conflicts with other services.

4.3.4 Site Access Tracks and Drainage

Access tracks will be provided to each of the turbines within the Proposed Development. Drainage infrastructure will be constructed in parallel with access track construction.

The Proposed Development will require the construction of approximately 6.0 kilometres of new site access tracks and associated drainage infrastructure. Existing drainage infrastructure shall be retained where possible and improved as necessary.

4.3.5 Cable Trenches

4.3.5.1 Wind Farm

Cable-ducts will generally be laid when the track is being constructed and will follow the edge of the site access tracks. The trenches within these locations will generally be backfilled using the excavated material. The contractor will excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material (CBM). A rope will be inserted into the ducts to facilitate cable-pulling later. The as-constructed detail of the cable duct locations will be carefully recorded. Cable marker strips will be placed above the ducts and the two communication ducts will also be laid. An additional layer of cable marker strips will be laid above the communication ducts and the trench back-filled. Back-filling and reinstatement in public roads will be to a specification to be agreed with the road authority and at least as good as the existing.

4.3.5.2 Grid Connection

The detailed construction sequence for the installation of cabling is detailed in the CEMP in **Appendix 5**.



Typical 33kV cable trench detail for installation along existing / proposed access track and for installation along a public road is shown on the Planning Drawings submitted with this application. For cable works in the public road, the traffic management plan will be implemented. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

Precast concrete cable joint bays will be installed within excavations in line with the trench. The cable joint bays are backfilled and the finished surface above the joint bay reinstated as per its original condition. The cable joint bays are re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays is reinstated again to its original condition.

The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable is pulled through.

When trenching and ducting is complete, the installation of the cable route cable will commence.

The finished surface of the road, road verge, or agricultural land will be reinstated as per its original condition or to the requirements of the Meath and Westmeath Area Engineers and the construction work area removed.

For cable works in the public road, the traffic management plan will be implemented. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

Precast concrete cable joint bays will be installed within excavations in line with the trench. The cable joint bays are backfilled and the finished surface above the joint bay reinstated as per its original condition. The cable joint bays are re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays is reinstated again to its original condition.

The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable is pulled through.

When trenching and ducting is complete, the installation of the cable route cable will commence.

The finished surface of the road, road verge, or agricultural land will be reinstated as per its original condition or to the requirements of the Meath and Westmeath Area Engineers and the construction work area removed.

4.3.5.3 Directional Drilling Works

Due to availability of land for development between T5 and T8 the cable route between these turbines shall be installed underground using the directional drilling method.

It is proposed to construct granular access tracks (from the proposed wind farm track) to new proposed drilling platforms for the directional drilling rigs. These platforms will also be constructed from granular material.

Drilling will then be undertaken between the two platforms which will include a duct being installed along the route for subsequent installation of the cable.

An updated underground cable check will be undertaken before construction commences.



4.3.5.4 Borrow Pits

The availability of appropriate aggregate material at the proposed borrow pit locations will be confirmed with site investigations being completed prior to construction.

Rock Breaking

Weaker rock will be extracted using a hydraulic excavator and a ripper. Where stronger rock is encountered and cannot be extracted using an excavator, then rock breaking equipment will be employed. This will typically involve the use of a 40-60 tonne 360-degree hydraulic excavator with a rock breaker. The rock breaker is supported by a smaller 30-40 tonne rock breaker which breaks the rock down further for feeding into the rock crusher machine. The larger rock breaker breaks out the rock in a progressive manner from the borrow pit and the smaller rock breaker breaks it down further. The broken-down rock is loaded into mobile crusher using a wheeled loading shovel machine and crushed down into the correct grade for use in the construction of Site Access Roads and Turbine Hardstands.

Rock Blasting

Where rock is very strong and blasting is required, this is carried out using a mobile drilling rig which is used to drill vertical holes into the rock area that requires blasting. This is where explosives are used. It will take the drilling rig 3 to 4 days to drill the number of holes required for a single blast. A specialist engineer will be employed to determine the locations and depths of blasting required. The specialist blasting engineer will arrange for the correct amount of explosives to be delivered to the Site for each blast. The management of explosives delivery and storage on-site will be agreed with An Garda Síochána in advance. The blast engineer will set the explosives and manage the blast. The rock generated from the blast will usually be the correct size to be loaded directly into the mobile crusher.

4.3.6 Substation Compound

The proposed layout for the substation compound will be 11,194m² and will be constructed with up to a 1m thick granular layer to create the finished level. Selected areas within the compound will contain concrete foundations, such as the Eirgrid Building and switchgear foundations.

The compound will also contain its own surface water drainage and internal access tracks.

The overall compound will be enclosed by a 2.6 metres high steel palisade fence.

4.3.7 Watercourse Crossings

The proposed wind farm development will utilise in total four crossings: two new crossings over the field drains, one existing crossing over a field drain, and one existing crossing over a field drain which connects the Newton Lough and D'arcys Crossroads Stream.

The identified crossings over the watercourses that are associated with the Proposed Development are listed in Table 4-6 below.

The proposed cable route will cross two sections of the Athboy River as it enters Clonmellon to the north of the Proposed Development.



Table 4-6: Watercourse Crossing

Crossing Point	Existing / Proposed	X coordinate (ITM)	Y coordinate (ITM)	Crossing type	Watercourse
WF-HF1	Existing	663112	767688	Flatbed Culvert	Field Drain
WF-HF2	Existing	663072	767714	Piped Culvert	Field Drain
WF-HF3	Proposed	662835	767827	Piped Culvert	Field Drain
WF-HF4	Proposed	662698	767830	Piped Culvert	Field Drain
GCR-1	Existing	664687	768427	Piped Culvert	Kilskeer Stream
GCR-2	Existing	664293	768880	Box Culvert	Clonmellon Stream

4.3.8 Turbine Hardstands

Turbines have a pre-designed hardstand from the manufacturer that allows for the correct placement of turbine components and locations for the cranes to undertake the lifting operations.

Blade storage is also provided in the form of two strips granular material raised above the localised flattened ground to store the blades prior to placement.

The main crane pad hardstanding will require to be constructed to provide a suitable bearing capacity for the loads expected during the turbine construction. This crane pad will be founded on solid ground and will have a 0.5m thick engineered granular hardstanding to provide a flat and even surface for the crane.

The Proposed Development will utilise material extracted from borrow pits and supplemented by local quarries if needed. These quarries will be sourced once planning consent for the project is granted. Further information on the quarries most likely to be utilised is found in **Chapter 06 Land Soils and Geology** and **Chapter 14 Traffic** within the EIAR.

Turbine crane hardstands will consist of a minimum 500 mm hardcore placed on top of a geotextile separator membrane. The construction methodology for newly constructed tracks will be as follows:

- Topsoil and soils will be excavated to create a formation surface,
- The formation will be prepared to receive the geotextile membrane,
- Stone will be placed and compacted in layers to a minimum of 500mm depth,
- A drainage ditch will be formed, within the excavated width and along the sides of the hard standing,
- Surplus topsoil will be placed along the side of the hard standing and dressed to blend in with surrounding landscaping for use in future restoration of the hardstandings, and
- Surplus excavated subsoil will be used for landscaping, visual screening and reinstatement of borrow pits.



Ditches will be provided where required around the crane pads to ensure they are suitably drained from surface water.

4.3.9 Turbine Foundation

The bases of the foundations are excavated to a competent bearing strata. It is anticipated that foundations will be gravity based foundations consisting of a reinforced concrete base between 21.5 - 28.4 metres in diameter. Piles will be used where the underlying strata does not meet the criteria for gravity based foundations. However, based on site investigations carried out to date, it is considered that all turbine foundations shall be shallow gravity bases types and founded on either rock or glacial till. This will be confirmed with further site investigations prior to construction. Excavated soil will be placed in the temporary storage areas adjacent to the turbines. Formwork and reinforcement are placed, and the concrete poured. Once the concrete is cured to a suitable strength the earthing system is put in place the foundation will be backfilled with compacted engineering fill to blend into the adjacent topography.

4.3.10 Turbine Erection

The turbine components will be delivered on site where they will be placed on hardstand and laydown areas prior to assembly. The components include the turbine towers which are delivered in sections, and the turbine blades which will be delivered individually. Once all components are available and there is suitable weather each turbine will be assembled.

Each turbine will take approximately 3-4 days to erect, weather dependent and will require two cranes in the assembly process. The turbines will then be commissioned and tested.

4.4 Waste Management

4.4.1 Waste Generated

Any waste that is generated during the development's construction phase will be collected, separated and stored in dedicated receptacles at the temporary construction compounds during construction works. It's the responsibility of the contractor for them main construction works when appointed to nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as the Waste Manager who will have overall responsibility for the management of waste. The Waste Manager will have overall responsibility to instruct all site personnel including subcontractors to comply with on-site requirements. This will ensure that at an operational level, each crew foreman is assigned direct responsibility.

The following categories of waste will most likely be generated during the construction phase of the Proposed Development:

- construction and demolition waste,
- waste oil and hydrocarbons,
- paper and cardboard,
- timber and steel,
- municipal solid waste generated from the office and canteen.

Sanitary waste will be removed from site by a licensed waste disposal contractor. All portaloos located on the site during the construction phase will be operated and maintained in accordance with the manufacturer's instructions and will be serviced under



contract with the supplier. All such units will be removed off site following the completion of the construction phase.

A fully authorised waste management contractor will be appointed prior to the commencement of construction works. This contractor will provide the appropriate receptacles for the collection of the various waste streams able ensure regular emptying and/or collection of these receptacles. Appropriate licensed waste facilities in the surrounding area will be used as part of Waste Management arrangements.

4.4.1.1 Waste Reduction Practices

All efforts will be made by site management to minimise the creation of waste throughout the project. Such efforts include:

- Material storage areas will be of a suitable design and construction to adequately protect which would generate additional waste.
- Material ordering will be optimised to ensure only the necessary quantities of materials are delivered to the site.
- All plants will be serviced before arriving to the Proposed Development Site which will reduce the risk of breakdown and the possible generation of waste oil or hydrocarbons on site.
- Prefabrication of design elements will be used where appropriate to eliminate waste generation on sites.

4.4.1.2 Waste Reuse

When possible, materials will be re used onsite for other suitable purposes e.g.:

- Re-use of shuttering etc. Where it is safe to do so;
- Re-use of rebar cut-offs where suitable;
- Re-use of excavated materials for screening, berms etc.;
- Re-use of excavated material etc. – where possible will be used as suitable fill elsewhere on site for site tracks, the hardstanding areas and embankments where possible;
- Excess subsoils from excavations shall be used to reinstate borrow pits on site.

Any excess excavated material that will be used for fill, re-instatement, or similar activities, within the development site boundary is not categorised as a waste material under relevant waste legislation, rather this material is exempt from waste classification.

Article 2 (1) (c) of Directive 2008/98/EC on waste, transposed through Article 26 (1) (c) of the European Communities (Waste Directive) Regulations (S.I. 126 of 2011) identifies the following as being an exemption from waste regulation:

“uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated”.

Surplus material will be re-instated in its natural condition on the site from which it was excavated, this material is not considered as waste.



4.4.2 Wastewater

During the construction stage effluent and waste will be captured onsite in a foul holding tank at temporary construction compound locations and stored for offsite disposal by a licensed contractor. During operation, effluent and waste will be collected from staff welfare facilities located at the Proposed Permanent Operational Compound and Proposed Substation and stored for offsite disposal by a licensed contractor.

At the Proposed Substation Site, a wastewater holding tank will be provided outside the substation compound fence line so that it can be maintained where required without requiring access to the substation compound. The wastewater holding tank will be a sealed storage tank with all wastewater tankered off-site as required by an authorised waste collector to a wastewater treatment plant.

Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the site). The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the site's turbines, wind measurement devices and electricity substation that will be monitored 24 hours a day seven days per week. This approach for managing wastewater on site has become a standard practice in windfarm sites.

The developer and the appointed contractor will seek to prevent, reduce, reuse and recover as much of the waste generated on the site as possible and to ensure the appropriate transport and disposal of residual waste is undertaken off site in accordance with the Waste Management Act 1996 (as amended) and in alignment with the National Waste Management Guidelines and the European Waste Management hierarchy.

4.4.3 Waste Recycling, Recovery and Disposal

National waste policy requires the separation of recyclable material at source. During the construction phase of the proposed development, receptacles will be provided for the separation and collection of dry recyclables (paper, cardboard, plastics), biological waste (canteen waste).

Receptacles for the following sources aggregated materials will be made available on site at a suitable location:

- food waste
- packaging waste
- dry mixed recyclables
- aluminium
- ferrous materials
- timber

The materials will be transported off site by an authorised contractor to a permitted recovery centre. These materials will then be processed through the various recovery operations.

Residual waste generated on site may require disposal. This waste will be deposited within dedicated receptacles and collected by the permitted waste management contractor who will then transport this waste to an appropriate facility. All waste movements will be recorded, and the waste manager on site will hold these records.



4.4.4 Construction Timeline

The construction phase of the proposed development, which includes civil, electrical, grid works, and turbine assembly will take approximately 18-24 months once the proposed turbines are acquired via a competitive tender process.

4.4.4.1 Operation and Lifespan of the Proposed Development

During the operational phase of the Proposed Development, turbines will operate automatically on a day-to-day basis. The turbines will respond to changes in wind speed and direction by means of anemometry-equipment and control systems.

Twice a year each turbine will undergo a schedule service. The operation of the wind turbines will be monitored remotely, and a caretaker will oversee the day-to-day running of the proposed windfarm.

The expected physical lifetime of the turbine is approximately 35 years, and permission is sought for a 35-year operation period commencing from full operational commissioning of the Proposed Development at the end of the proposed 10 year permission.

The Proposed Development seeks a 35-year operational period. However, it should be noted that following the end of their useful life, wind turbines may, subject to further planning permission, be replaced with a new set of turbines or the Proposed Development may be decommissioned.

4.4.4.2 Project Decommissioning

During the decommissioning phase of the Proposed Development, the turbines will be fully disconnected from the power supply.

The internal components of the turbine will be removed prior to the dismantling of the turbines using cranes in a similar manner to the construction but in reverse. The turbine will be removed to approximately ground level and the components will be transported off site for re-use or recycling. Turbine crane pads are likely to require remedial works (removal of vegetation, levelling and recompacting of granular material) to ensure they are suitable to take the bearing loads of the cranes.

The foundations will be covered over and allowed to re-vegetate naturally. Leaving turbine foundations in situ is considered a more environmentally sensible option. Removing the reinforced concrete foundation associated with each turbine would result in environmental nuisances such as noise and vibration and dust.

It is proposed that the internal site access tracks will be left in situ, subject to agreement with Westmeath and Meath County Councils and the relevant landowners.

The proposed on-site substation will be taken in charge by ESBN /EirGrid upon completion and should be left in place forming part of the national electricity network.

Underground cabling will be cut back and left in situ.

A detailed decommissioning plan will be agreed in advance of construction with Westmeath and Meath County Councils.

4.5 Ecology Baseline

4.5.1.1 Ecology Surveys

Table 4-7 details all the surveys undertaken at the Proposed Development site.



Table 4-7: Summary of ecological surveys

Survey	Description	Timing	Guidance Applied
Habitats and Flora	Walkover survey within the Proposed Development site	June and August 2022, and November 2022	(Fossitt, 2000) (Smith <i>et al.</i> , 2011)
	Annex 1 habitat surveys within Northern Cluster	July 2022 and September 2023	(Perrin <i>et al.</i> , 2014)
	Condition assessment of Possible Ancient Woodland (PAW) in Southern Cluster	June 2022	(Perrin and Daily, 2010)
Birds	Vantage Point (VP) surveys covering each turbine location plus a 500 m radius Two VPs x hours/VP/season over 0.5 years ¹⁷ Three VPs x 36 hours/VP/season over 2 years ^{18,19}	Breeding season 2019: June to September 2019	(NatureScot, 2017)
		Non-breeding season 2019/20 October 2019 to March 2020	
		Breeding season 2020: May to September 2020	
		Non-breeding season 2020/21: October 2020 to March 2021	
		Breeding season 2021: April to September 2021	
		Breeding walkover surveys within the Proposed Development Site plus a 500 m buffer zone	
	Breeding season 2020: May to July 2020		
	Breeding season 2021: April to July 2021		
	Breeding raptor surveys within the Main Wind Farm plus a 2 km buffer zone	Breeding season 2019: May to July 2019	(Hardey <i>et al.</i> , 2013)
		Breeding season 2020: May to July 2020	
		Breeding season 2021: April to July 2021	
	Breeding woodcock surveys within the Main Wind Farm plus a 500 m buffer zone	Breeding season 2019: June 2019	(Gilbert <i>et al.</i> , 1998)
		Breeding season 2020: May and June 2020	

¹⁷ June to September 2019

¹⁸ October 2019 to September 2021

¹⁹ Slightly less survey effort was provided for each winter season (66, 71 and 61 hours for VPs 1 to 3, respectively).



