APPENDIX 4

UPDATED NIS

Planning and Environmental Consultants

Appropriate Assessment Screening Report and Natura Impact Statement (Updated)

Seskin Renewables Wind Farm



DOCUMENT DETAILS

Client:	**Seskin Renewables Ireland Ltd.**
Project Title:	**Seskin Renewables Wind Farm**
Project Number:	**231103**
Document Title:	**Appropriate Assessment Screening Report and Natura Impact Statement**
Document File Name:	**NIS F-2025.02.07**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	30.06.2025	CH	CC/ CK
02	Final RFI	16.07.2026	CH/CK	CC

Table of Contents

1. INTRODUCTION 3
1.1 Background 3
1.2 References to Proposed Development 4
1.3 Statement of Authority 5
1.4 Methodology 5
1.4.1 Appropriate Assessment Process 5
1.4.2 Ecological Survey Methodologies 6
1.4.3 Desk Study 9
1.5 Structure and Format of this Document 9
2. DESCRIPTION OF THE PROPOSED DEVELOPMENT 11
2.1 Site Location 11
2.2 Characteristics of the Proposed Development 11
3. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT 16
3.1 Regional and Local Hydrology and Hydrogeology 16
3.1.1 Regional Hydrology 16
3.1.2 Local Hydrology 17
3.1.3 Baseline Water Quality 18
3.2 Results of Baseline Ecological Surveys 19
3.2.1 Ecological Walkover Surveys 19
3.2.2 Fisheries and Aquatic Fauna 40
3.2.3 Bird Surveys (Kingfisher) 44
3.2.4 Noise Survey 44
4. APPROPRIATE ASSESSMENT SCREENING 45
4.1 Identification of Relevant European Sites 45
4.2 Appropriate Assessment Screening Conclusion 59
5. INFORMATION TO INFORM APPROPRIATE ASSESSMENT 60
5.1 Identification of relevant Qualifying Features 61
5.1.1 River Barrow and River Nore SAC 61
5.2 Identification of relevant Qualifying Features 93
5.2.1 River Nore SPA 93
6. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED MITIGATION 100
6.1 Potential for Direct Effects on the European Sites 100
6.2 Potential for Indirect Effects on the European Sites 100
6.2.1 Hydrological Impact - Water Quality/Habitat Degradation 100
6.2.2 Impacts to Kingfisher- Disturbance 126
7. ASSESSMENT OF RESIDUAL ADVERSE EFFECTS 128
8. IN-COMBINATION EFFECTS 129
8.1 Assessment of Plans 129
8.2 Assessment of Projects 129
8.2.1 Proposed Grid Connection Underground Cabling Route 131
8.2.2 Other Wind Farm Projects 132
8.2.3 Other Projects within the Hydrological Sub catchment 133
9. CONCLUDING STATEMENT 137
BIBLIOGRAPHY 138

1. INTRODUCTION

1.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of a wind energy energy development (hereafter referred to as the Proposed Development), comprising 8 no. wind turbines and a 38 kV substation and associated works, including underground 38kV cabling to connect to the national grid at Ballyragget 110kV substation, in the townlands of Ballynaslee, Seskin, Ballyconra, Moatpark, Co. Kilkenny and Tinwear, Archerstown and Durrow, Co. Laois. ~~the Proposed Development.~~

Seskin Renewable Energy Ltd. applied to Laois County Council and Kilkenny County Council for planning permission to construct the Proposed Development on 9th July 2025. Laois County Council was assigned a Planning Reference LCC Pl. Ref. 2560414 and Kilkenny County Council was assigned a Planning Reference KCC Pl. Ref. 2560418. On 2nd of September 2025 both Laois County Council and Kilkenny County Council refused to grant permission for the Proposed Development. Seskin Renewable Energy Ltd. subsequently appealed this decision to An Coimisiún Pleanála (the Commission) on 29th September 2025. On the 18th of May 2026, the Commission issued a Request for Further Information, which sought information on several items.

A number of these items related to aspects of biodiversity relevant to Appropriate Assessment and Further Information Response (FIR) Item No. 9 requested that "*an updated AA Screening Report and NIS reflecting the changes to the conservation objectives* [for the River Barrow and River Nore SAC] *as published on the 6th of June 2025*" be submitted. In addition, FIR Item No. 3 noted that "*The proposed grid connection route includes underground cabling works which will cross beneath the River Barrow and River Nore SAC (002162). It is noted that no information on the baseline noise conditions at this location and predicted noise/ vibration levels associated with HDD are included in the EIAR/ NIS such that potential significant disturbance effects on QI Species can be determined. In this regard, you are required to submit and updated EIAR/ NIS which responds to this issue*". Therefore, this document has been updated to provide a full and complete assessment of the potential effects of the Proposed Development on European designated sites. The updates to this document are provided as green text, while any deletions are shown in strikethrough red text.