Survey	Description	Timing	Guidance Applied
		Breeding season 2021: May and June 2021	
	Winter walkover surveys within the Main Wind Farm plus a 500 m buffer zone	Non-breeding season 2019/20: October 2019 to March 2020	(Bibby <i>et al.</i> , 2000)
		Non-breeding season 2020/21: October 2020 to February 2021	
	Wildfowl distribution and abundance surveys within the Main Wind Farm plus a 500 m buffer zone for foraging wildfowl and a 1 km buffer for roosting wildfowl	Breeding season 2019: September 2019	(NatureScot, 2017) (BirdWatch Ireland, 2015)
		Non-breeding season 2019/20: October 2019 to March 2020	
		Breeding season 2020: May, August and September 2020	
		Non-breeding season 2020/21: October 2020 to February 2021	
		Breeding season 2021: April to May 2021	
Terrestrial Mammals (excluding bats)	Searches within 150 m of any proposed infrastructure at Main Wind Farm and at offsite substation	June and August 2022, November 2022	(Cresswell <i>et al.</i> , 2012)
	Trail cameras within Main Wind Farm (Northern and Southern Cluster)	August 2022	
Bats	Preliminary ecological appraisal within Main Wind Farm	June 2022	(Collins, 2016) (NatureScot, 2021)
	Summer roost assessment within Main Wind Farm	June, July and August 2022	
	Winter roost assessment within Main Wind Farm	October and November 2022	
	Surveys of trees/structures along cable corridor and TDR	June and August 2022	
	Ground-level static detectors: at 8 turbines for spring, summer and autumn 2022 rounds	Spring: 12 to 24 May 2022 Summer: 13 to 27 July 2022 Autumn:	



Survey	Description	Timing	Guidance Applied
		29 September to 12 October 2022	
	At-height static detector: located on meteorological mast for summer and autumns rounds 2023	Round 1: 1 to 21 June 2023 Round 2: 4 to 31 August 2023	
	Transects: two locations (both in Southern Cluster)	Spring: 19 May 2022 Summer: 24 June 2022 Autumn: 3 October 2022	
	Emergence surveys at structures within Main Wind Farm	23 June, 4 July, 5 August, 7 September and 8 September 2022	
Other Protected Fauna	Invertebrates, amphibians and reptiles within the Proposed Development site.	June 2022	N/A
	Marsh fritillary butterfly habitat suitability and larval web survey	23 June and 30 October 2022	(NRA, 2009) (Fowles, 2003)
Fisheries and Aquatic Ecology	Undertaken on a catchment-wide scale, the baseline surveys focused on aquatic habitats in relation to fisheries potential (including both salmonid and lamprey habitat), white-clawed crayfish <i>Austropotamobius pallipes</i> , freshwater pearl mussel <i>Margaritifera margaritifera</i> (eDNA only), macro-invertebrates (biological water quality), macrophytes and aquatic bryophytes, aquatic invasive species, and species of conservation value which may use the watercourses in the catchment in which the Proposed Development is located e.g. otters and amphibians.	19 to 22 July 2022	(Environment Agency, 2003)

All constraints and limitations to the survey effort outlined above is detailed in Chapter 5 'Biodiversity' in the EIAR. However, all limitations and uncertainties were minor and did not affect the ability to make an accurate assessment of the likely effects of the Proposed Development in accordance with best practice.



4.5.1.2 Habitats (Annex I)

H7140 Transition mires and quaking bog

One Annex I fen habitat type, H7140 Transition mires and quaking bog, was recorded within the Proposed Development Site but outside of any European site. This habitat occurs in two discrete areas, the westernmost is continuous, whereas the easternmost is in small patches. This Annex I type may also occur in the vicinity of Lough Shesk and Freekan Lough, (c.870 m and c.480 m from the nearest infrastructure, respectively), outside the Proposed Development Site but within the River Boyne and River Blackwater cSAC.

H7210 Calcareous fens and H7230 Alkaline fen

H7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae, and H7230 Alkaline fen were recorded outside the Proposed Development Site (c.345 m from the nearest infrastructure (T3)) in a narrow band around Newtown Lough. Newtown Lough and the surrounding fen are included within the cSAC. Again, these two Annex I types may also occur in the vicinity of Lough Shesk and Freekan Lough.

H91E0 Alluvial forests

An area of woodland (c. 0.5 ha) to the southwest of Newtown Lough was classified as WN6 wet willow-alder-ash woodland according to the Fossitt classification. This vegetation of this woodland shows some affinity with the Annex I habitat type: H91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae).

4.5.1.3 Species (Annex I birds and Annex II others)

Kingfisher was recorded on one occasion during a wildfowl distribution survey within the Proposed Development Site. In October 2020, a kingfisher was observed commuting along a river approximately 600m to the west of the Proposed Development Site.

Lough Derravarragh SPA is located approximately 16 km west of the Proposed Development. The qualifying interests of this SPA include whooper swan and coot.

Whooper swan was observed commuting over the Proposed Development Site on seven occasions during the study period (June 2019 – September 2021). Observations ranged from a pair to 28 birds, and all flights were at potential collision height. This species was also recorded feeding and roosting in small numbers within the Proposed Development Site. It is not known whether these birds from part of the SPA wintering population, however, this species may make local movements between sites during the winter.

Coot was recorded breeding in small numbers at Newtown Lough. There were no observations of this species in flight. Again, it is not known whether these birds from part of the SPA wintering population.

No other qualifying interest features for this SPA were recorded during the surveys.

Lough Derravarragh SPA is also designated for waterbird and wetland birds, of which the Annex 1 golden plover was recorded during ornithology baseline study. During flight activity surveys, a peak count of approximately 500 golden plover in one flock was observed within 500m of the Proposed Development Site boundary. During the winter months this species was recorded feeding and roosting within 500m of the Proposed Development Site. Wood sandpiper was observed within the Proposed Development site and could be considered part of the Lough Derravarragh SPA waterbird and wetland bird population. The



conservation objectives for this qualifying interest relates to the maintenance and restoration of the wetland habitat within the SPA, rather than the bird populations directly.

Aquatic surveys were undertaken on watercourses within the Proposed Development Site and within the surrounding catchment (see **Appendix 2** for more detail). Despite widespread suitability, otter signs were only recorded at a total of three sites (see **Appendix 2** for site locations); B6 on the Stonyford River, and B3 and B5 on the D'arcy's Crossroads Stream. No breeding (holts) or resting (couch) areas were identified. All of these sites are within 1 km of the Proposed Development Site boundary, of which site B5 is approximately 200 m from the western boundary.

The fisheries assessment (see **Appendix 2** for more detail) recorded Atlantic salmon in low densities in Athboy River (A4), D'arcy's Crossroads Stream (B5 & B6) and the Stonyford River (B9). This species was also recorded in medium density at site B7 on the Stonyford River. Lamprey ammocoetes are widespread in the vicinity of the Proposed Development Site, being recorded in the Athboy River (A4; see **Appendix 2** for site locations), D'arcy's Crossroads Stream (B5 & B6) and the Stonyford River (B7 & B9). These are almost certainly Brook lamprey.

Hen harrier, peregrine falcon, merlin and marsh fritillary were also recorded within the Proposed Development Site. However, these species are not qualifying interests of any European site for which there is source-receptor connectivity.

White-clawed crayfish were only recorded in the Athboy River (A4). White-clawed crayfish is a qualifying interest of the following SAC's within 20 km of the Proposed Development Site; Lough Bane and Lough Glass cSAC, Lough Lene SAC and White Lough, Ben Lough and Lough Doo SAC. However, there is no ecological connectivity between these European Sites and the Proposed Development Site.

4.5.1.4 Ecological Connections

A species that is a qualifying interest of a European Site could use habitat within or in the vicinity of the Proposed Development Site. If such a species is present within the Proposed Development site, it could be considered to be connected to the relevant European Site.

Ecological connectivity between the Proposed Development site and following European sites has been identified; River Boyne and River Blackwater cSAC and Lough Derravarragh SPA.

In addition, there are fen habitats present within the Proposed Development site that may provide supporting habitat to those within the River Boyne and River Blackwater cSAC.

4.5.1.5 Hydrology and Hydrogeological Connections

There is connectivity, via surface and ground water, between the Proposed Development Site and the River Boyne and River Blackwater cSAC and River Boyne and River Blackwater SPA. Refer to Drawing 3 for hydrological connectivity and **Table 3-2** for further detail.

The Proposed Development Site is bordered on the west by D'arcy's Crossroads Stream which flows in a southerly direction, joining with the Cross Keys stream and then becoming the Stonyford River, which flows on to the River Boyne. Tributaries of D'arcy's Crossroads Stream include the Killacroy stream. D'arcy's Crossroads Stream, the Stonyford River and parts of the Cross Keys and Killacroy streams are included within the River Boyne and River Blackwater cSAC.

Newtown Lough lies east of the Proposed Development site. The Lough is fed by two small streams, the Kilskeer and Kilrush Lower, from the north and south respectively, and is



drained by the Kilskeer River which flows on to join or become the Athboy River. Athboy River which also flows in a southerly direction approximately parallel to the Stonyford River (c. 6km apart), until it meets the River Boyne (becoming the Templestown River along the way). Newtown Lough and the Athboy River (but not Kilskeer River) are also included in the River Boyne and River Blackwater cSAC.

4.6 Step 1, Part 2 Information on European Sites

4.6.1 River Boyne and River Blackwater cSAC

The River Boyne and River Blackwater cSAC has site specific conservation objectives (NPWS, 2021). These provide clarity on the definition of favourable conservation condition for the qualifying interests of the cSAC, and state whether the qualifying interests are favourable or unfavourable. These are summarised in **Table 4-8**.

Table 4-8: Conservation objectives for the qualifying interest of the River Boyne and River Blackwater cSAC (F=favourable, U=unfavourable, M=maintain, R, restore)

Qualifying interest	Occurrence in River Boyne and River Blackwater cSAC	Attributes defining conservation condition	Conservation condition and objective
Alkaline fens	The main areas of alkaline fen in the cSAC are documented to occur in the vicinity of Lough Shesk, Freekan Lough, Newtown Lough in the upper reaches of the Stonyford River, it may also occur elsewhere. Newtown Lough is c.450 m from the nearest site infrastructure (T1 and T3). The other Loughs are further away, but less than 1 km distant.	Habitat area Habitat distribution Ecosystem function: soil nutrients Ecosystem function: peat formation Ecosystem function: hydrology - groundwater levels Ecosystem function: hydrology - surface water flow Ecosystem function: water quality Vegetation composition: community diversity Vegetation composition: typical brown mosses Vegetation composition: typical vascular plants Vegetation composition: native negative indicator species Vegetation composition: non-native species Vegetation composition: native trees and shrubs Vegetation composition: algal cove Vegetation structure: vegetation height Physical structure: disturbed bare ground Physical structure: tufa formations Indicators of local distinctiveness Transitional areas between fen and adjacent habitats	F/M
Alluvial forests with <i>Alnus glutinosa</i> and	Grove Island and Yellow Island, near	Habitat area	U/R



Qualifying interest	Occurrence in River Boyne and River Blackwater cSAC	Attributes defining conservation condition	Conservation condition and objective
Fraxinus excelsior	Drogheda, and possibly elsewhere.	Habitat distribution Woodland size Woodland structure: cover and height Woodland structure: community diversity and extent Woodland structure: natural regeneration Hydrological regime: flooding depth/height of water table Woodland structure: dead wood Woodland structure: veteran trees Woodland structure: indicators of local distinctiveness Woodland structure: indicators of overgrazing Vegetation composition: native tree cover Vegetation composition: typical species Vegetation composition: negative indicator species Vegetation composition: problematic native species	
River lamprey	Lower reaches of the Boyne River.	Distribution Distribution of larvae Population structure of larvae Larval lamprey density in fine sediment Extent and distribution of spawning nursery habitat	U/R
Salmon	Present in the D'arcy's Crossroads Stream, Stonyford River and Athboy River.	Distribution: extent of anadromy Adult spawning fish Salmon fry abundance Out-migrating smolt abundance Number and distribution of redds Water quality	U/R
Otter	Present throughout. During baseline surveys an otter spraint was recorded on the D'arcy's Crossroads steam within 200 m of the Proposed Development site boundary.	Distribution Extent of terrestrial habitat Extent of freshwater (river) habitat Extent of freshwater (lake) habitat Couching sites and holts Fish biomass available Barriers to connectivity	F/M

4.6.2 River Boyne and River Blackwater SPA

4.6.2.1 Qualifying Interests and Conservation Objectives

The conservation objectives for the River Boyne and River Blackwater SPA are generic:



‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.’

In the case of the River Boyne and River Blackwater SPA, this is the resident kingfisher population.

The kingfisher population was 19 pairs in 2010 (NPWS, 2010b). There are no more recent accessible data for this species within the SPA, therefore it is not possible to establish the most recent population in terms of population dynamic data. However, the most recent BoCCI kingfisher is amber-listed with a moderate decline in the breeding population of 45% and 44% over short and long time periods respectively (Gilbert *et al.*, 2021). Therefore, under the precautionary principle, the assumption is the population is unfavourable and the conservation objective is to restore (U/R).

4.6.3 Lough Derravarragh SPA

4.6.3.1 Qualifying Interests and Conservation Objectives

The conservation objectives for Lough Derravarragh SPA are also generic:

‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.’

In the case of Lough Derravarragh SPA, this is:

- whooper swan,
- pochard,
- tufted duck, and
- coot.

All four species are considered to be in an unfavourable condition as the mean peak counts between 2016/17 and 2020/21 are considerably lower than the baseline reference values (mean peak counts between 1995/96 and 1999/2000) cited in the site synopsis. Specifically, whooper swan numbers have fallen from 102 to 28, pochard numbers from 3,129 to 114, tufted duck numbers from 1,073 to 188 and coot numbers from 1,358 to 821.

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, ‘Wetland and Waterbirds’ may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included for Lough Derravarragh as follows:

‘To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derravarragh SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.’

Under the precautionary principle, the assumption is that habitat is unfavourable and the conservation objective is to restore (U/R).



4.7 Step 2, Part 1: Effects on the Integrity of European Sites 'Alone'

4.7.1 River Boyne and River Blackwater cSAC

4.7.1.1 Hydrological and Hydrogeological Connectivity

The D'arcy's Crossroads Stream, part of the River Boyne and River Blackwater cSAC is directly adjacent to the western and northern boundary of the Proposed Development Site. The surface water run-off from the Proposed Development Site generally flows towards D'arcy's Crossroads Stream.

The cSAC is also in the same sub-catchment (WFD Boyne_SC_050) as the Proposed Development and therefore they are hydrogeologically connected.

Water Quality

During construction, decommissioning, and to a lesser extent, during operation (in the form of routine maintenance) of the Proposed Development there is potential for the release of:

- suspended solids,
- nutrients, and
- other pollutants, (such as hydrocarbons, contaminated waste-water, and cement-based products).

All identified pathways outlined above have the potential to impact upon the aquatic habitat interest features of the cSAC (Alkaline fens and Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)) if run-off from the Proposed Development site reaches Newtown Lough, where both habitats are found. Suspended solids could reduce water clarity reducing the plants ability to photosynthesize, resulting in die back. The increased availability of nutrients can lead to algal blooms (eutrophication) which can also limit light penetration, reducing growth and causing the death of plants in littoral zones. Hydrocarbon pollution affects leaf biochemistry, leading to decline in productivity and die back of vegetation (Arellano *et al.*, 2015).

Release of suspended solids could occur when soil is disturbed during construction and/or decommissioning works, especially during periods of heavy rainfall. Suspended solid pollution could reduce water quality and smother spawning beds of fish species, leading to negative effects on fish populations, including river lamprey (were it to be restored to the river) and salmon (which is known to occur downstream from the Proposed Development Site in D'arcy's Crossroads Stream and the Stonyford River, part of the cSAC), and consequently negative effects on the species which prey upon the fish, such as otter (which is also known to occur locally). Hydrocarbon pollution also negatively impacts fish. Even at low levels of hydrocarbon pollution, bio-accumulation can occur, leading to suppressed immune systems, reduced metabolism and damage to gills (Austin, 2010). These impacts to fish would in turn negatively impact upon species that hunt them, including otter. During algal blooms, fish can die due to inflammation, mucus production and haemorrhaging gills, which impacts upon the species higher up in the food chain (Hallegraeff, 1992). When algal blooms eventually die, microbial decomposition severely depletes dissolved oxygen levels, creating a hypoxic environment that is unable to support most organisms.

However, the period for potential release of suspended solids is likely to be temporary, occurring only during the construction and/or decommissioning works.