Screening for Appropriate Assessment is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The current project is not directly connected with, or necessary for, the management of any European Site. Consequently, the project has been subject to the Appropriate Assessment Screening process.

This Natura Impact Statement (NIS) has been prepared in accordance with:

- European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites.
- Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2021)
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018)
- Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010)
- Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin 7, Ireland OPR (2021).

1.2 References to Proposed Development

The Proposed Development will be known as the 'Seskin Renewables Wind Farm' and is referenced within this NIS as follows:

- Where the 'Proposed Development' is referred to this encompasses the entirety of the project for the purposes of this NIS, as shown in Figure 2-1.
- Where the 'Proposed Wind Farm' is referred to, this refers to the wind turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compounds, underground cabling, borrow pit, spoil management, site drainage, biodiversity enhancement, turbine delivery accommodation areas and all ancillary works and apparatus.
- Where the 'Proposed Grid Connection' is referred to, this refers to the 38kV onsite substation, associated temporary construction compound and 38kV underground cabling connecting to the existing Ballyragget 110kV substation, and all ancillary works and apparatus.
- Where the 'Site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of the EIAR and encompasses an area of approximately 302 hectares

1.3 Statement of Authority

This Natura Impact Assessment has been prepared by Ciara Hackett (B.Sc. Zoology) and reviewed by Corey Cannon and Caroline Kelly. Corey is a Project Director (Ecology) at MKO and holds a BSc in Zoology and an MSc in Biodiversity Survey. Corey is also a Chartered Ecologist and Full Member of CIEEM. Corey has over 12 years' consultancy experience. Caroline is a Senior Ecologist at MKO and holds a BSc. in Environmental Biology, an MSc. in Applied Ecological Assessment and an Advanced Postgraduate Diploma in Planning and Environmental Law. She has over 9 years' professional experience. The updated sections of the report were prepared by Caroline Kelly and reviewed by Corey Cannon.

The baseline ecological surveys were undertaken by MKO ecologists Ciara Hackett, David Mesarcik (BSc. Ecology & Evolutionary Biology), Ellen Tuck (B.Sc. Environmental Science), Corey Cannon, Rudraksh Gupta (B.Sc, M.Sc. Biodiversity and Conservation), Timothy O'Ceallaigh (B.Sc., Environmental Science) and Katy Beckett (B.A Environmental Science, MSc. Biodiversity and Conservation). Aquatic surveys were undertaken by Aran Von Der Geest Moroney (B.Sc. Ecology and Environmental Biology) and Niamh Rowan (B.Sc. Biological Sciences).

1.4 Methodology

1.4.1 Appropriate Assessment Process

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, either alone or in combination with other plans or projects, is likely to have significant effects on a European 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 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 Appropriate Assessment of a project is required. Therefore, where significant effects are likely, uncertain or unknown at screening stage, an AA of the project will be required.

Appropriate Assessment - This stage of the process is a focused and detailed examination, analysis and evaluation by the Competent Authority of the implications of the plan or project, either alone or 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 must:

i. identify, in the light of the best scientific knowledge in the field, all aspects of the Proposed Development which may, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;
ii. 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 potential adverse 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 (assessment of alternative) and, if necessary, stage four (IROPI[1]).

1.4.2 ~~Ecological~~ Survey Methodologies

The following sections describe the methodologies followed to establish the baseline ecological condition of the site and surrounding area.

1.4.2.1 Ecological Multidisciplinary Walkover Surveys

A comprehensive survey of the biodiversity within the Proposed Development site was undertaken to inform this Biodiversity Chapter of the EIAR and the Appropriate Assessment for the Proposed Development. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies and guidance followed. Surveys were carried out between April 2024 and January 2025 and are summarised in Table 1-1 below.

A comprehensive walkover of the entire Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys for example marsh fritillary and botanical quadrat surveys. Habitat and botanical surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al*., 2011). The walkover surveys are designed to detect the presence, or likely presence, of a range of protected species and invasive species.

The multi-disciplinary walkover surveys comprehensively covered the entire study area and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009). Methodology for surveys of particular relevance to the appropriate assessment are described in more detail below (e.g. otter, kingfisher, aquatics etc.).

Table 1-1 Ecology Surveys Informing the EIAR and Appropriate Assessment

Survey Type	Dates	Detailed Survey Findings
Multi-disciplinary walkover (incl. habitats)	• 30.04.2024 • 01.05.2024	Chapter 6 of EIAR (Section 6.4)
Detailed Botanical Surveys – Irish Vegetation Classification (IVC)	• 30.04.2024 • 01.05.2024	Botanical Report, Appendix 6-1 (Chapter 6 of EIAR)
Hedgerow Condition Assessments	• 28.05.2024 • 29.05.2024 • 11.06.2024 • 12.06.2024 • 17.07.2024 • 18.07.2024	Botanical Report, Appendix 6-1(Chapter 6 of EIAR)

[1] *IROPI - 'imperative reasons of overriding public interest', the test found in Article 6(4) of the Habitats Directive.*

Badger/Mammal survey and camera trap set up	Camera traps deployed: • 28.05.2024 • 11.06.2024 • 24.06.2024 • 19.12.2024 Camera traps collected: • 11.06.2024 • 24.06.2024 • 17.07.2024 • 14.01.2025	Chapter 6 of EIAR (Section 6.4)
Bryophyte/spring survey	• 24.06.2024	Chapter 6 of EIAR (Section 6.4)
Marsh fritillary survey	• 27.08.2024	Chapter 6 of EIAR (Section 6.4)
Bat Surveys	• Various (detailed in Updated Bat Report submitted as part of the FI Response)	Updated Bat Report (submitted as part of the FI Response) ~~Bat Report, Appendix 6-2 (Chapter 6 of EIAR)~~
Bird Surveys	• Various (Detailed in Chapter 7, Ornithology) • Dedicated kingfisher survey at Grid Connection crossing point on 15.05.2025	Chapter 7 (Ornithology) of EIAR. and Section 3.2.3 of this NIS
Aquatic surveys (including otter)	• 03.07.2024 • 04.07.2024 • 05.07.2024	Aquatics Report, Appendix 1 and Section 3.2.2 of this NIS
Dedicated Otter Survey (Grid Connection)	• 19.12.2024	Chapter 6 (Section 6.4) of EIAR and Section 3.2.2.6 of this NIS

1.4.2.2 Otter Surveys

Otter surveys were conducted adhering to best practice guidance (NRA, 2009b) and CIEEM best practice competencies for species surveys[2]. Otter surveys were undertaken during the detailed aquatic surveys in July. All watercourses considered to provide potential habitat for otter and were subject to

[2] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey: Otter, Online, Available at: https://cieem.net/wp-content/uploads/2019/02/CSS-EURASIAN-OTTER-April-2013.pdf*

targeted surveys for this species. This involved a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts). Due to the quantity of otter signs recorded during the initial surveys along the River Nore an additional dedicated otter survey was undertaken in the winter season (December 2024) when vegetation had died back to ensure any potential resting sites (holts/couches) could be identified.

1.4.2.3 Aquatic surveys

The aquatic baseline assessment focused on aquatic ecology including fisheries and biological water quality, as well as protected aquatic species and habitats in the vicinity of the Proposed Development. Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included river habitat assessments, surveys for white-clawed crayfish (*Austropotamobius pallipes*), freshwater pearl mussel (*Margaritifera margaritifera*) (eDNA only), macro-invertebrates (biological water quality), otter, and fish species, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities including Annex I habitat associations where present. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Development and ensured that any habitats and species of high conservation value would be detected. Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, see Appendix 1. Aquatic survey locations are shown in Figure 1-1 and 1-2 of the Aquatics report and the survey locations are referenced throughout this report as WF 1, WF 2, WF 3, WF 4, WF 5, WF 6, WF 7, and GC 1.

1.4.2.4 Kingfisher Survey

Detailed Ornithological survey findings are described in Chapter 7 of the EIAR. Only one Special Conservation Interest (SCI) species of relevance to this Appropriate Assessment (based on SPAs within the ZoI of the Proposed Development) was recorded during the surveys, namely kingfisher (Alcedo atthis). Signs of kingfisher were searched for during multi-disciplinary walkover survey, while and a further dedicated breeding kingfisher survey and habitat appraisal was carried out on the 15th May 2025 at the Proposed Grid Connection crossing point of the River Nore. The survey comprised a search of the river banks for existing kingfisher burrows, and an assessment of the habitat suitability of the banks for nesting kingfisher. The survey encompassed the crossing location and extended approximately 300m upstream and downstream of this location. The survey methodology was carried out with regard to Cummins et al (2010).

1.4.2.5 Dedicated Habitat and Vegetation Composition Surveys

All habitats recorded on site and described in this NIS have been classified in accordance with Fossitt (2000). Full details of all the botanical surveys and results are provided in Appendix 6-1 of Chapter 6 (Biodiversity) and an assessment of the potential for the site to support Annex I habitats is also provided in this Appendix.

Detailed botanical surveys/relevé assessments of the Proposed Development were also undertaken throughout multidisciplinary walkover surveys carried out in 2024. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the Proposed Development layout.

The habitat assessment surveys described in this report have been undertaken with reference to the following guidelines and interpretation documents:

- Commission of the European Communities (2013) *Interpretation manual of European Union habitats*. Eur 27. European Commission DG Environment.

- NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland*. Volume 2: *Habitat Assessments*. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), *The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats*. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
- Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010).