Water Quantity

Temporary lowering of groundwater levels is proposed during the construction of the turbine bases and borrow pits. The temporary lowering of ground water is proposed based on current available information and is subject to confirmatory assessments at the time of construction. If the lowering of ground water levels is required, the impact will be localised and short-term. As previously mentioned, the nearest known location of Alkaline fens and possible Alluvial forests is around Newtown Lough, which is c.450 m from the nearest proposed infrastructure. Alkaline fen also occurs to the west of D'arcy's Crossroads Stream. Lowering of the water in these habitats, even temporarily, would affect the vegetation composition, for example by facilitating colonisation of scrub within the fen, which would be difficult to reverse.

4.7.1.2 Ecological Connectivity

Supporting Habitats

The Annex I H7140 Transition mires and quaking bogs wetland habitats within the Proposed Development Site may be a supporting habitat for the fen habitats within the cSAC, and therefore loss or damage to these undesignated habitats may have knock-on effects for those within the cSAC. For example, some plant species occur in both areas. Whilst the Transition mires and quaking bogs habitat within the Proposed Development site will be largely retained, there will be small losses of this habitat around T1. This habitat could also be lost or damaged, for instance through changes in water levels, if not protected during construction or appropriately managed post construction.

Fish

Salmon, river lamprey and otter are qualifying interests of the River Boyne and River Blackwater cSAC. During aquatic surveys conducted in 2022, salmon were recorded in the Athboy River, D'arcy's Crossroads Stream and the Stonyford River. Lamprey ammocoetes were widespread in the vicinity of the Proposed Development Site, being recorded in the Athboy River, D'arcy's Crossroads Stream and the Stonyford River (see **Appendix 2** for locations). These are most likely to be brook lamprey as river lamprey are absent from the cSAC above Slane due to the presence of weirs.

During construction, two existing crossings over an arterial drainage channel between Turbines 1 and 3 will be upgraded and 2 no. new culverted crossings over a field ditch are proposed to be installed. Construction within watercourses could cause disturbance, displacement, physical injury, or death of these species. Furthermore, the effects of pollution, as discussed in the previous section, may be magnified as species are in closer proximity to the source of the pollution.

Otter

Otter signs were recorded on the Stonyford River and D'arcy's Crossroads Stream (See **Appendix 2** for locations). Otters could utilise small streams and terrestrial habitat within the Proposed Development and there is a risk an otter could become trapped in excavations on land if no appropriate exit is provided. If present within or nearby to the Proposed Development, human activity could affect otter by disturbing and/or displacing individuals, preventing foraging and leading to a loss of condition.



Invasive Non-native Plant Species

There is the potential for construction activity to result in the importation or spread of invasive non-native species within the Proposed Development Site which may subsequently reach the cSAC. Japanese knotweed *Fallopia japonica*, cherry laurel *Prunus laurocerasus* and snowberry *Symphoricarpos alba* were all recorded during surveys. Japanese knotweed was recorded within an abandoned area used for dumping adjacent to the Cable Corridor (at least 20 m from the road verge and separated by a hedge). Cherry laurel was recorded within a hedge in Clonmellon adjacent to the Cable Corridor. Snowberry was recorded along the proposed access track for the Southern Cluster. These species could be transported around the site by construction machinery and potentially make their way into the cSAC. Japanese knotweed, for example could spread along D'arcy's Crossroads Stream once introduced.

4.7.2 River Boyne and River Blackwater SPA

4.7.2.1 Hydrological and Hydrogeological Connectivity

The qualifying interest of the River Boyne and River Blackwater SPA is kingfisher. This species was not recorded within 500 m of the Proposed Development Site. There is hydrological and hydrogeological connectivity between this SPA and the Proposed Development and therefore suspended solids, nutrients and other pollutants, generated during the construction and/or decommissioning of the Proposed Development could enter SPA watercourses. This could result in negative effects on the fish and aquatic insect populations upon which the kingfisher preys, or cloud waters making hunting difficult, or even impossible.

4.7.3 Lough Derravarragh SPA

4.7.3.1 Ecological Connectivity

Lough Derravarragh SPA is located approximately 16 km west of the Proposed Development. The designated features of this SPA are whooper swan, pochard, tufted duck, coot, and waterbirds and wetland birds.

Whooper Swan

Whooper swan was observed occasionally during the surveys. The records are:

- 01/02/2020 at 08:14 four birds in flight for 70s within PCH
- 04/02/2020 at 16:46 28 birds in flight for 50s within PCH
- 30/10/2020 at 10:24 six birds swimming and feeding in Newtown Lough
- 30/10/2020 at 11:32 six birds descending towards Newtown Lough
- 23/11/2020 at 11:21 eleven birds in flight for 380s in PCH
- 15/12/2020 at 16:57 five birds in flight for 29s in PCH flying together to the direction of Newtown Lough
- 10/01/2021 at 13:25 two birds roosting, one in water one resting on ice at Newtown Lough
- 21/01/2021 at 13:03 four birds in flight for 25s in PCH and 20s below PCH



- 26/01/2021 at 11:51 seven birds feeding in flooded/frozen arable fields near Crowinstown Great (SE)
- 09/02/2021 14:44 two birds flying close to Crowinstown Great
- 16/02/2021 at 17:58 two birds in flight for 50s in PCH
- 19/03/2021 at 07:29 four birds in flight for 85s in PCH.

The data confirms that this species occasionally uses Newtown Lough and a field containing a small (seasonal) waterbody near Ballinlig for foraging.

Newtown Lough is minimum distance of 450 m from the nearest infrastructure, T1 and T3. This is beyond the distance at which this species is likely to be disturbed by construction activity and maintenance activity (Goodship, 2022). The waterbody near Ballinlig is approximately 175 m from the cable route and c. 460 m from any other infrastructure. Other than possibly a short section of cable route the construction areas are therefore all beyond the distance at which this species would be expected to be disturbed by construction activity. The grid connection follows a road so even where this comes within 200 m of the location where whooper swan was observed, construction workers will be obscured by vegetation and farm buildings and therefore mostly not visible to the birds. The risk that whooper swan is disturbed during construction, maintenance and decommissioning works is therefore negligible.

Whooper swan may also be displaced by the presence of wind turbines. The displacement distance for whooper swan is 200 – 400 m (Rees 2012). Newtown Lough is c.450 m from T1 and T3 (the closest turbines to the Lough), at the minimum distance, with most of the Lough more than 500 m distant. The (seasonal) waterbody near Ballinlig fields in which this species was recorded are all greater than c.845 m from the nearest turbine (T6). Therefore, the risk that whooper swan is displaced from its foraging areas by the operating wind farm is negligible. Using the data from the surveys, collision risk modelling (CRM) has been completed which indicates that the windfarm could result in 0.24 (Seimens) to 0.27 (Vestas) collisions per year, or 1 bird every four years. The current Lough Derravarragh SPA population is 28 whooper swan. The predicted increase in annual mortality (taking into account the current level) on that size of population is between 3 and 4%.

However, the population of this species has been increasing nationally and in Westmeath (Burke, et al. 2021), it is not known whether the birds observed at the Proposed Development Site are part of the SPA population. Furthermore, there are few (10 in the whole of Europe) known instances of this species colliding with wind turbines since 2002 (Dürr, 2023).

Given the recent increase in population generally, it is unclear why the population at Lough Derravarragh has apparently declined. The whooper swan in Ireland generally feeds by day on grassland and roosts at night on open water and therefore counts at waterbodies are influenced by the time of day that the count is made, which could explain the recent low counts. Regardless, when set against the recent increases (25% increase in Ireland between 2015 and 2020 to 14,467 birds, and 152.4% increase in Westmeath to 982 birds (Burke, et al. 2021)) the predicted mortality from the Proposed Development overall will not have a perceptible effect on the whooper swan population. Moreover, since Lough Derravarragh is c.16 km distant, it may be that the birds observed around the Proposed Development Site are roosting more locally and do not form a regular part of the SPA population.

The small numbers of turbines, divided into two clusters with 1.6 km between them, and a lack of other wind farms in the vicinity means that the energetic costs for the whooper swan of avoiding the wind turbines is negligible.



The risk that the Proposed Development will hinder the restoration of the whooper swan population at Lough Derravarragh through increased mortality is therefore very low, and there is no risk of population level effects from disturbance, displacement or the barrier effect.

Eurasian coot

The coot breeds at Newtown Lough and there were no other recorded of this species made during the surveys.

The distance between Newtown Lough (and indeed the nature of this species), means that it will not be affected by disturbance or displacement due to the Proposed Development.

As previously described, there is a possibility that this species migrates (to/from Britain) through the Proposed Development Site at night on its way to Lough Derravarragh. Given that (i) Lough Derravarragh is 16 km distant from the Proposed Development site, (ii) Lough Derravarragh is the 8 km in length, (iii) there is a wide arc of approach directions to Lough Derravarragh, (iv) there are relatively small numbers of birds, (v) the number of days on which the birds migrate to/from Lough Derravarragh is low and (vi) the relatively small area of the rotor swept area, the risk that a migrating coot associated with the SPA collides with a wind turbine at the Proposed Development Site is very low, and population levels effects can be excluded.

Tufted Duck and Pochard

The situation for migrating tufted duck and pochard is similar to coot, except that these species have been recorded as wind farm fatalities much less often (Dürr, 2023) and may migrate during the day. The risk that a migrating tufted duck and pochard collides with a wind turbine at the Proposed Development Site is very low and very unlikely to affect the population size of these species.

4.8 Step 2, Part 2: Effects on the integrity of European sites ‘In Combination’

4.8.1 Projects

A desktop-based planning search spanning 10 years within a radius of 20 km was undertaken. Sources consulted included the EIA portal, An Bord Pleanála, Westmeath County Council and Meath County Council planning lists. The list was refined by eliminating all single homes from 2 km outside the red line boundary of the Proposed Development and focused on planning applications of over 50 houses and planning applications which contained an EIAR or an NIS. This formed our cumulative long list of developments.

Further refinement was undertaken to ascertain developments within this list. These refinements included:

- All wind farms and cable route planning applications within 20 km where the planning status is to be determined, or where the construction period would likely coincide with the construction period of the Proposed Development;
- All infrastructural projects which are operational and utilising the same road networks that are proposed by the Proposed Development;
- All quarries within 2 km of the Proposed Development red line boundary;



- All Strategic Infrastructure and Strategic Housing Developments within 20 km where the same road network would be utilised; and
- All Strategic Housing Development and Large-Scale Residential Developments within 5 km.

There are no constructed wind farms in the immediate vicinity (5 km) of the Proposed Development. There are three wind farms within 20 km. **Figure 4** illustrates the wind farms within 20 km of the Proposed Development. A further two projects are also considered, specifically a single wind turbine and Knockanarragh meteorological mast. **Table 4-9** gives further details.



Table 4-9: Other projects considered for ‘in-combination’ effects

Applicant / Development name	Development type	Reg. ref.	Distance to development
<p>Bracklyn Wind Farm Ballagh (Mullingar Rural E.D.), Billistown, Ballynacor, and Bracklin, County Westmeath; and Coolronan, Co. Meath</p>	<p>A 10-year planning permission for a renewable energy development within a 30-year operational life consisting of 9 no. wind turbines with a hub height of 10 metres, a rotor diameter of 162 m and an overall tip height of 185 m. Permission is also being sought for the provision of access tracks, all associated underground electrical and communications cabling, 1 no. control building, meteorological mast, 1 no. temporary construction compound, a 110 kV substation, including 2 no. control buildings, 6.3 km of 110kV underground electricity lines accompanied by 2.5 km of associated access track, 3 no. site entrances and all associated site development and drainage works.</p>	<p>ABP REF. PA25M.311565 Granted 07/07/2022</p>	<p>5.0 km south</p>
<p>Ballivor Wind Farm Development Lislogher Great, Cockstown, Clonmorrill, Clonleame, Bracklin, Craddanstown, Killagh, Grange More and Riverdale in County Westmeath and the townlands of Clondalee More, Derryconor, Clonycavan, Robinstown, Coolronan, Doolystown and Moyfeagher in County Meath</p>	<p>The construction of 26 no. wind turbines with a hub height of 115 m, a rotor diameter of 170 m and an overall tip height of 200 m and all associated hard-standing areas. Permission is also being sought for 2 no. permanent meteorological anemometry masts with a height of 115 m, 4 no. temporary construction compounds, 5 no. temporary security cabins, 2 no. borrow pits, 1 no. permanent 110 kV electrical substation, telecom tower, associated electrical plant and equipment, a groundwater well and a wastewater holding tank, all associated underground electrical and communications cabling connecting the turbines and masts to the proposed electrical substation, site access tracks. A 10-year planning permission and 30-year operational life of the wind farm from the date of commissioning of the entire wind farm.</p>	<p>ABP REF. PA25M.316212 Case not yet decided</p>	<p>4.8 km south</p>
<p>Coole Wind Farm Limited Camagh, Carlanstown, Coole, Clonrobert, Clonsura, Doon, Monkstown, Mullagh, Newcastle, Boherquill, Corralanna, Culvin, Joanstown, Mayne, Fearnmore (Fore by), Newtown (Fore by), Simonstown (fore by), Ballinealoe, Shrubbywood, Clonava, Lackan (Corkaree by), Soho, Ballynaclonagh, Abbeyland, Rathganny, Ballindurrow, Cullendarragh, Culleenabohoge, Ballynafid, Knightwood, Portnashangan, Culleen More, Farranistick, and Irishtown (Moyashel by), Co.</p>	<p>Proposed development of up to 15 wind turbines with a tip height of up to 175 m and laying of approximately 26 km of underground electricity cabling to facilitate the connection to the national grid, and all associated site development works.</p>	<p>ABP REF. PA25M.309770 Case not yet decided</p>	<p>c. 20 km northwest</p>



Applicant / Development name	Development type	Reg. ref.	Distance to development
Westmeath			
Reforce Energy Ltd Dryderstown, Delvin, Co. Westmeath	A single electricity generating wind turbine of hub height up to 64m and rotor diameter up to 48 m, a hardstanding, control Building, associated site roads, drainage & site works.	12/2054 (Westmeath) Granted 24/05/2013	c. 9 km southwest
Knockanarragh meteorological mast Cavestwon and Rosmead, Co. Westmeath	The project involves the erection, operation and decommissioning of an 80 m temporary met mast in the townland of Knockanarragh, Co. Westmeath for a maximum period of 15 months.	S5-7-23 (Westmeath) Granted Date 27/09/2023	Within Project site



4.8.2 Plans

The following development plans have been reviewed and taken into consideration:

- Regional Spatial and Economic Strategy 2020-2032 (RSES),
- Westmeath County Development Plan 2021 – 2027,
- Meath County Development Plan 2021 – 2027, and
- National Biodiversity Action Plan.

The review examined policies and objectives relating to designated sites for nature conservation, biodiversity, protected species, conservation of peatlands, sustainable land use and preservation of surface water quality.

Key policies and development allocations are summarised in **Table 4-10**.



Table 4-10: Assessment of relevant plans

Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
Regional Spatial and Economic Strategy 2020-2031	<p>RPO 5.4 Encourage the prioritisation of Site-Specific Conservation Objectives (SSCO) for all sites of Conservation Value, designated in EU Directive (i.e. SACs, SPAs) to integrate with the development objectives of this Strategy.</p> <p>RPO 5.5 Conserve and protect European sites and their integrity.</p> <p>RPO 5.7 Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate.</p>	Not applicable.
Westmeath County Development Plan 2021-2027	<p>12.1 Contribute as appropriate towards the protection of designated sites in compliance with relevant EU Directives and applicable national legislation.</p> <p>12.2 Support the implementation of any relevant recommendations contained in the National Biodiversity Plan, the All-Ireland Pollinator Plan and the National Peatlands Strategy</p> <p>12.3 Support the implementation of the Westmeath Biodiversity Action Plan 2014-2020 and any revisions made thereto.</p> <p>12.4 Protect and conserve Special Areas of Conservation, candidate Special Areas of Conservation, Special Protection Areas and candidate Special Protection Areas, designated under the EU Birds and Habitats Directives respectively.</p> <p>12.9 Identify and provide appropriate buffer zones between Designated Sites and local biodiversity features and areas zoned for development.</p> <p>12.13 Protect, manage and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath, in recognition of its importance as both a non-renewable resource and a natural asset.</p> <p>12.14 Require all new developments in the early pre-planning stage of the planning process to identify, protect and enhance ecological features by making provision for local biodiversity (e.g., through provision of swift boxes, bat roost sites, green roofs, etc.) and</p>	No development allocations identified within the development plan were found to occur within the wider area surrounding the Proposed Development Site. However, the Plan provides a framework for land use developments and activities with potential for construction and operation source effects throughout the County.



Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
	<p>provide links to the wider Green Infrastructure network as an essential part of the design process.</p> <p>12.15 Support the protection of all native woodlands listed in the National Survey of Native Woodlands 2003 to 2008.</p> <p>12.23 Seek to create and enhance ecological linkages and buffer zones from Development.</p> <p>12.24 Protect and where possible enhance biodiversity and ecological connectivity, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, geological and geo-morphological systems, other landscape features, natural lighting conditions, and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones in the context of Article 10 of the Habitats Directive. Appropriate mitigation and/or compensation to conserve biodiversity, landscape character and green infrastructure networks will be required where habitats are at risk or lost as part of a development.</p> <p>12.25 Recognise that nature conservation is not just confined to designated sites and acknowledge the need to protect non-designated habitats and landscapes and to conserve the biological diversity.</p> <p>12.27 Prevent the spread of invasive species within the plan area, including requiring landowners and developers to adhere to best practice guidance in relation to the control of invasive species</p> <p>12.28 Ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicant will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477/2011).</p> <p>12.37 Preserve and enhance the amenity and biodiversity value of the County, by promoting the protection of trees, groups of trees and ancient woodlands, of significant amenity value, especially</p>	



Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
	<p>native and broadleaf species.</p> <p>12.29 Discourage the felling of mature trees and hedgerow, particularly species rich roadside and townland boundary hedgerows to facilitate development and seek Tree Management Plans to ensure that trees are adequately protected during development and incorporated into the design of new developments.</p> <p>12.40 Protect and preserve existing hedgerows in new developments, particularly species rich roadside and townland boundary hedgerows, and where their removal is necessary during the course of road works or other works seek their replacement with new hedgerows of native species indigenous to the area.</p> <p>12.47 Support the preparation of a Tree Planting Policy for the County which promotes biodiversity and indigenous tree planting.</p> <p>12.48 Resist development that would destroy, fragment or degrade any wetland in the County.</p> <p>12.51 Protect floodplains, wetlands and watercourses, for their biodiversity and flood protection value.</p> <p>12.52 Ensure that all proposed land zonings take cognisance of appropriate riparian setback distances that support the attainment of high ecological status for water bodies, the conservation of biodiversity and good ecosystem health, and buffer zones from flood plains.</p> <p>12.54 Seek the continued improvement of water quality, bathing facilities and other recreational opportunities in waterways and to protect the ecology and wildlife thereof.</p> <p>12.56 Protect the biodiversity of rivers, streams and other water courses and maintain them in an open state and discourage culverting and realignment.</p> <p>12.58 Ensure that the County's watercourses are retained for their biodiversity and flood protection values and to conserve and enhance where possible, the wildlife habitats of the County's rivers and riparian zones, lakes, canals and streams which occur outside of designated areas to provide a network of habitats and biodiversity corridors throughout the county.</p>	



Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
	<p>12.66 Exercise control of peat extraction, both individually and cumulatively, which would have significant impacts on the environment, in accordance with legislative provisions, in the interest of protecting and enhancing biodiversity and addressing climate change.</p> <p>12.69 Support collaboration between Local Authorities, the Bord na Mona Transition Team and relevant stakeholders in the development of partnership approaches to integrated peatland management for a just transition having regard to relevant policies and strategies such as the Bord na Móna Biodiversity Plan 2016-2021 and the national Climate Mitigation and Adaptation Plans. This shall include support for the rehabilitation and/or re-wetting of suitable peatland habitats.</p> <p>12.75 Identify, protect and enhance existing and planned Green Infrastructure assets and to facilitate, in consultation with relevant stakeholders, the development of Green Infrastructure that recognises the benefits that can be achieved with regards to the following:</p> <ul style="list-style-type: none"> • Provision of open space amenities • Sustainable management of water • Protection and management of biodiversity • Protection of cultural heritage • Protection of protected landscape sensitivities 	
<p>Meath County Development Plan 2021-2027</p>	<p>HER POL 27 To protect, conserve and enhance the County's biodiversity where appropriate.</p> <p>HER POL 28 To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.</p> <p>HER POL 29 To raise public awareness and understanding of the County's natural heritage and biodiversity.</p>	<p>No development allocations identified within the development plan were found to occur within the wider area surrounding the Proposed Development. However, the Plan provides a framework for land use developments and activities with potential for construction and operation source effects throughout the County.</p>



Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
	<p>HER POL 30 To promote increased public participation in biodiversity conservation by supporting and encouraging community-led initiatives.</p> <p>HER OBJ 30 To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of Ireland’s National Biodiversity Action Plan 2017 - 2021 which relate to the remit and functions of Meath County Council.</p> <p>HER OBJ 31 To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of the County Meath Biodiversity Plan 2015-2020 and any revisions thereof.</p> <p>HER OBJ 32 To actively support the implementation of the All-Ireland Pollinator Plan 2021-2025 and any revisions thereof.</p> <p>HER POL 32 To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with NPWS.</p> <p>HER POL 35 To ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites and to require an appropriate level of ecological assessment by suitably qualified professional(s) to accompany development proposals likely to impact on such areas or species.</p> <p>HER OBJ 35 To ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law.</p> <p>HER POL 37 To encourage the retention of hedgerows and other distinctive boundary treatments in rural areas and prevent loss and fragmentation, where practically possible. Where removal of a</p>	



Plan	Policies for the protection of European Sites	Development allocations with potential for in combination effects
	<p>hedgerow, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same type of boundary will be required.</p> <p>HER OBJ 40 To work in partnership with Waterways Ireland and relevant stakeholders to encourage best practice biodiversity management of canal and towpath habitats.</p> <p>HER POL 43 To promote best practice in the control of invasive species in the carrying out its functions in association with relevant authorities including TII and the Department of Transport, Tourism and Sport.</p> <p>HER POL 45 To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance.</p> <p>HER POL 49 To protect the character, visual, recreational, ecological and amenity value of the coast and provisions for public access, in assessing proposals for development.</p> <p>HER OBJ 59 To identify and map green infrastructure assets and sites of local biodiversity value over the lifetime of the Plan.</p>	



4.8.3 River Boyne and River Blackwater cSAC

The primary identified pathway that could affect the River Boyne and River Blackwater cSAC is through a reduction in water quality, due to the number of features associated with aquatic habitat. Any construction projects that are located within the same catchment as the cSAC have the potential to have an in-combination effect with the Proposed Development they also have a negative effect on water quality. This could occur if other projects are timed to be constructed or decommissioned while this Proposed Development is constructed and/or decommissioned, producing a decline in water quality, or in series, with an ongoing reduction in water quality.

In addition, there is the potential for the Proposed Development in-combination with other projects in the same water catchment and in the vicinity of the Proposed Development, to lower ground water levels. Such change, even if temporary, could result in negative changes to ground water dependant habitats.

Furthermore, activities undertaken during the construction/ decommissioning of the wind farm could result in disturbance to otter. Other projects in the vicinity of the Proposed Development Site, if timed to be constructed and/or decommissioned while this Proposed Development is constructed and/or decommissioned, could result in an in-combination effect.

The construction on the Proposed Development has the potential to damage or remove wetland habitat which support habitat within the cSAC. Other construction projects that are located very close to the River Boyne and Blackwater cSAC have the potential to have an in-combination effect with the Proposed Development if they also have the potential to damage or remove such habitats.

There is the potential for construction activity to result in the importation or spread of invasive non-native species, such as Japanese knotweed. Other construction projects with connectivity to the River Boyne and Blackwater cSAC have the potential to have an in-combination effect with the Proposed Development if they also have the potential to spread invasive non-native species.

However, it can be expected that all such projects and plans will be subject to an appropriate assessment process under the Habitats Directive. These have been looked up where possible for the projects identified and a summary of the conclusions and mitigation are presented in **Table 4-11**. Moreover, water quality in the catchment is primarily determined by farming activity rather than the effects of construction.

4.8.4 River Boyne and River Blackwater SPA

The main pathway that could impact upon kingfisher, the qualifying interest of this SPA, is via a deterioration in water quality, as described above in Section 4.7.3.

Any construction projects that are located within the same catchment as the SPA have the potential to have an in-combination effect with the Proposed Development. This could occur if other projects are timed to be constructed or decommissioned while this Proposed Development is constructed and/or decommissioned, producing a decline in water quality, or in series, with an ongoing reduction in water quality.

However, it can be expected that all such projects and plans will be subject to an appropriate assessment process under the Habitats Directive. These have been looked up where possible for the projects identified and a summary of the conclusions and mitigation are presented in **Table 4-11**. Moreover, water quality in the catchment is primarily determined by farming activity rather than the effects of construction.



4.8.5 Lough Derravarragh SPA

The Proposed Development could result in collisions with whooper swan, and possibly the other qualifying species, which may be a part of the SPA population. The Proposed Development will not result in displacement or disturbance which could affect population sizes. The Proposed Development will not present a barrier to migration on its own and the nearest wind farms to it (either existing or proposed) are c. 5km distant and therefore would not collectively present a barrier to migration.

Other wind farms or single wind turbines located within 20 km have the potential to have an in-combination effect with the Proposed Development. However, it can be expected that all such projects and plans will be subject to an appropriate assessment under the Habitats Directive. These have been looked up where possible for the projects identified and a summary of the conclusions and mitigation are presented in **Table 4-11**.



Table 4-11: Summary of NIS conclusions and mitigation for the other identified projects

Project	NIS conclusion	Mitigation measures summary	Source
Bracklyn Wind Farm ABP REF. PA25M.311565 Granted 07/07/2022	It is concluded that the Proposed Development will not, beyond reasonable scientific doubt, adversely affect the integrity of any Natura 2000 site either directly or indirectly.	<p>Construction Stage: Water quality mitigation</p> <ul style="list-style-type: none"> • Works for stream crossings will be carried out during the working window for instream works. This working window is defined by IFI as July to September to avoid vulnerable spawning salmonids/lamprey that may be present in downstream environments outside of this window. Any works outside this period would require a derogation under the Local Authorities (Works) act, 1949. • There will be no crossing of rivers or streams by machinery during the construction phase and all machinery must stay within the works corridor and utilise designated access routes. • There will be no direct dewatering to watercourses onsite during the construction phase. All outflows from drainage associated with construction will be by diffuse overland drainage at appropriate locations and through settlement ponds. • For locations where works will be undertaken within water protection buffer zones (i.e. within 10 m of watercourses) double silt fences will be installed around the watercourse to prevent sediment/silt infiltration into the watercourse. • Cement leachate, hydrocarbon oils and other toxic poisonous materials will require full containment and should not be permitted to discharge to any waters, and control measures to be in place will include: <ul style="list-style-type: none"> ○ Appropriate bunded storage area for storage of fuels/oils, with onsite - storage of hydrocarbons to be kept to a minimum. ○ Mobile double skinned fuel bowser will be used for re-fuelling on-site ○ No refuelling will be permitted at works locations within the 50 m hydrological buffer. ○ Spill kits will be readily available to deal with any accidental spillage. ○ There is an outline emergency plan for the construction phase to deal with accidental spillages. ○ Ready-mixed concrete will be brought to site, with no batching of wet-cement products occurring on site. ○ Where possible pre-cast products will be installed, including all watercourse crossings. 	Woodrow (2021) Natura Impact Statement Bracklyn Wind Farm. Co. Westmeath



Project	NIS conclusion	Mitigation measures summary	Source
		<ul style="list-style-type: none"> ○ Use of wet-cement products within the hydrological buffer will be avoided, insofar as possible. ○ Lined cement washout ponds will be used for chute cleaning. ○ No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be permitted. ● Wastewater emanating on-site (sewage, waste-water from site office) will be taken off-site for disposal/treatment at controlled facilities. To this effect, welfare facilities for construction site workers will include self-contained port-a-loos with an integrated waste holding tank. No water will be sourced on the site, nor will any wastewater be discharged to the site. ● A Sustainable Drainage Systems (SuDS) will be implemented to manage surface water taking account of water quantity (flooding), water quality (pollution) and biodiversity (wildlife and plants). This SuDS will adopt the following elements: <ul style="list-style-type: none"> ○ Open constructed drains for development run-off collection and treatment. ○ Infiltration interception drains for upslope 'clean' water collection and dispersion. ○ Flow attenuation and filtration check dams to reduce velocities, with consideration given to gradient with drains to determine spacing requirements. ○ Settlement ponds and buffered outfalls to control and store development runoff to allow settlement prior to discharge at Greenfield runoff rates. No outflow will be permitted directly into natural watercourses. ○ The site drainage and attenuation system will be installed prior to the main construction activities, and includes excavation of drainage ditches and installation of settlement ponds and soakaways. ● Measures to ensure adequate management of soil/peat deposition areas in order to avoid impacting on water quality include; <ul style="list-style-type: none"> ○ Both proposed spoil deposition areas are located outside the 50 m stream buffer zone. ○ Silt fences, straw bales and biodegradable matting will be used to control surface water runoff for deposition areas. ○ Deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. 	



Project	NIS conclusion	Mitigation measures summary	Source
		<p>Other measures include:</p> <ul style="list-style-type: none"> • In order to avoid run-off of silt-laden water impacting upon water quality within watercourse adjacent to the works corridor, reinstatement works including measures to re-vegetate disturbed areas through re-seeding and/or placement of saved turves will be undertaken immediately after construction works. • During construction turves will be stored separately from spoil (soil/rock). Separate storage of turves will ensure vegetation is not significantly damaged while stored and that turves can be replaced as a top-mat to facilitate rapid reinstatement of the surface vegetation, whereby avoiding the risk of silt laden surface waters impacting on water quality. • To ensure control measures are implemented appropriately an Ecological Clerk of Works (ECoW) and Environmental Manager will be employed for the duration of the construction works. • Monitoring of water quality during construction will be undertaken. <p>Operational Stage: Water quality mitigation</p> <ul style="list-style-type: none"> • Up-gradient interceptor drains, with water re-distributed over the ground by means of a level spreader. • Swales/roadside drains to collect runoff from operational infrastructure, including transverse drains ('grips') to direct water to swales and check dams to intercept silts at source, with water channelled to settlement ponds. • Settlement ponds will be designed in accordance the greenfield runoff rate requirements and will buffer volumes of runoff discharging from the drainage system during periods of high rainfall. • Overall, the site-specific drainage scheme is required to attenuate the projected increase in runoff of c. 20.4 m³/day (worst-case scenario) that would arise from the hardstands created by the Proposed Development. • Site water runoff quality will be monitored during the operational phase of the Proposed Development. The early stages of the operational phase will require a relatively high frequency of monitoring; however, the frequency of monitoring can gradually reduce thereafter – presuming there are no issues with the quality of discharging water at that point in time. 	



Project	NIS conclusion	Mitigation measures summary	Source
<p>Bord na Móna Powergen Ltd. ABP REF. PA25M.316212 Case not yet decided</p>	<p>Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the site, and, on the basis of objective information, having taken into account the relevant mitigation measures, it can be concluded that the Proposed Development will not have an adverse impact on any European Sites, either alone or in combination with other plans or projects.</p>	<p>Ecology</p> <ul style="list-style-type: none"> Should any otter holts be identified within 150 m of the proposed works during the pre-construction surveys, it will be subject to exclusion procedures as outlined in the TII/NRA guidelines (2006) in consultation with NPWS. Should any kingfisher nesting sites be identified within or adjacent to the Proposed Development footprint during the pre-commencement survey, any construction works in the footprint of or adjacent to the nest will be undertaken outside of the breeding season (March to July inclusive). <p>Hydrology</p> <ul style="list-style-type: none"> Construction Phase Drainage The Project Hydrologist/Design Engineer will complete a site drainage and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. Drainage infrastructure will include: <ul style="list-style-type: none"> Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader. Swales/roadside drains will be maintained to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling. Check dams will be maintained at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events. Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling 	<p>MKO (2023) Natura Impact Statement Proposed Ballivor Wind Farm Development</p>



Project	NIS conclusion	Mitigation measures summary	Source
		<p>ponds will be sized according to the size of the area they will be receiving water from but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds will be ongoing through the construction period.</p> <ul style="list-style-type: none"> • In addition to the above, there will be no instream works within any natural watercourses. • Proposed mitigation measures for watercourse crossings are detailed below: • All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. There will be no in-stream excavation works and therefore there will be no direct impact on the stream at the proposed crossing location. • Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road. • Works in proximity to watercourses will adhere to IFI (2016) Guidelines on protection of fisheries during construction works in and adjacent to waters. • During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas. • All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent. All of the above works will be supervised by an Environmental Clerk of Works and the project hydrologist. Works in proximity to watercourses will adhere to IFI (2016) Guidelines on protection of fisheries during construction works in and adjacent to waters. <p>Operational Phase Drainage</p> <ul style="list-style-type: none"> • The project hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described below: 	



Project	NIS conclusion	Mitigation measures summary	Source
		<ul style="list-style-type: none"> • Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader. • Swales/road side drains will be installed to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling. • Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling ponds will be sized according to the size of the area they will be receiving water from, but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds will be ongoing through the construction period. <p>Refuelling, Fuel and Hazardous Materials Storage</p> <ul style="list-style-type: none"> • The following mitigation measures are proposed to avoid release of hydrocarbons at the site: • Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling should occur at a controlled fuelling station. • On-site refuelling will take place using a mobile double skinned fuel bowser. The fuel bowser will be re-filled off site, and will be towed by a 4x4 jeep to machinery is located. The 4x4 jeep will also carry fuel spill kits in the event of any spillages. The fuel bowser will be parked on a designated level area in the construction compound when not in use. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. • Fuel volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor. 	