1.4.2.6 Noise Monitoring Survey

On the 1st July 2026, as part of the response to FI Item 3, attended noise monitoring, in accordance with guidance contained in ISO 1996: *Acoustics – Description measurement and assessment and environmental noise Part 2: Determination of sound pressure levels (2017),* took place, adjacent to the River Nore, within the area where Proposed Grid Connection underground cabling and Horizontal Directional Drilling (HDD) are proposed.

A RION NL-52 Sound Level Meter with serial number 586940 was used for the measurements. The sound level meter was field calibrated before and after the measurement and no significant levels of drift were identified. No adverse weather conditions were observed during the survey period.

1.4.3 Desk Study

The desk study undertaken for this assessment included a thorough review of the available ecological data associated with the screened-in European Sites within the likely zone of impact of the proposed development. Sources of data included the following:

- Review of NPWS Conservation Objectives supporting documents, site synopsis, standard data forms and supporting documents for European Designated Sites,
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA),
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Review of NPWS Article 17 metadata and GIS database.

1.5 Structure and Format of this Document

- Section 1 provides an introduction, background information, methodology and statement of authority for the AASR and NIS.
- Section 2, provides a full description of all elements of the Proposed Development.
- In Section 3, the characteristics of the receiving environment are fully described.
- In Section 4, a Stage 1 Screening is undertaken to identify any European Sites upon which there is a potential for a likely significant effect to occur either individually or in combination with other plans and projects as a result of the Proposed Development.
- Section 5, the Natura Impact Statement provides a detailed consideration of the Screened In European Sites and identifies the relevant qualifying features and how they may be affected in light of their conservation objectives.
- Section 6 provides an assessment of the potential for adverse effects on the identified European Sites as a result of the Proposed Development and in the absence of mitigation. Where impact pathways have been identified this section prescribes the mitigation

required to avoid adverse effects on any European site. This section also prescribes mitigation to robustly block any identified pathways for impact or effect.

- Section 7 provides an assessment of residual effects taking into consideration the proposed mitigation.
- In Section 8, the potential in combination effects of the Proposed Development on European Sites, when considered in combination with other plans and projects were assessed.
- A concluding statement is provided in Section 9.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location

The core of the Proposed Wind Farm is located approximately 2.5 kilometres south of the town of Durrow, Co. Laois, 3.2 kilometres northwest of the village of Ballyragget, Co Kilkenny and 5.9 kilometres east of the village of Cullahill, Co. Laois. The N77 National Secondary Road runs in a north-south orientation, east of the Site. It is proposed to access the Proposed Development via an existing agricultural access off the L58333 Local Road, part of the old N77, on the eastern side of the Site. The Site is served by a number of existing public and agricultural roads and tracks. A site location context map is included as Figure 2-1.

The Proposed Grid Connection includes for underground 38kV cabling from the proposed onsite 38kV substation, in the townland of Ballynaslee, Co. Kilkenny, to the existing Ballyragget 110kV substation in the townland of Moatpark, Co. Kilkenny. The total length of the Proposed Grid Connection underground cable route, measures approximately 3.4km in length with approximately 2.2km located within the public road corridor and approximately 1.2km located in agricultural lands.

Temporary accommodation works will be required at two locations to facilitate the delivery of turbine components and other abnormal loads to the Proposed Wind Farm during the construction phase. The accommodation works will be located within the town of Durrow, Co. Laois, at the Chapel Street/Mary Street (N77) junction and at the junction between the N77/L58333 in the townland of Ballynaslee, Co. Kilkenny.

Current land-use within the Proposed Wind Farm comprises agricultural pastural land. Current land-use along the Proposed Grid Connection route comprises of transport, and agricultural pastural land. Land-use in the wider vicinity of the Site comprises a mix of agriculture, low density residential, renewable energy and industrial and commercial.

2.2 Characteristics of the Proposed Development

The Proposed Development will comprise the construction of 8 No. wind turbines with a ground-to-blade tip height of 175 metres and all associated works and a 38 kV substation and associated works, including underground 38kV cabling to connect to the national grid at Ballyragget 110kV substation. The full description of the Proposed Development is detailed in Chapter 4 of the accompanying EIAR. The project description for the Proposed Development is as follows:

Overall Development Description

i. *The construction of 8 no. wind turbines with an overall turbine tip height of 175 metres; a rotor blade diameter of 150 metres; and hub height of 100 metres, and associated foundations and hard standing areas;*

ii. *A permanent 38kV substation compound (control building with welfare facilities, all associated electrical plant and apparatus, security fencing including vegetative screening, underground cabling, wastewater holding tank, site drainage and all ancillary works);*

iii. *Permanent underground electrical (38kV) and communications cabling to the existing Ballyragget 110kV substation in the townland of Moatpark (including joint bays,*

communication and earth sheath link chambers and all ancillary works along the route);

iv. *Underground electrical and communications cabling connecting the wind turbines and meteorological mast to the on-site substation;*

v. *A meteorological mast with a height of 100m above ground and associated foundation and hard-standing area;*

vi. *Upgrade of existing tracks and roads and the provision of new site access roads;*

vii. *All works associated with the upgrade of the existing agricultural access off the L58333 local road (including the installation of fencing and steel gates);*

viii. *2 no. temporary construction compounds (including temporary site offices and staff facilities);*

ix. *Accommodation works along the N77 National secondary road, in the townlands of Durrow Townparks, Co. Laois and Ballynaslee, Co. Kilkenny, to facilitate the delivery of turbine components and other abnormal sized loads;*

x. *A borrow pit;*

xi. *Spoil Management;*

xii. *Hedgerow removal;*

xiii. *Biodiversity Management and Enhancement Plan measures (including establishment of new hedgerow, translocation of existing hedgerow and enhancement of existing hedgerow);*

xiv. *Site Drainage;*

xv. *Operational stage site signage; and,*

xvi. *All associated site development works, ancillary works and apparatus.*

The development descriptions for the current planning applications as they appear in the public notices for Kilkenny County Council and Laois County Council are as follows:

Kilkenny County Council – Planning Notice Project Description

i. *The construction of 6 no. wind turbines with an overall turbine tip height of 175 metres; a rotor blade diameter of 150 metres; and hub height of 100 metres, and associated foundations and hard standing areas;*

ii. *A permanent 38kV substation compound (control building with welfare facilities, all associated electrical plant and apparatus, security fencing including vegetative screening, underground cabling, wastewater holding tank, site drainage and all ancillary works);*

iii. *Permanent underground electrical (38kV) and communications cabling to the existing Ballyragget 110kV substation in the townland of Moatpark (including joint bays, communication and earth sheath link chambers and all ancillary works along the route);*

iv. *Underground electrical and communications cabling connecting the wind turbines and meteorological mast to the on-site substation;*

v. *A meteorological mast with a height of 100m above ground and associated foundation and hard-standing area;*

vi. *Upgrade of existing tracks and roads and the provision of new site access roads;*

vii. *All works associated with the upgrade of the existing agricultural access off the L58333 local road (including the installation of fencing and steel gates);*

viii. *2 no. temporary construction compounds (including temporary site offices and welfare facilities);*

ix. *Accommodation works along the N77 National secondary road in the townland of Ballynaslee, Co. Kilkenny to facilitate the delivery of turbine components and other abnormal sized loads;*

x. *A borrow pit;*

xi. *Spoil Management;*

xii. *Hedgerow removal;*

xiii. *Biodiversity Management and Enhancement Plan measures (including establishment of new hedgerow, translocation of existing hedgerow and enhancement of existing hedgerow);*

xiv. *Site Drainage;*

xv. *Operational stage site signage; and,*

xvi. *All associated site development works, ancillary works and apparatus.*

Laois County Council – Planning Notice Project Description

i. *The construction of 2 no. wind turbines with an overall turbine tip height of 175 metres; a rotor blade diameter of 150 metres; and hub height of 100 metres, and associated foundations and hard standing areas;*

ii. *Upgrade of existing tracks and roads and the provision of new site access roads;*

iii. *Underground electrical and communications cabling connecting the wind turbines to a proposed 38kV on-site substation located in the townland of Ballynaslee Co. Kilkenny;*

iv. *Accommodation works along the N77 National secondary road in the townland of Durrow Townparks, Co. Laois to facilitate the delivery of turbine components and other abnormal sized loads;*

v. *Hedgerow Removal;*

vi. *Biodiversity Management and Enhancement Plan measures (including establishment of new hedgerow, translocation of existing hedgerow and enhancement of existing hedgerow);*

vii. *Spoil Management;*

viii. *Site Drainage;*

ix. *Operational stage site signage; and,*

x. *All associated site development works, ancillary works and apparatus.*

Both applications are seeking a ten-year permission and 35-year operational life from the date of commissioning of the wind farm development.

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Development, will have an operational lifespan greater than the 35-year operational life that is being sought as part of the planning application.