Project	NIS conclusion	Mitigation measures summary	Source
		<ul style="list-style-type: none"> • The electrical substation compound fuel storage area will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor. • The plant used will be regularly inspected for leaks and fitness for purpose. • An emergency plan for the construction phase to deal with accidental spillages will be developed. Spill kits will be available to deal with any spillage in and outside the refuelling area. <p>Cement Based Products Control Measures</p> <ul style="list-style-type: none"> • The following mitigation measures are proposed to avoid release of cement leachate from the site: • No batching of wet-cement products will occur on site. • Ready-mixed supply of wet concrete products and where possible, emplacement of precast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used. • No washing out of any plant used in concrete transport or concreting operations will be allowed on-site. • Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. • Use weather forecasting to plan dry days for pouring concrete. • Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event. • The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a concrete washout area, typically built using straw bales and lined with an impermeable membrane. The areas are generally covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned <p>Natura Impact Statement NIS - F 2023.03.24- 191137 86 down from the chute</p>	



Project	NIS conclusion	Mitigation measures summary	Source
		<p>will have solidified and can be broken up and disposed of along with other construction waste.</p> <p>Dust Control</p> <ul style="list-style-type: none"> Proposed measures to control dust include: Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions. The public roads outside the wind farm Site Boundary including the two access locations off the R156 will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary. Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions. The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary. All construction related traffic will have speed restrictions on un-surfaced roads to 20 kph; Daily inspection by the ECoW of construction sites to examine dust measures and their effectiveness. When necessary, sections of the haul route immediately outside the site entrances will be swept using a truck mounted vacuum sweeper; and, All vehicles leaving the construction areas of the site will pass through a wheel washing area prior to entering the local road network. 	
<p>Coole Wind Farm ABP REF. PA25M.309770 Case not yet</p>	<ul style="list-style-type: none"> Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the site, and, on the basis of objective 	<p>Construction Phase Mitigation</p> <p>A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in place prior to the start of the construction phase. A summary of the some of the main points included in the CEMP are provided below and in the</p>	<p>MKO (2021) Natura Impact Statement Coole Wind Farm, Co. Westmeath</p>



Project	NIS conclusion	Mitigation measures summary	Source
decided	information, having taken into account the relevant mitigation measures, it can be concluded that the Proposed Development will not have an adverse impact on any European Sites, either alone or in combination with other plans or projects.	<p>following sections:</p> <ul style="list-style-type: none"> • All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended. • The removal of woody vegetation will be undertaken outside the bird breeding season which runs from the 1st of March to the 31st of August inclusive. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. • In line with best practise, no construction works are permitted 1st of March to the 31st of August inclusive within a 350m radius of the lapwing breeding territories. In line with best practise, no construction works are permitted 1st of March to the 31st of August inclusive within a 500m radius of the barn owl breeding site. • During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. • Plant machinery will be turned off when not in use. • All plant and equipment for use will comply with the industry best practise Construction Plant and Equipment Permissible Noise Levels Regulations and other relevant legislation. • An Ecological Clerk of Works (ECoW) will be appointed. Duties will include: <ul style="list-style-type: none"> ○ Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. ○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development site. ○ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress. • No operational phase impacts requiring mitigation were identified. • Decommissioning Phase Mitigation 	



Project	NIS conclusion	Mitigation measures summary	Source
		<ul style="list-style-type: none">• The following measures are proposed for the decommissioning phase:• During the decommissioning phase, disturbance limitation measures will be as per the construction phase.• Plant machinery will be turned off when not in use.• All plant and equipment for use will comply with industry best practise Construction Plant and Equipment Permissible Noise Levels Regulations.	



For all the identified projects where an NIS/ environmental reporting was available, the projects incorporated significant mitigation to prevent suspended solids/ pollution from reaching the River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA.

The only project for which the interest features of Lough Derravarragh SPA were assessed at Stage 2: Appropriate Assessment was Coole Wind Farm. However, no impacts requiring mitigation were identified.

4.9 Step 2, Part 3: Implications for the Conservation Objectives

4.9.1 River Boyne and River Blackwater cSAC

The unmitigated risks for the Proposed Development to undermine the draft conservation objectives for the River Boyne and River Blackwater cSAC are set out below in **Table 4-12**.

Table 4-12: Unmitigated risk of undermining the conservation objectives of the River Boyne and River Blackwater cSAC

Conservation objective (summary)	For the Proposed Development Alone	For the Proposed Development in combination with other plans and projects
Maintain the: <ul style="list-style-type: none"> habitat area, and habitat distribution of Alkaline fen	Very low risk: There are no works proposed within the cSAC and the closest known location of this habitat is around Newtown Lough which is 450 m away from the nearest infrastructure (T1 and T3). Temporary lowering of groundwater levels during construction of turbine bases and borrow pits may occur resulting in indirect negative impacts to the area and distribution of this habitat.	Elevated but very low risk of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.
Maintain the: <ul style="list-style-type: none"> Ecosystem function: soil nutrients, Ecosystem function: peat formation, Ecosystem function: hydrology - groundwater levels, Ecosystem function: hydrology - surface water flow, and Ecosystem function: water quality of Alkaline fen	Low risk: Unmitigated, the Proposed Development could release suspended sediment, nutrients and other pollutants into water courses hydrologically connected with the cSAC resulting in a deterioration of water quality and increase in soil nutrients. Temporary lowering of groundwater levels during construction of turbine bases and borrow pits may occur which could impact upon ground water levels within the cSAC. Potential for increase in surface water flow due to run-off from surfaced and hard stand areas within the Proposed Development site.	Elevated but low risk, of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.
Maintain the: <ul style="list-style-type: none"> vegetation composition: community diversity, vegetation composition: typical brown mosses, vegetation composition: typical vascular plants, vegetation composition: native negative indicator 	Low risk: There are no works proposed within the cSAC and alkaline fen habitat was not recorded within the Proposed Development site during the surveys. There will be no direct disturbance of this habitat. However, construction activity may result in the temporary lowering of ground water levels which could result in changes to groundwater levels within the cSAC and	Elevated but low risk of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.



Conservation objective (summary)	For the Proposed Development Alone	For the Proposed Development in combination with other plans and projects
<p>species,</p> <ul style="list-style-type: none"> • vegetation composition: nonnative species, • vegetation composition: native trees and shrubs, • vegetation composition: algal cover, and • Vegetation structure: vegetation height <p>of Alkaline fen</p>	<p>cause changes to vegetation composition and structure.</p> <p>There is also the potential for construction activity to result in the importation or spread of invasive non-native species within the Proposed Development site which may subsequently reach the cSAC.</p>	
<p>Maintain the:</p> <ul style="list-style-type: none"> • physical structure: disturbed bare ground, and • physical structure: tufa formations <p>of Alkaline fen</p>	<p>Very low risk: There are no works proposed within the cSAC and alkaline fen habitat was not recorded within the Proposed Development Site during the surveys.</p> <p>However, construction activity may result in the temporary lowering of groundwater levels which could result in changes to groundwater levels within the cSAC and cause changes to the physical structure of the habitat.</p>	<p>Elevated but very low risk of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.</p>
<p>Maintain the:</p> <ul style="list-style-type: none"> • indicators of local distinctiveness, and • transitional areas between fen and adjacent habitats <p>of Alkaline fen</p>	<p>Very low risk: There are no works proposed within the cSAC and alkaline fen habitat was not recorded within the Proposed Development Site during the surveys.</p> <p>However, construction activity may result in the temporary lowering of groundwater levels which could result in changes to groundwater levels within the cSAC and cause changes to indicators or local distinctiveness and transitional areas between fens and adjacent habitats.</p>	<p>Elevated but very low risk of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.</p>
<p>Restore the:</p> <ul style="list-style-type: none"> • habitat area, and • habitat distribution <p>of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)</p>	<p>No risk: There are no works proposed within the cSAC and alluvial forest habitat was not recorded within the Proposed Development Site during the surveys. There will be no loss of this habitat. There is no potential for adverse effects on alluvial forest in respect of habitat area or distribution as a result of the Proposed Development .</p>	<p>n/a</p>
<p>Restore the:</p> <ul style="list-style-type: none"> • woodland size, • woodland structure: cover and height, • woodland structure: community diversity and extent, • woodland structure: natural regeneration, • woodland structure: dead 	<p>No risk: There are no works proposed within the cSAC and alluvial forest habitat was not recorded within the Proposed Development during the surveys. There will be no works within this habitat and therefore no changes to the structure of alluvial woodlands as a result of the Proposed Development.</p>	<p>n/a</p>



Conservation objective (summary)	For the Proposed Development Alone	For the Proposed Development in combination with other plans and projects
<p>wood,</p> <ul style="list-style-type: none"> woodland structure: veteran trees, woodland structure: indicators or local distinctiveness, and woodland structure: indicators of overgrazing <p>of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)</p>		
<p>Restore the:</p> <ul style="list-style-type: none"> hydrological regime: flooding depth/height of water table <p>of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)</p>	<p>Low risk: There are no works proposed within the cSAC and alluvial forest habitat was not recorded within the Proposed Development during the surveys.</p> <p>However, construction activity may result in the temporary lowering of groundwater levels, subject to confirmatory survey prior to construction, which could result in changes to the height of the hydrological regime within the cSAC.</p>	n/a
<p>Restore the:</p> <ul style="list-style-type: none"> vegetation composition: native tree cover, vegetation composition: typical species, vegetation composition: negative indicator species, and vegetation composition: problematic native species <p>of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)</p>	<p>No risk: There are no works proposed within the cSAC and alluvial forest habitat was not recorded within the Proposed Development site during the surveys. There will be no works within this habitat and therefore no changes to vegetation composition of alluvial woodland as a result of the Proposed Development.</p>	n/a
<p>Restore the;</p> <ul style="list-style-type: none"> distribution, population structure of juveniles, juvenile density in fine sediment, extent and distribution of spawning habitat, and availability of juvenile habitat for river lamprey. 	<p>Low risk: Unmitigated, the Proposed Development could release suspended sediment, nutrients and other pollutants into water courses hydrologically connected with the cSAC resulting in a deterioration of water quality.</p> <p>Suspended solids could cover breeding grounds and impact upon breeding productivity or hinder the restoration of breeding grounds and productivity.</p> <p>Pollutants could decrease the abundance of prey species and negatively affect the restoration of adult river lamprey.</p> <p>Further due to the presence of weirs this species is absent above Slane. It is very likely that any effect from the Proposed Development will be gone before the removal of the weir.</p>	Elevated but low risk, of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.



Conservation objective (summary)	For the Proposed Development Alone	For the Proposed Development in combination with other plans and projects
<p>Restore the:</p> <ul style="list-style-type: none"> • distribution, • adult spawning fish, • salmon fry abundance, • out-migrating smolt abundance, • number and distribution of redds, and • water quality for salmon. 	<p>Low risk: Unmitigated, the Proposed Development could release suspended sediment, nutrients and other pollutants into water courses hydrologically connected with the cSAC resulting in a deterioration of water quality and consequently hinder the restoration of spawning habitat.</p>	<p>Elevated but low risk, of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.</p>
<p>Maintain the;</p> <ul style="list-style-type: none"> • distribution, • extent of terrestrial habitat, • extent of marine habitat, • extent of freshwater habitat (river & lake), and • couching sites and holts for otter. 	<p>Low risk: There will be no works within the cSAC and the watercourses within the Proposed Development site do not support suitable habitat for this species. No otter resting or breeding sites were recorded within the Proposed Development site. However, otter signs were recorded on D'arcy's Crossroads Stream and the Stonyford River which lie adjacent to the western site boundary. Activities undertaken during the construction/ decommissioning of the Proposed Development could result in disturbance and displacement of otter from the adjacent sections of the cSAC. However, this species is not very sensitive to disturbance (Chanin, 2003)</p>	<p>Elevated but low risk, of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.</p>
<p>Maintain the:</p> <ul style="list-style-type: none"> • fish biomass available for otter. 	<p>Low risk: Water pollution via suspended sediment could negatively affect fish spawning gravels, vegetation or invertebrates that fish forage upon.</p>	<p>Elevated but low risk, of other construction and/or decommissioning works at other project sites adding to the risk for the Proposed Development alone.</p>

4.9.2 River Boyne and River Blackwater SPA

The unmitigated risks for the Proposed Development to undermine the conservation objectives of the River Boyne and River Blackwater SPA are related to the release of suspended solids, nutrients and other pollutants, generated during the construction and/or decommissioning of the wind farm, into SPA watercourses. This could result in negative effects on the fish and aquatic insect population upon which the kingfisher (the only qualifying interest for this SPA) hunts, or could cloud waters impacting hunting efficiency. Due to the temporary nature of this risk (only during the construction and/or decommissioning phase), the length of this riverine SPA and the ability of kingfishers to forage elsewhere along the potentially impacted rivers, the risk is considered to be low. In combination, the risk is low but elevated as other projects could also release pollution into connected watercourses.



4.9.3 Lough Derravarragh SPA

The Proposed Development may present a collision risk to whooper swan. The data confirms that whooper swan makes occasional flights through the Proposed Development Site. Using the data from the surveys, collision risk modelling (CRM) has been completed which indicates that the Proposed Development could result in 0.24 (Seimens) to 0.27 (Vestas) collisions per year, or 1 bird every four years. The current Lough Derravarragh SPA population is 28 whooper swan. The predicted increase in annual mortality (taking into account the current level) on that size of population is between 3 and 4%.

There are a total of three consented wind farms within 20 km of Lough Derravarragh SPA, namely Bracklyn Wind Farm, Ballivor Wind Farm and Coole Wind Farm. Of these, collision risk modelling for whooper swan was conducted for Ballivor Wind Farm and Coole Wind Farm. Collision risk modelling for whooper swan was not conducted for Bracklyn Wind Farm because the recorded flight times for this species were too low. The collision risk for whooper swan for Ballivor Wind Farm and Coole Wind Farm has been calculated 1.342 and 0.14 collisions per year, respectively. Therefore, taking into account, this Proposed Development, Ballivor Wind Farm and Coole Wind Farm, the cumulative collision risk for this species has been calculated as 1.722 (Seimens) to 1.752 (Vestas) collisions per year. In light of the most recent population estimate for whooper swan at Lough Derravarragh SPA (28 individuals). The predicted increase in annual mortality (taking into account the current level) is between 8.5 and 8.6%. However, it should be noted that the population of this species has generally been increasing nationally and in Westmeath (Burke, et al. 2021), it is not known whether the birds observed at these projects are part of the SPA population. Furthermore, since 2002 there are few (10 in the whole of Europe) known instances of this species colliding with wind turbines (Dürr, 2023).

Regardless, when set against the recent increases (25% increase in Ireland between 2015 and 2020 to 14,467 birds, and 152.4% increase in Westmeath to 982 birds (Burke, et al. 2021)) the predicted cumulative mortality from these wind farms would not have a perceptible effect on the whooper swan population.

In combination, the risk of undermining the conservation objectives and having an adverse effect on site integrity is considered to be low.

4.10 Step 3: Effects on the Integrity of the European Sites

4.10.1 River Boyne and River Blackwater cSAC

As set out in **Table 4-12**, without mitigation, overall there is a low risk of undermining the conservation objectives and therefore having an adverse effect on the for the River Boyne and River Blackwater cSAC during construction and/or decommissioning works as a result of the release of suspended solids and/or other water pollutants, lowering of groundwater levels and spread of non-native invasive species.

4.10.2 River Boyne and River Blackwater SPA

Without mitigation, there is a low risk of undermining the conservation objectives and therefore having an adverse effect on the River Boyne and River Blackwater SPA during construction and/ or decommissioning works as a result of the release of suspended solids and/or other water pollutants into the catchment.



4.10.3 Lough Derravarragh SPA

The risk of disturbance and/or displacement of whooper swan and coot is negligible and therefore the conservation objectives for these species will not be undermined and there will be no adverse effect on site integrity.

Collision with the turbines is considered to present a low risk of undermining the conservation objectives for whooper swan, and very low risk of undermining the conservation objectives for coot, tufted duck and pochard.

4.11 Step 4: Mitigation Measures

4.11.1 Mitigation Measures - Construction

In order to mitigate potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. Good practice measures will be applied in relation to pollution risk, sediment management and management of surface runoff rates and volumes. These measures are set out in the CEMP.

A CEMP (**Appendix 5**) has been developed for the Proposed Development to ensure adequate protection of the environment. The CEMP will be a key contract document and the appointed contractor will be required to implement it in full. All personnel working on the Proposed Development will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP.

During the construction phase, all works associated with the construction of the Proposed Development will be undertaken in accordance with the guidance contained within CIRIA Document C741 'Environmental Good Practice on Site' (CIRIA, 2015), which is current best practice. Any groundwater encountered will be managed and treated in accordance with best practice CIRIA C750, 'Groundwater control: design and practice' (CIRIA, 2016).

4.11.1.1 Buffer to Watercourses

A buffer distance of 50 m will be between watercourses and any proposed construction activities or infrastructure. Where the 50 m buffer cannot be provided at T1, a drainage report has been undertaken and mitigation measures provided for (see **Appendix 6**). The mitigation measures include the provision of a silt fence between the T1 construction area and the River Boyne and River Blackwater cSAC boundary (Code 002299).

4.11.1.2 Site Drainage

During the construction phase of the Proposed Development, the measures outlined in sections 5.9.13, 5.9.15 and 5.9.1.6 will be adopted to prevent silt, chemicals and/or other contaminants from being washed into existing watercourses. Areas exposed due to the removal of existing vegetation are more susceptible to erosion during heavy rainfall so areas will be reinstated prior to heavy rainfall to minimise this effect.

This will include specific guidance in relation to drainage (and control of pollution to the water environment) around the following aspects of site infrastructure:

- access routes,
- foundations, and
- hardstanding areas and new structures.



4.11.1.3 Management of Sediment and Surface Waters

Good practice construction techniques outlined in the CEMP will be adopted for the management of sediment and surface water run-off generated during the construction phase of the Proposed Development. Sustainable Drainage Systems (SuDS) will be used where applicable.

Drainage from the Proposed Development Site would include elements of SuDS design. SuDS replicate natural drainage patterns and have a number of benefits:

- SuDS will attenuate run-off, thus reducing peak flow and any flooding issues that might arise downstream; and
- SuDS will treat run-off, which can reduce sediment and pollutant volumes in run-off before discharging back into the water environment; and
- SuDS measures, such as lagoons or retention ponds, where appropriate and correctly implemented will produce suitable environments for wildlife.

Good practice measures for the management of earthworks to reduce erosion and sedimentation will be implemented and are outlined in the CEMP and are as follows:

- Granular, non-organic material required to be stored temporarily would be compacted, to reduce the potential for erosion and transfer of sediment and stockpiled in designated areas at least 50m from a watercourse.
- Material excavated during new and upgraded access track construction would be stored adjacent to the track and granular, non-organic material compacted in order to limit instability and erosion potential. Peat would not be allowed to dry out, through rewetting and monitored irrigation.
- Stockpiling of excavated material would be managed such that the potential contamination of down slope water supplies and/or natural drainage systems is mitigated / minimised.
- Stockpiled material will either be seeded or appropriately covered.
- Temporary interception bunds and drainage ditches would be constructed upslope of the borrow pit(s) to prevent surface water runoff from entering the excavation. Swales would be implemented to convey and attenuate excess surface water flow away from borrow pit(s).
- Limited dewatering of the borrow pit(s) may be necessary. Water would be treated by a settlement lagoon(s) and then discharge onto vegetated surfaces. Outflow from settlement lagoon(s) in proximity to the borrow pit(s) would discharge to surface water drains.
- Clean and dirty (silty) water encountered onsite during the construction works will be separated, and dirty water will pass through a number of settlement lagoons and silt/sediment traps to remove silt before re-entering the water environment through percolation to ground or discharge to the surrounding drainage system.
- If soil/subsoil material is stockpiled on a slope, silt fences will be located at the top of the slope to reduce sediment transport, silt fences would also be erected between areas at risk of erosion and watercourses.
- Drainage systems will be designed to minimise sedimentation into natural watercourses - this includes buffer strips, silt traps, check dams and infiltration trenches.



- Silt/sediment traps, silt busters, single size aggregate, geotextiles or straw bales will be used as required to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment will avoid periods of heavy rainfall, as instructed by the ECoW.
- Permanent swales and drainage ditches adjacent to access tracks would have outlets at required intervals to reduce the volume of water collected in a single channel and, therefore, reduce the potential for erosion. Outfall pipes would drain into a bunded section of the drainage ditch to allow suspended solids to settle.
- New access tracks would be designed to have adequate cross fall or camber to avoid ponding of rainwater and surface run-off. Run-off from the access tracks and existing drainage ditches would be directed into swales that would be designed to intercept, filtrate and convey the runoff. Check dams would be installed within the swales and existing drainage ditches where required in order to increase the attenuation of run-off and allow sediment to drop out.
- Construction personnel and the Principal Contractor will carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas, in consultation with the appointed ECoW.

4.11.1.4 Foul Drainage

Effluent and waste from onsite construction will be captured and stored for offsite disposal by a licensed contractor. The system will be designed for approval by the EPA prior to the construction phase of the Proposed Development.

4.11.1.5 Pollution Risk

Good practice measures in relation to pollution prevention will be implemented as follows;

- refuelling will take place at least 50m from watercourses and where possible it will not occur when there is risk that oil from a spill could directly enter the water environment, for example, periods of heavy rainfall or when standing water is present will be avoided;
- a vehicle management plan and speed limit will be strictly enforced onsite to minimise the potential for accidents to occur;
- drip trays will be placed under all stationary vehicles which could potentially leak fuel/oils;
- water will be prevented as far as possible, from entering excavations such as borrow pits;
- areas of battery storage will be bunded and positively drained so that the quality of runoff within the bunded area can be visually monitored prior to release by tap, and contained if required;
- procedures will be adhered to for storage of fuels and other potentially contaminative materials to minimise the potential for accidental spillage (e.g. stored in 110% bunded storage facilities); and
- an appropriately sized spill kit(s) would be provided and maintained onsite, consideration would be given to suitable locations across the active areas of the site and to having vehicles including plant carry a spill kit. This kit would contain materials, such as absorbent granules and pads, absorbent booms and collection



bags. These are designed to halt the spread of spillages and would be deployed, as necessary, should a spillage occur elsewhere within the construction compound.

In relation to forestry clearance, the following measure to protect water quality are proposed:

- A 50m buffer distance between watercourses and any proposed development including construction activities including fuel storage has been applied to those watercourses within the Site.
- To capture and control suspended sediment, silt traps must be installed within relevant watercourses. These should be constructed along and towards the point of outflow of mound drains, where a firm bank exists, and a ten-metre 'buffer zone' containing sufficient vegetation (e.g. grasses, reeds, and shrubs) to filter out any remaining sediment and nutrients can be implemented. Silt traps must be cleared out periodically to ensure they remain fully functional. The build-up of sediment should be emptied onto a level section of the forest floor several metres from any watercourse.
- To further reduce the risk of run-off and sediment mobilisation, felling and extraction of timber should, as far as possible, be conducted during periods of dry weather.
- The refuelling and chemical/fuel storage area on-site must be sited in a dry, sheltered, flat location, at least fifty metres from any watercourse.
- Where it is necessary to cross watercourses/drains during harvesting operations, temporary crossing points are required. These may comprise logs lined lengthwise and overlaid with a geotextile membrane and brash to capture falling soil from machinery wheels. The condition of temporary crossing points must be carefully monitored throughout operations, and these should be cleaned out and supplemented (as necessary). Where it is necessary to cross a watercourse, a clear span log structure must be implemented.

4.11.1.6 Fluvial Flood Risk

It is proposed to adopt SuDS as part of the Proposed Development. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced at the Proposed Development prior to development. Good practice in relation to the management of surface water runoff rates and volumes and potential for localised fluvial flood risk will include the following:

- drainage systems will be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse;
- onsite drainage will be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding.
- appropriate drainage will attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk;
- in instances where water may accumulate, leading to a potential flood risk, check dams will be used within cable trenches in order to prevent trenches developing into preferential flow pathways; and
- as per good practice for pollution and sediment management, prior to construction, section specific drainage plans will be developed and construction personnel made familiar with the implementation of these.



4.11.1.7 Water Quality Monitoring

Water quality monitoring during the construction phase will be undertaken by the applicant for the surface water catchments that serve the Proposed Development to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring will be carried out at a specified frequency on these catchments.

With regard to the protection of the water environment the following risks will be addressed:

- siltation of watercourses;
- discolouration of raw water;
- potential pollution from construction traffic due to diesel spillage or similar;
- alteration of raw water quality resulting from imported track construction material;
- excavation and earthworks;
- use of large quantities of concrete;
- site compound and associated drainage/foul drainage and diesel spill issues;

The Project Supervisor Construction Stage (PSCS) will compile a monitoring and maintenance plan for the drainage system and surface water runs.

A Water Quality Monitoring Plan (WQMP) will be developed to form part of the Construction Method Statement (CMS), which will be submitted to the appropriate planning authorities prior to construction and development. The WQMP will be implemented to monitor surface water quality, fish populations and macroinvertebrate community prior to, during and post-construction. A robust baseline of water quality in surface watercourses / drainage channels downstream of construction works will be established prior to construction commencing and used as a benchmark of water quality for the construction phase monitoring.

- visual monitoring/inspections during site works and water crossing construction works, the relevant drainage/surface water features potentially being impacted by these works will be inspected on a daily basis by the Environmental Clerk of Works (ECoW) while works are ongoing in this area;
- surface water monitoring is to be continued at the 13 no. riverine survey sites which were assessed for biological water quality through Q-sampling in July 2022 during the aquatic baseline survey (see **Appendix 2**).

The WQMP will outline details for the monitoring of surface watercourses down gradient of works areas including watercourse crossings, access tracks, turbine foundations and borrow pits and at control sites (up gradient of works areas), and will include:

- Planning level monitoring locations;
- Frequency of monitoring prior to, during and after construction;
- Parameters for field hydrochemistry testing and laboratory analysis including as a minimum ph, electrical conductivity, suspended solids, dissolved metals, nutrients and hydrocarbons;
- Sampling and analysis protocols;
- Relevant environmental quality standards (EQS);
- Responsibilities for monitoring – it is expected that the ECoW will be responsible for daily monitoring of watercourses particularly around active works areas and watercourse crossings;



- Procedures to be followed in the event of an environmental incident; and
- Recording and communicating of results.

4.11.1.8 Groundwater Levels

Prior to construction of the turbine base at T1, a groundwater monitoring borehole will be extended to confirm the ground conditions and determine the depth to groundwater. Due to the presence of low permeability superficial deposits at the T1 area, shallow groundwater is not expected to be encountered and it is not expected that there would be any impact on groundwater levels in the nearby cSAC during construction. However, should significant dewatering be required during the construction of the turbine base at T1, sheet piling will be placed between the construction area and the cSAC, so that there would be no change in the groundwater levels within the SAC.

4.11.1.9 Emergency Response

Drainage networks provide a conduit for rapid transport of silty water and potential contamination from surface spills of fuels / oils, concrete or chemicals. A pollution emergency incident will include any discharge to the drainage network that could potentially cause environmental damage.

The PSCS will be required to prepare an Environmental Incident and Emergency Response Plan which will provide emergency response contacts, reporting procedures, and procedures for dealing with all potential pollution incidents during the construction of the Proposed Development.

4.11.1.10 Otter

A pre-construction walkover survey of the Proposed Development Site and 150 m buffer of the Proposed Development boundary will be undertaken by a suitably experienced ecologist. This will search for otter holts/couches, which could change over time. If any are identified, then appropriate exclusion zone(s) will be implemented and construction activities timed to avoid sensitive periods, such as the breeding season, as relevant.

The following measures will also be implemented to reduce the possibility of injury and disturbance:

- limiting constructions works to daylight hours;
- providing exit points for any excavations (e.g. escape planks or spoil runs) so otters do not become trapped; and
- a suitably qualified Ecologist will be employed for the duration of the construction period to make contractors aware of the otters sensitivities and to undertake surveys as necessary for holts/couches throughout the construction period, enforcing exclusion areas as required, which is 150 m for otter.

4.11.1.11 Supporting Habitats

In addition to the mitigation measures outlined above regarding sediment, pollution and surface water, temporary fencing (paling with 25 mm mesh) will be erected around the required site works to delineate the works area and to minimise the potential for disturbance impacts outside of the works area.



4.11.1.12 Invasive Non-native Species

A Habitat and Species Management Plan (HASMP) will be implemented to prevent the spread of invasive and non-native species. In particular, Japanese knotweed, cherry laurel and snowberry must not be spread during construction works.

A pre-construction walkover survey of the works corridor will confirm the presence of any invasive/non-native species that may have escaped into the area since the baseline surveys were conducted.

A method statement will be prepared in relation to cleaning machinery and the avoidance of importing/spreading non-native invasive plant species. Any plant or equipment that may have worked in environments where invasive species are present (including but not restricted to crayfish plague), will be suitably cleaned by high pressure hose, disinfected and dried before being used on site to prevent the spread of invasive species. Water used for this washing process will always be intercepted and prevented from draining back into watercourses.

4.11.2 Mitigation Measures: Operational

4.11.2.1 Routine Maintenance

During the operational phase of the Proposed Development, it is anticipated that routine maintenance of infrastructure and tracks will be required across the Proposed Development site. This may include work such as maintaining access tracks and drainage and carrying out wind turbine maintenance.

Should any maintenance be required onsite which would involve construction type activities; mitigation measures will be adhered to along with the measures in the CEMP to avoid potential effects.

During the operation of the Proposed Development, it is not anticipated that there will be any excavation or stockpiled material, reducing the potential for erosion and sedimentation effects. Should any excavation be required, this is likely to be limited and required for maintenance of tracks etc. Any excavation, handling and placement of material from borrow pits will be subject to the same safeguards that will be used during the construction phase of the Proposed Development.

4.11.2.2 Flight Activity Surveys and Collision Monitoring

Based on current best-practice guidelines (SNH, 2009), a targeted range of flight activity surveys and collision monitoring (carcass searching) will be undertaken during the breeding and non-breeding seasons in years 1, 2 and 3 post construction, to monitor the rate of avian turbine collisions. Thereafter, if the rate of turbine strikes is as low as predicted by the CRM (which is highly precautionary), the monitoring should no longer be required. If monitoring indicates collision mortality for SPA birds, mitigation measures will be developed and implemented, and further monitoring will also be identified, to reduce the risk of collision to SPA birds. This could include curtailment of the turbines during peak migration periods. Proposed mitigation and monitoring measures will be agreed with the planning authority prior to implementation.

4.11.3 Mitigation Measures: Decommissioning

Mitigation measures for decommissioning will be similar to those for the construction phase, however the magnitude required will be less, as track and turbine installation will not be required.





4.11.4 Summary of mitigation measures and residual effects

Table 4-13: Summary of mitigation measures and residual effects

European Site	Objective	Mitigation summary	Alone	In Combination
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> habitat area, and habitat distribution of Alkaline fen	Mitigation measures to address potential risk are outlined in the following section above: <ul style="list-style-type: none"> 5.9.1.8. Groundwater Levels 	No risk	No risk
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> Ecosystem function: soil nutrients, Ecosystem function: peat formation, Ecosystem function: hydrology - groundwater levels, Ecosystem function: hydrology - surface water flow, and Ecosystem function: water quality of Alkaline fen	Mitigation measures to address potential risks are outlined in the following sections above: <ul style="list-style-type: none"> 5.9.1.1. Buffer to Watercourses 5.9.1.2. Site Drainage 5.9.1.3. Management of Sediment and Surface Waters 5.9.1.4. Foul Drainage 5.9.1.5. Pollution Risk 5.9.1.6. Fluvial Flood Risk 5.9.1.7. Water Quality Monitoring 5.9.1.8 Groundwater Levels 5.9.1.9. Emergency Response 5.9.2.1. Routine Maintenance 5.9.3. Mitigation Measures: Decommissioning 	No risk	No risk
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> vegetation composition: community diversity, vegetation composition: typical brown mosses, 	Mitigation measures to address potential risks are outlined in the following sections above: <ul style="list-style-type: none"> 5.9.1.8. Groundwater Levels 5.1.9.12. Invasive Non-native Species 	No risk	No risk



European Site	Objective	Mitigation summary	Alone	In Combination
	<ul style="list-style-type: none"> vegetation composition: typical vascular plants, vegetation composition: native negative indicator species, vegetation composition: nonnative species, vegetation composition: native trees and shrubs, vegetation composition: algal cover, and Vegetation structure: vegetation height of Alkaline fen			
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> physical structure: disturbed bare ground, and physical structure: tufa formations of Alkaline fen	Mitigation measures to address potential risk are outlined in the following section above: <ul style="list-style-type: none"> 5.9.1.8. Groundwater Levels 	No risk	No risk
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> indicators of local distinctiveness, and transitional areas between fen and adjacent habitats of Alkaline fen	Mitigation measures to address potential risk are outlined in the following section above: <ul style="list-style-type: none"> 5.9.1.8. Groundwater Levels 	No risk	No risk
River Boyne and Blackwater cSAC	Restore the: <ul style="list-style-type: none"> hydrological regime: flooding depth/height of water table of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)	Mitigation measures to address potential risk are outlined in the following section above: <ul style="list-style-type: none"> 5.9.1.8. Groundwater Levels 	No risk	No risk