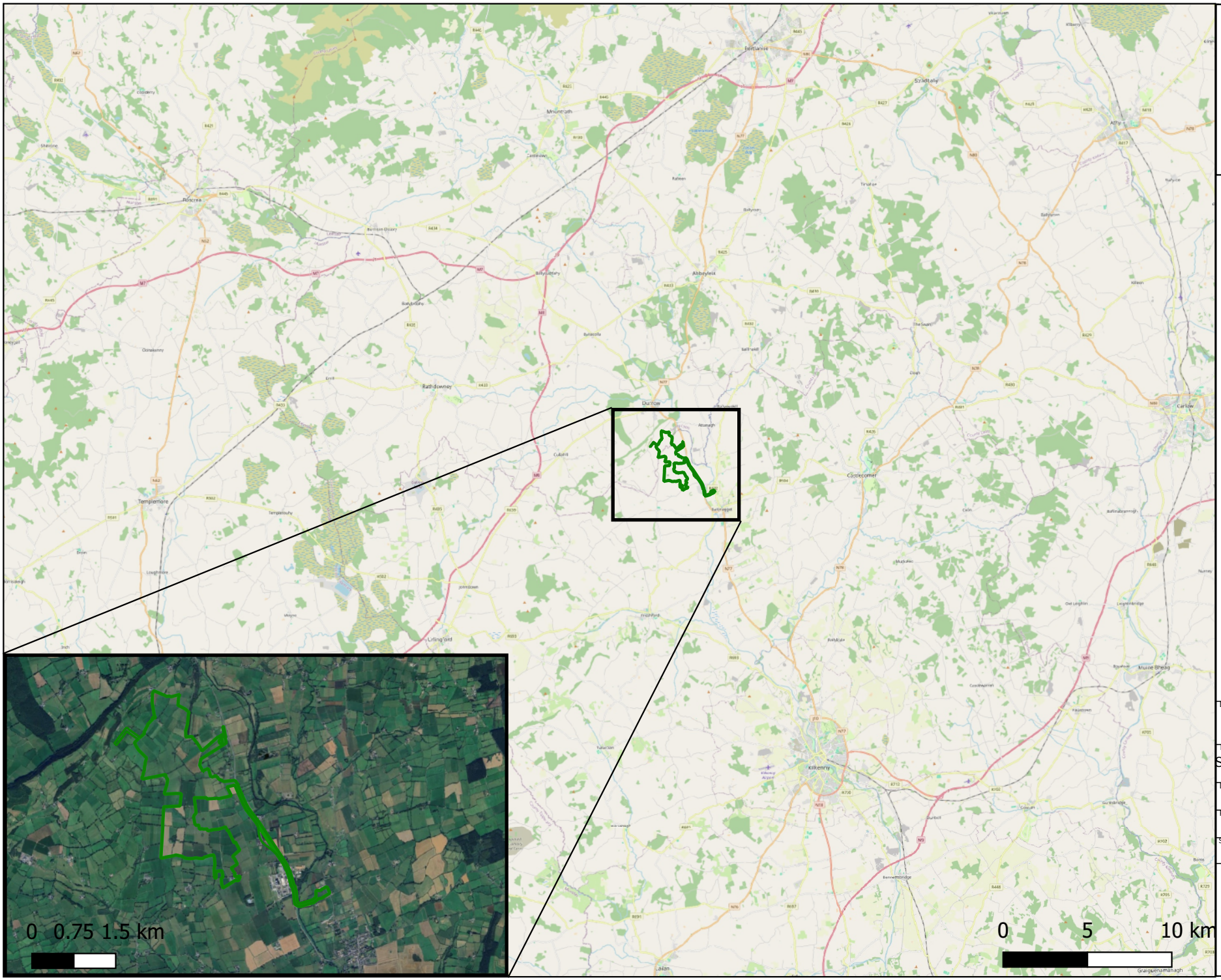
Each of proposed wind turbines will have a generating capacity of 6MW. Therefore, on this basis, the proposed 8 no. wind turbines would have a combined generating capacity of 48MW. The actual turbine procured as part of a competitive tender process may have a power output that is marginally lower or greater than the 6MW turbine described in the EIAR. Irrespective of the power output of the actual turbine procured, the conclusions of the NIS will not be materially affected.

The layout of the Proposed Development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site (refer to Chapter 3, Section 3.2.5, of the EIAR). The roads layout for the Proposed Development makes the use of the existing onsite roads and access tracks where possible, with approximately 1.5 kilometres of existing roadway/ tracks requiring upgrading and approximately 4.9 kilometres of new access road to be constructed.

The Proposed Development includes for an onsite 38kV electricity substation and underground grid connection cabling, connecting the Proposed Wind Farm to the national electricity grid via the existing Ballyragget 110kV electricity substation located in the townland of Moatpark, Co. Kilkenny. The cabling will be located within the public road corridor and agricultural lands for its entire length. The total length of the Proposed Grid Connection underground cable route is approximately 3.4km.

There are no dwellings located within 700 metres of any proposed turbine location. This equates to 4 times the proposed maximum blade-tip height of 175m. This complies with the requirements of the Department of Housing, Local Government and Heritage's Draft Revised Wind Energy Development Guidelines, December 2019 (Draft WEGs 2019).

All elements of the Proposed Development have been assessed as part of this NIS.