European Site	Objective	Mitigation summary	Alone	In Combination
River Boyne and Blackwater cSAC	<p>Retore the:</p> <ul style="list-style-type: none"> • distribution, • population structure of juveniles, • juvenile density in fine sediment, • extent and distribution of spawning habitat, and • availability of juvenile habitat for river lamprey. 	<p>Mitigation measures to address potential risks are outlined in the following sections above:</p> <ul style="list-style-type: none"> • 5.9.1.1. Buffer to Watercourses • 5.9.1.2. Site Drainage • 5.9.1.3. Management of Sediment and Surface Waters • 5.9.1.4. Foul Drainage • 5.9.1.5. Pollution Risk • 5.9.1.7. Water Quality Monitoring • 5.9.1.9. Emergency Response • 5.9.2.1. Routine Maintenance • 5.9.3. Mitigation Measures: Decommissioning 	No risk	No risk
River Boyne and Blackwater cSAC	<p>Restore the:</p> <ul style="list-style-type: none"> • distribution, • adult spawning fish, • salmon fry abundance, • out-migrating smolt abundance, • number and distribution of redds, and • water quality for salmon. 	<p>Mitigation measures to address potential risks are outlined in the following sections above:</p> <ul style="list-style-type: none"> • 5.9.1.1. Buffer to Watercourses • 5.9.1.2. Site Drainage • 5.9.1.3. Management of Sediment and Surface Waters • 5.9.1.4. Foul Drainage • 5.9.1.5. Pollution Risk • 5.9.1.7. Water Quality Monitoring • 5.9.1.9. Emergency Response • 5.9.2.1. Routine Maintenance • 5.9.3. Mitigation Measures: Decommissioning 	No risk	No risk
River Boyne and Blackwater cSAC	<p>Maintain the;</p> <ul style="list-style-type: none"> • distribution, • extent of terrestrial habitat, • extent of marine habitat, 	<p>Mitigation measures to address potential risk are outlined in the following section above:</p> <ul style="list-style-type: none"> • 5.9.1.10. Otter 	No risk	No risk



European Site	Objective	Mitigation summary	Alone	In Combination
	<ul style="list-style-type: none"> extent of freshwater habitat (river & lake), and couching sites and holts for otter. 			
River Boyne and Blackwater cSAC	Maintain the: <ul style="list-style-type: none"> fish biomass available for otter. 	Mitigation measures to address potential risks are outlined in the following sections above: <ul style="list-style-type: none"> 5.9.1.1. Buffer to Watercourses 5.9.1.2. Site Drainage 5.9.1.3. Management of Sediment and Surface Waters 5.9.1.4. Foul Drainage 5.9.1.5. Pollution Risk 5.9.1.7. Water Quality Monitoring 5.9.1.9. Emergency Response 5.9.2.1. Routine Maintenance 5.9.3. Mitigation Measures: Decommissioning 	No risk	No risk
River Boyne and Blackwater SPA	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests (i.e. Kingfisher) for this SPA.	Mitigation measures to address potential risks are outlined in the following sections above: <ul style="list-style-type: none"> 5.9.1.1. Buffer to Watercourses 5.9.1.2. Site Drainage 5.9.1.3. Management of Sediment and Surface Waters 5.9.1.4. Foul Drainage 5.9.1.5. Pollution Risk 5.9.1.7. Water Quality Monitoring 5.9.1.9. Emergency Response 5.9.2.1. Routine maintenance 5.9.3. Mitigation Measures: Decommissioning 	No risk	No risk



European Site	Objective	Mitigation summary	Alone	In Combination
Lough Derravarragh SPA	<p>To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.</p> <p>In the case of Lough Derravarragh SPA, this is:</p> <ul style="list-style-type: none"> • whooper swan, • pochard, • tufted duck, and • coot. 	<p>Mitigation measures to address potential risk are outlined in the following section above:</p> <ul style="list-style-type: none"> • 5.9.2.2. Flight Activity Surveys and Collision Monitoring 	No risk	No risk



5.0 Conclusion

This NIS contains information which the competent authorities, may consider in making its own complete, precise and definitive findings and conclusions and upon which it is capable of determining that all reasonable scientific doubt has been removed as to the effects of the Proposed Development on the integrity of the relevant European sites. With the identified mitigation measures in place, it can be concluded, beyond all reasonable scientific doubt that the Proposed Development, either alone or in combination with other plans or projects will not undermine the conservation objectives of any European Sites. It can therefore be concluded that the Proposed Development will not have an adverse effect on the integrity of any European site.

A proposed mitigation scheme for the construction, operational and decommissioning phases is described, and these mitigation measures will be implemented in full.



6.0 References

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Figures

Figure 1 Proposed Development and Cable Route Location

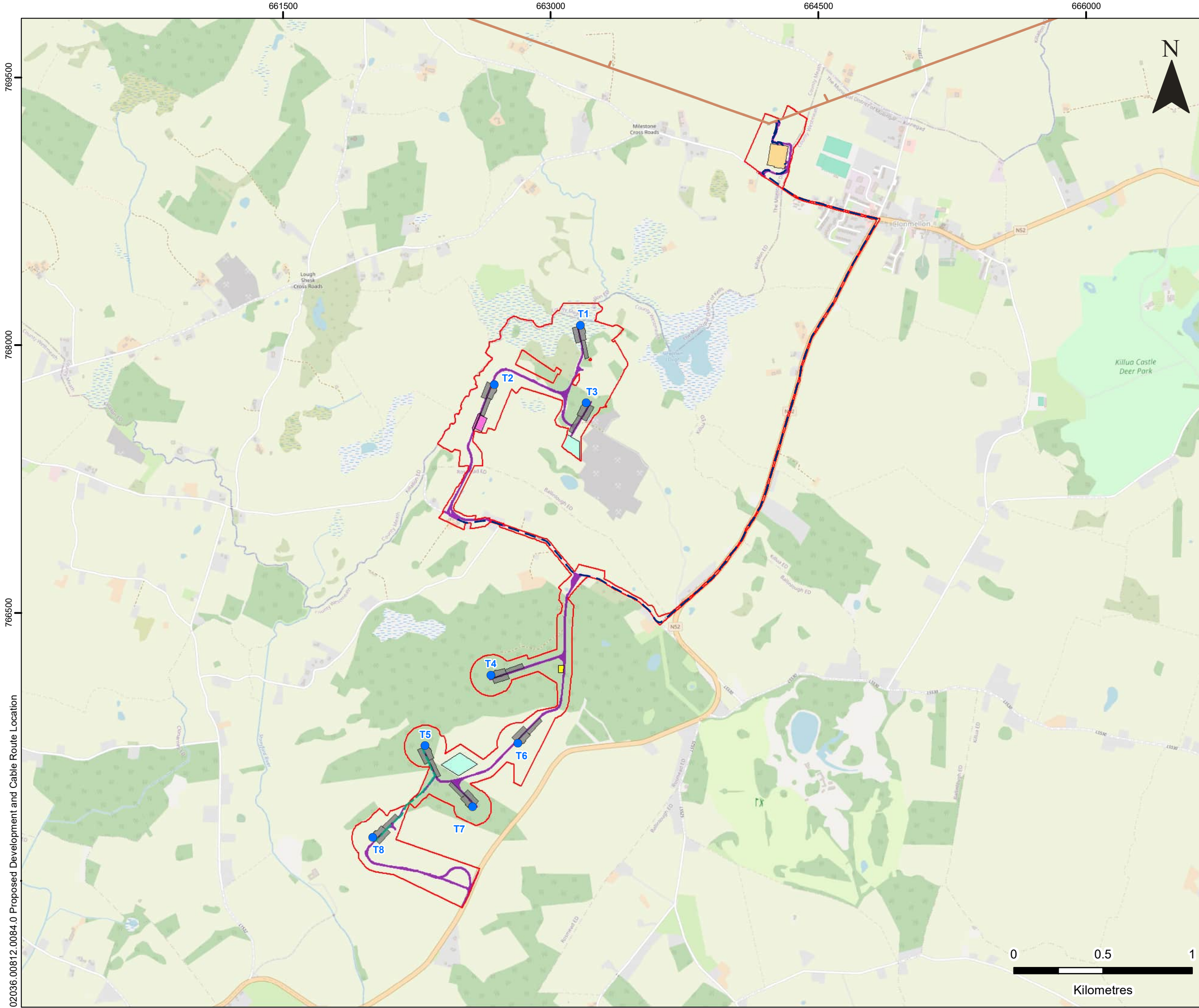
Figure 2 European Sites within 20 km of Proposed Development and Cable Route

Figure 3 Hydrological and Hydrogeological Connections

Figure 4 Developments within 20 km of the Proposed Development







LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Internal Cable Route
- Proposed Cable Route
- Proposed Access Track
- Proposed Construction Compound
- Proposed Operational Compound
- Proposed Substation Location
- Proposed Crane Hardstanding
- Proposed Borrow Pit
- Existing High Voltage Transmission Line



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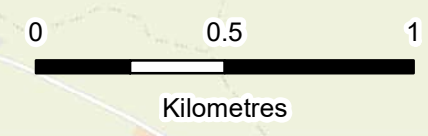
**KNOCKANARRAGH WIND FARM
 ENVIRONMENTAL IMPACT
 ASSESSMENT REPORT**

NATURA IMPACT STATEMENT

**PROPOSED DEVELOPMENT AND
 CABLE ROUTE LOCATION**

FIGURE 1

Scale 1:20,000 @ A3	Date MARCH 2024
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02036.00812.0084.0 Proposed Development and Cable Route Location

769500

768000

766500

661500

663000

664500

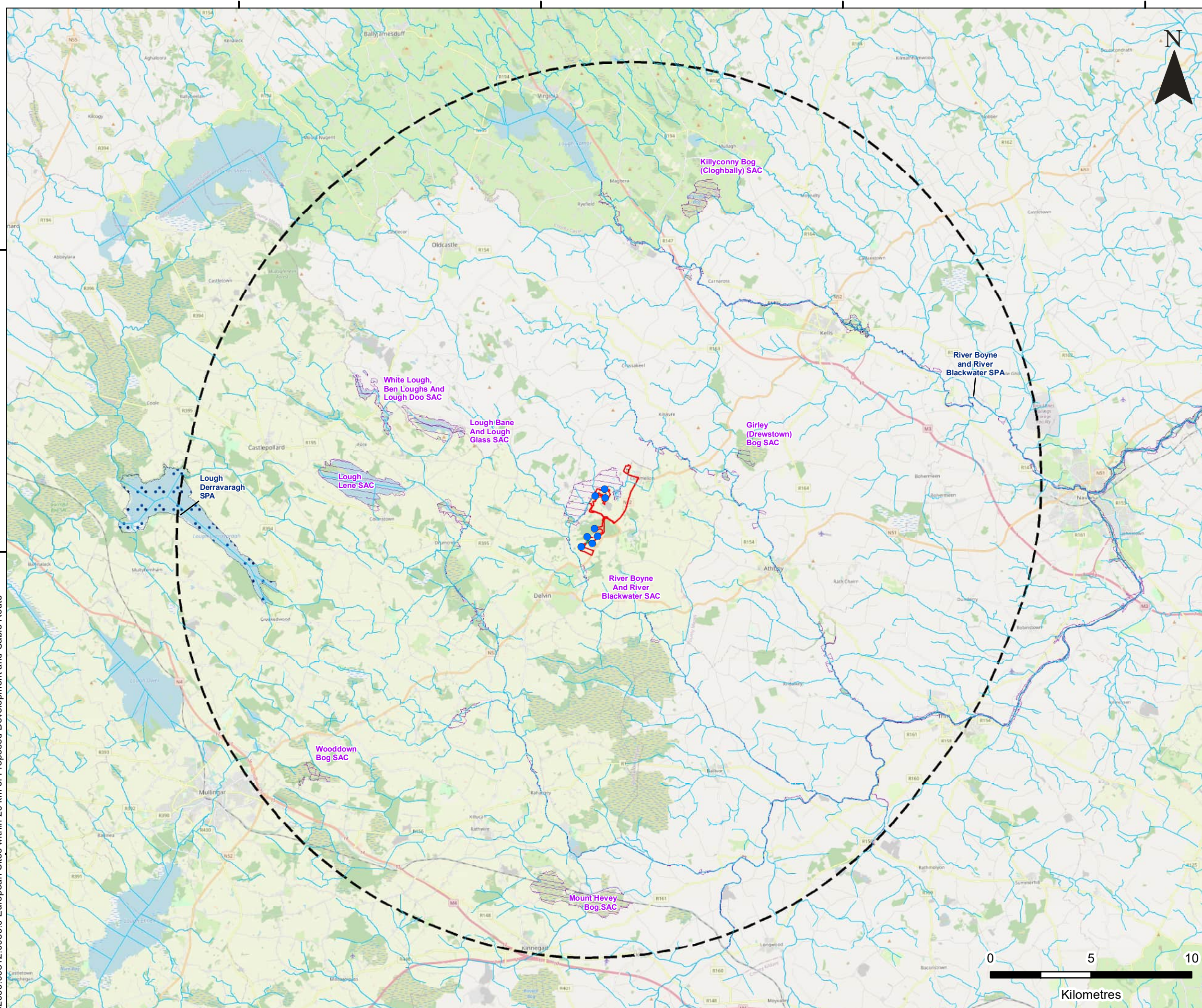
666000

645000 660000 675000 690000

780000

765000

02036.00812.0085.0 European Sites within 20 km of Proposed Development and Cable Route



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Development Site Boundary 20 km Buffer
- Watercourse
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)



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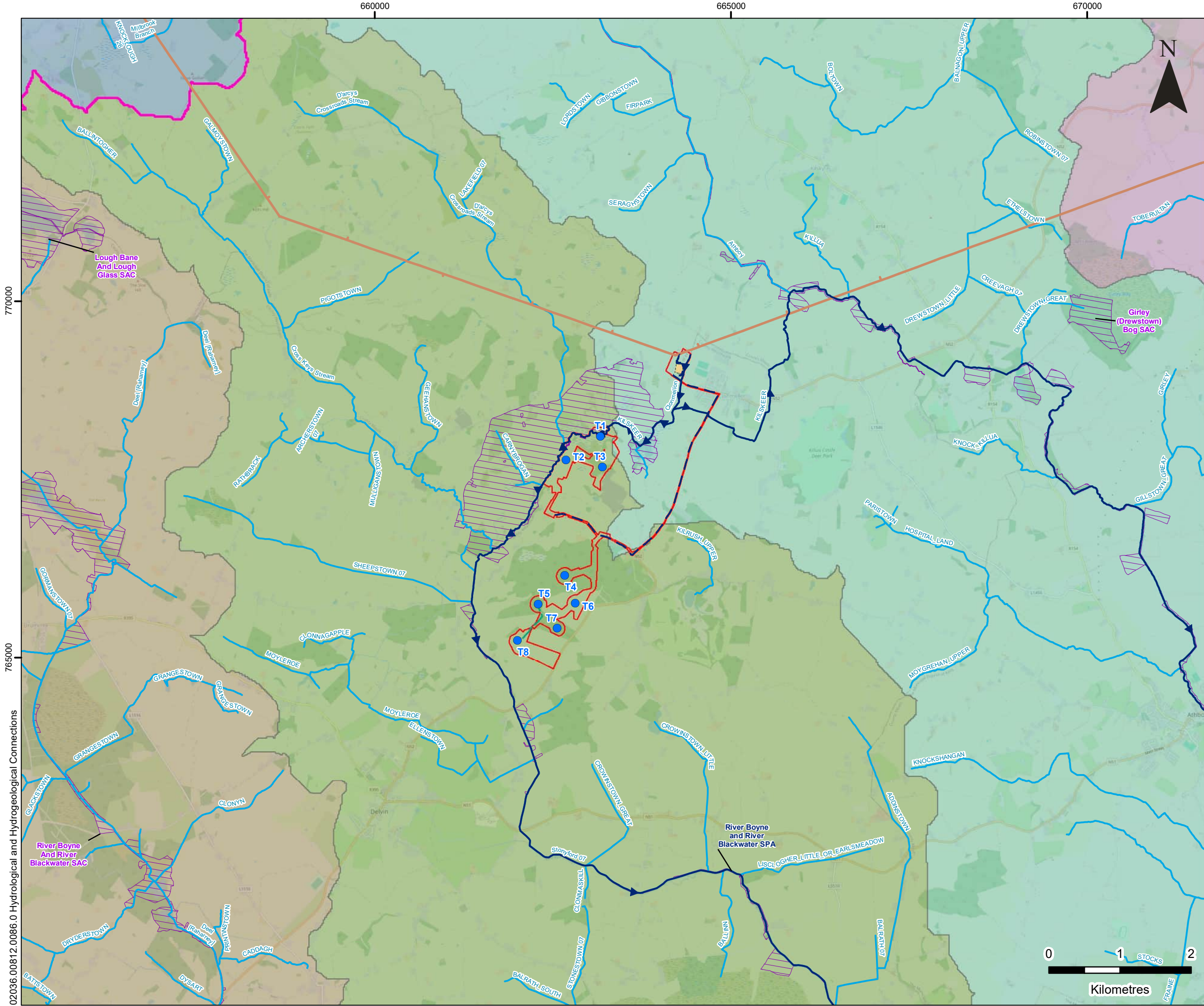
NATURA IMPACT STATEMENT

EUROPEAN SITES WITHIN 20 KM
OF PROPOSED DEVELOPMENT
AND CABLE ROUTE

FIGURE 2

Scale 1:180,000 @ A3 Date OCTOBER 2023





LEGEND

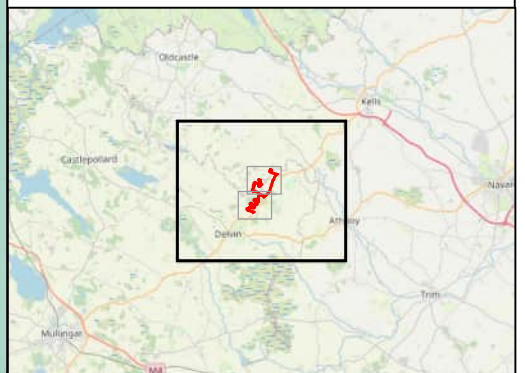
- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Internal Cable Route
- Proposed Cable Route
- Proposed Substation Location
- Existing High Voltage Transmission Line
- Potential Hydrological Connection
- Other Watercourse
- Catchment Boundary
- Sub-Catchment Boundary

Sub-Catchment

- Blackwater[Kells]_SC_030
- Boyne_SC_050
- Boyne_SC_070
- Deel[Raharney]_SC_010
- Inny[Shannon]_SC_010

Designation

- Special Area of Conservation (SAC)
- Special Protection Area (SPA)



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NATURA IMPACT STATEMENT

HYDROLOGICAL AND HYDROGEOLOGICAL CONNECTIONS

FIGURE 3-1

Scale: 1:50,000 @ A3	Date: MARCH 2024
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02036.00812.0086.0 Hydrological and Hydrogeological Connections

770000

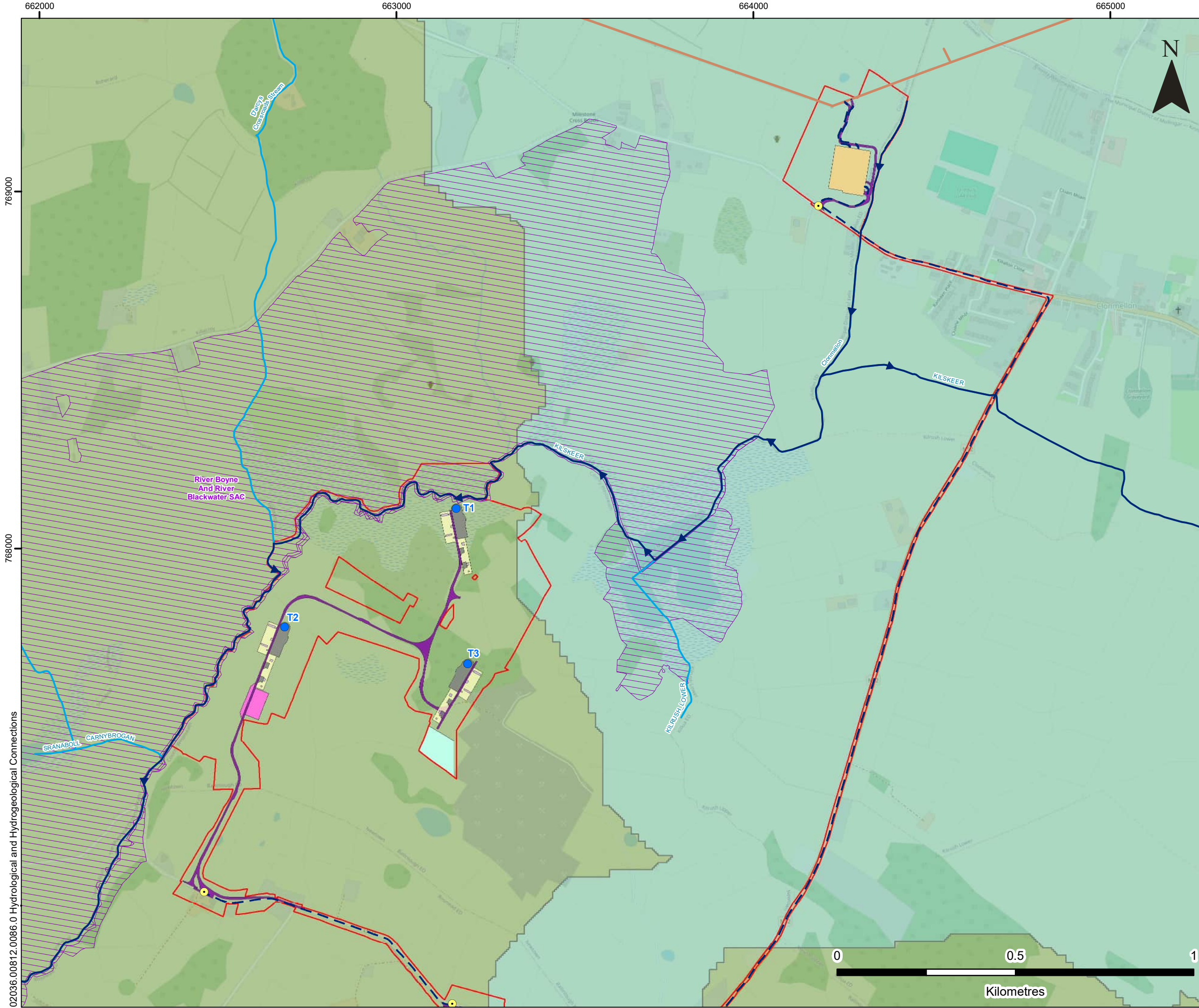
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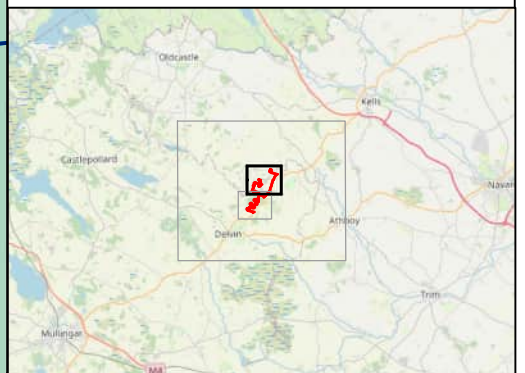
665000

670000





- LEGEND**
- Proposed Development Site Boundary
 - Proposed Turbine Location
 - Proposed Access Point
 - Proposed Cable Route
 - Proposed Access Track
 - Proposed Construction Compound
 - Proposed Substation Location
 - Proposed Borrow Pit
- Proposed Crane Hardstanding**
- Permanent Hardstanding
 - Temporary Hardstanding
 - Level and Clearance Area
- Existing High Voltage Transmission Line
 - ➔ Potential Hydrological Connection
 - Other Watercourse
 - Sub-Catchment Boundary
- Sub-Catchment**
- Boyne_SC_050
 - Boyne_SC_070
- Designation**
- Special Area of Conservation (SAC)



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 ASSESSMENT REPORT
 NATURA IMPACT STATEMENT
 HYDROLOGICAL AND
 HYDROGEOLOGICAL CONNECTIONS

FIGURE 3-2

Scale: 1:10,000 @ A3 Date: MARCH 2024

02036.00812.0086.0 Hydrological and Hydrogeological Connections

662000

663000

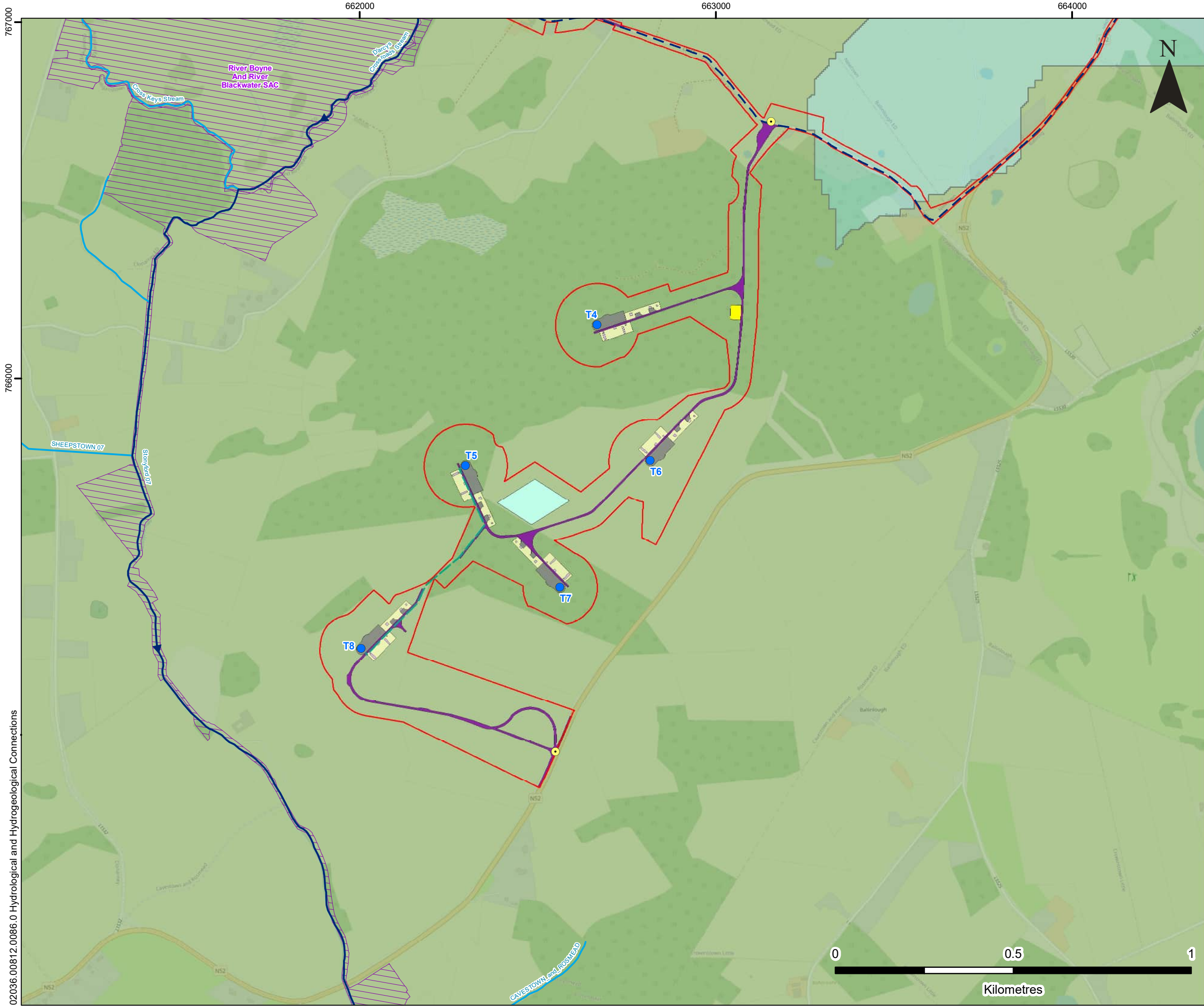
664000

665000

769000

768000





LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Access Point
- Proposed Internal Cable Route
- Proposed Cable Route
- Proposed Access Track
- Proposed Operational Compound
- Proposed Borrow Pit

Proposed Crane Hardstanding

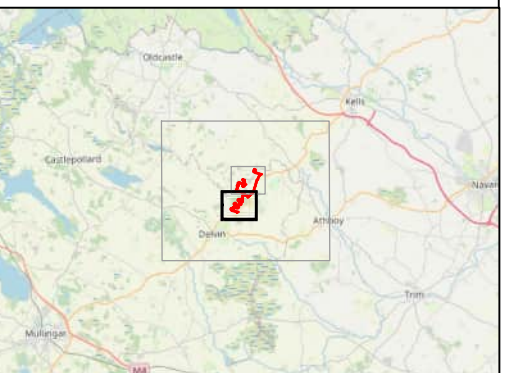
- Permanent Hardstanding
- Temporary Hardstanding
- Level and Clearance Area
- ➔ Potential Hydrological Connection
- Other Watercourse
- Sub-Catchment Boundary

Sub-Catchment

- Boyne_SC_050
- Boyne_SC_070

Designation

- Special Area of Conservation (SAC)



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NATURA IMPACT STATEMENT

**HYDROLOGICAL AND
 HYDROGEOLOGICAL CONNECTIONS**

FIGURE 3-3

Scale 1:10,000 @ A3	Date MARCH 2024
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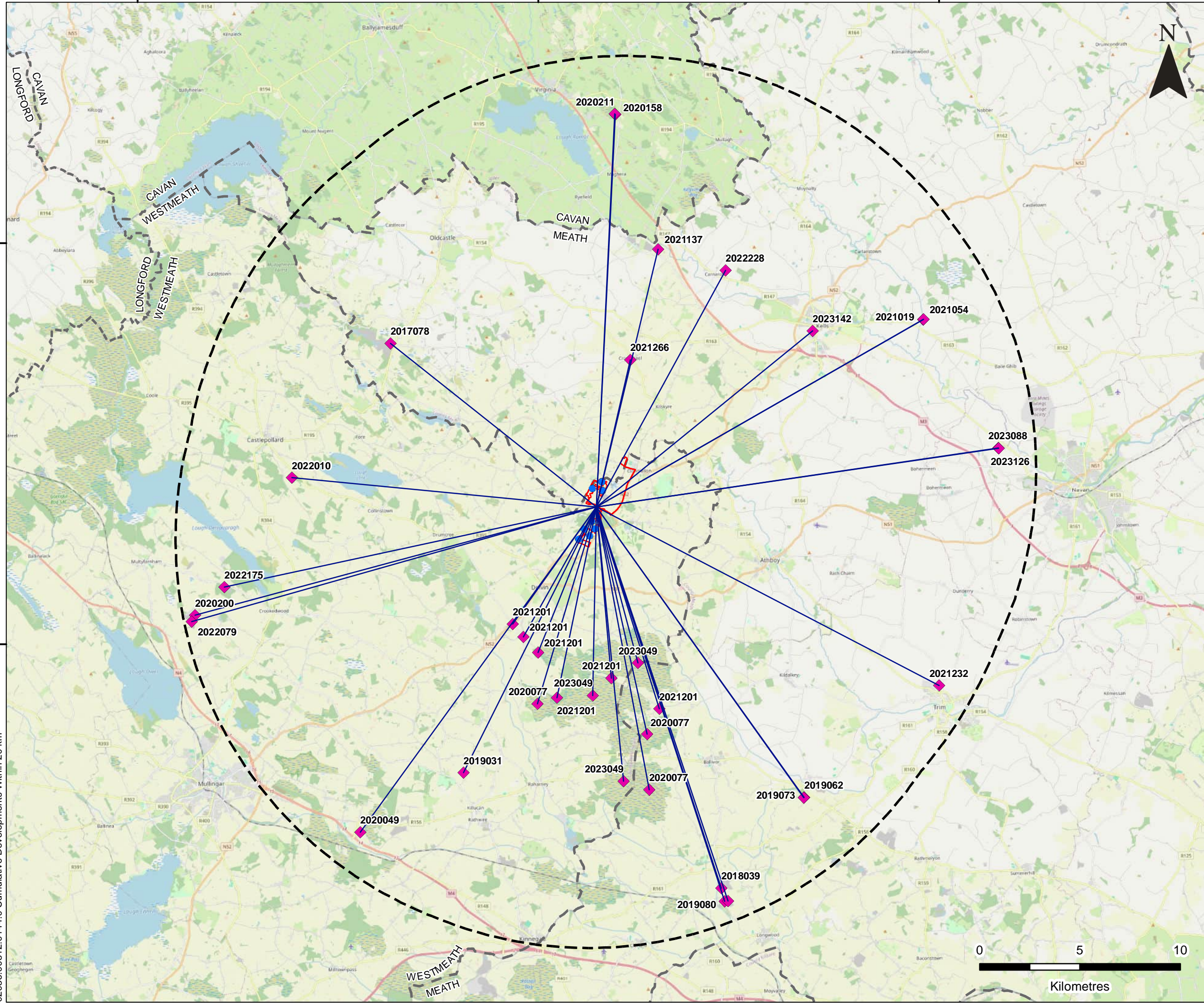
02036.00812.0086.0 Hydrological and Hydrogeological Connections

640000 660000 680000

780000

760000

02036.00812.0144.0 Cumulative Developments Within 20 km



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Development Site Boundary 20 km Buffer
- County Boundary
- ◆ Environmental Impact Assessment Location



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**CUMULATIVE DEVELOPMENTS WITHIN
20KM OF PROPOSED DEVELOPMENT**

FIGURE 4

Scale 1:180,000 @ A3 Date MARCH 2024