Map Legend

Site Boundary

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Drawing Title

Site Location

Project Title: Seskin Renewables Wind Farm	
Drawn By: CH	Checked By: CC
Project No.: 231103	Drawing No.: Figure 2-1
Scale: 1:292,021	Date: 17.06.2025

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3. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

3.1 Regional and Local Hydrology and Hydrogeology

3.1.1 Regional Hydrology

3.1.1.1 Proposed Wind Farm

A regional hydrology map is shown in Figure 9-1 within Chapter 9 'Hydrology and Hydrogeology' of the EIAR which accompanies this application (See Appendix 3). On a regional scale, the Proposed Wind Farm site is located within the Nore catchment, within Hydrometric Area 15 (Nore) of the Irish River Basin district. On a more local scale, the Proposed Wind Farm site is contained within the Nore_SC_070 sub-catchment, with a small section to the north of the site located in the Nore_SC_050 sub-catchment.

The River Nore is located ~450 meters east of the Proposed Wind Farm site (parallel to N77 road) and flows south through Ballyragget. The majority of the Proposed Wind Farm site drains into the River Nore via the Lisdowney Stream, including its tributaries: Archerstown stream, Aharney stream, and the Ballyconra stream. The Durrow Townparks watercourse drains the northeast of the site to the River Nore just south of Durrow.

The closest major watercourse to the Proposed Wind Farm site is the River Nore situated 450 meters to the east. The river is monitored with measurements by the EPA located at a bridge at E244048, N171562.

The River Erkina is located ~2km north of the site and flows east before discharging into the River Nore approximately ~1.2km north of the Site. The Newtown stream is mapped ~1.8km west of the Proposed Wind Farm site, which flows north before discharging to the River Goul which flows east and discharges to the River Erkina. The Lisdowney stream is mapped directly south of the Site, which flows southeast and discharges into the River Nore approximately ~4km south of the Proposed Wind Farm site. The Loughill river is mapped ~1km east of the site, which flows west and discharges into the River Nore.

A regional hydrology map is shown in Figure 9-1 of Chapter 9 of the accompanying EIAR.

3.1.1.2 Proposed Grid Connection Route

The Proposed Grid Connection undergoing cabling route is located within the catchments of the Nore_120 and Nore_130 waterbodies, i.e. within the Nore_SC_060, Nore_SC_070 and Nore_SC_080 subcatchments. These surface water catchment areas and waterbodies are illustrated in Figure 9-1 of Chapter 9 of the accompanying EIAR. The Proposed Grid Connection underground cabling route runs south along the N77 and crosses the River Nore. There is 1 no. watercourse crossing along the Proposed Grid Connection underground cabling route. The co-ordinates of the Proposed Grid Connection underground cabling route crossing are given in Table 3-1 below.

Table 3-1: Grid Connection Watercourse crossings

Townland	River	Easting	Northing
Ballyragget	Nore_130 – River Nore	E243998	N171854

3.1.2 Local Hydrology

3.1.2.1 Proposed Wind Farm site

Within the Proposed Wind Farm, there is 1 no. mapped small stream. The Ballyconra stream is mapped by the EPA as beginning in a field ~15m south of the Site boundary and ~480m southeast of turbine T8, however there is also a seepage face leading to a field drain situated ~500m northwest of this point. This seepage face exists along the approximate location of the mapped fault, and the topography and overall nature of the ground near this stream indicates that the seepage face is associated with the transition between the Bregaun flagstone Fm[3]/Kileshin Siltstone Fm and the Carboniferous Limestones of the Clogrenan Fm and Ballyadams Fm. Generally, the flow rate from this seepage face is low, typically 0.25-0.5 l/s.

There is a further unmapped short watercourse north of the Ballyconra stream. This unmapped stream emerges as a small seepage face near E241750, N173608. This seepage then travels along a relatively steep stream channel towards a swallow hole at E241925, N173397, located ~180m north of turbine T6. This stream exists along the mapped fault between the sandstone/shale to the west/northwest and the Limestone to the east, which is further supported with drilling data from MW3 at Turbine T6 (located 140m southwest of swallow hole) and geophysics conducted at the proposed turbine location and across the area of the swallow hole.

The Ballyconra stream is a tributary to the Lisdowney stream.

The Archerstown 15 stream flows south from the northwestern edge of the Wind Farm. The Archerstown 15 stream is not located within the Wind Farm, with the origin point situated ~30m from the site boundary and ~380m southwest of turbine T4. The Archerstown 15 stream flows south where it discharges into the Lisdowney stream.

The topography broadly slopes southeast across the site, although local variations do exist. Any surface water runoff from the Proposed Wind Farm site is expected to flow in this direction (apart from at T4 where the ground slopes southwest).

No field drains were observed across the site, apart from at the origin point of the Ballyconra stream, where it appears the channel has been dug out to encourage drainage from the spring seepage which emerges to the northwest. The agricultural fields are primarily improved grassland, which are well drained.

A local hydrology map including mapped surface water bodies is shown in Figure 9-2 of Chapter 9 of the accompanying EIAR.

[3] *Fm – Bedrock Formation; consists of a certain number of bedrock strata that have a comparable lithology, facies or other similar properties.*

3.1.2.2 Proposed Grid Connection

Drainage along the Proposed Grid Connection underground cabling route is broadly localised to the River Nore which flows along the N77 road. The River Nore meets the N77 National Road approximately ~2.3km north of the Proposed Wind Farm site, and subsequently runs approximately parallel to the N77 road, varying between 0.1-1km east of the road carriageway. Drainage from the road carriageway will primarily drain in the direction of the River Nore, however under typical moderate rainfall conditions, the surface water will likely infiltrate through the soil/subsoil before reaching the river as shallow baseflow, due to the soils (Sand and gravel) and subsoils (High permeability) along the Proposed Grid Connection underground cabling route.

3.1.3 Baseline Water Quality

Biological Q-rating data for EPA monitoring points are available from locations along the River Nore, as well as the River Erkina, River Goul, and the Lisdowney stream. The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

The River Nore achieved a Q3-Q4 (Moderate) rating ~ 0.3km to the southeast of the Wind Farm site and a Q4 (Good) rating 0.7~km to the northeast of the Proposed Wind Farm site. These ratings were achieved in 2020 and 2022 respectively.

The River Erkina achieved a Q3 (Poor) status based on sampling from 2022. The River Goul also achieved a Q3 (Poor) rating from sampling completed in 2022. The Lisdowney stream achieved a Q3-Q4 (Moderate) rating from sampling completed in 2022.

A summary of the Q ratings is given below in Table 3-2.

Table 3-2: Water quality status of watercourses within or in proximity of the Proposed Wind Farm site

Waterbody	Substation Code	Year	Q rating	Status
R. Nore	RS15N011380	2020	3-4	Moderate
R. Nore	RS15N011300	2022	4	Good
R. Erkina	RS15E010300	2022	3	Poor
R. Goul	RS15G020500	2022	3	Poor
Lisdowney stream	RS15L020100	2022	3-4	Moderate

3.2 Results of Baseline Ecological Surveys

3.2.1 Ecological Walkover Surveys

3.2.1.1 Description of Habitats and Flora within the Proposed Development Site

A total of fourteen habitats were recorded within the Proposed Wind Farm site including:

- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Arable Crops (BC1)
- Tilled Land (BC3)
- (Mixed) Broadleaved Woodland (WD1)
- (Mixed) Broadleaved / Conifer Woodland (WD2)
- Wet Willow-Alder Ash Woodland (WN6)
- Scrub (WS1)
- Earth Banks (BL2) associated with hedgerows (WL1) and treelines (WL2)
- Hedgerows (WL1)
- Treelines (WL2)
- Drainage Ditches (FW4)
- Eroding/ Upland River (FW1)
- Buildings and Artificial Surfaces (BL3)

A map showing the Proposed Wind Farm development footprint overlaying the Habitat Map is shown in Figure 3-1 and 3-2.



Map Legend

- Site Boundary
- WFD River Waterbodies
- Drainage Ditches (FW2)
- Hedgerows (WL1)
- Treelines (WL2)
- Improved agricultural grassland (GA1)
- Arable crops (BC1)
- Wet grassland (WS4)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved/conifer woodland (WD2)
- Buildings and artificial surfaces (BL3)
- Scrub (WS1)
- Wet willow-alder-ash woodland (WN6)
- Potential Grid Route
- Proposed Turbine Layout
- Proposed Hardstands
- Construction Compounds
- Indicative Borrow Pit Location
- Potential 38kV Substation with Battery Storage
- Proposed New Roads
- Proposed Road Amendments Existing Roads
- Met Mast Location

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Drawing Title
Habitat Map with development overlay (Northern Section)

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
CH	CC
Project No.	Drawing No.
231103	Figure 3-1
Scale	Date
1:8,598.85	19.06.2025

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Map Legend

- Site Boundary
- WFD River Waterbodies
- Drainage Ditches (FW2)
- Hedgerows (WL1)
- Treelines (WL2)
- Improved agricultural grassland (GA1)
- Arable crops (BC1)
- Wet grassland (WS4)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved/conifer woodland (WD2)
- Buildings and artificial surfaces (BL3)
- Scrub (WS1)
- Wet willow-alder-ash woodland (WN6)
- Potential Grid Route
- Proposed Turbine Layout
- Proposed Hardstands
- Construction Compounds
- Indicative Borrow Pit Location
- Potential 38kV Substation with Battery Storage
- Proposed New Roads
- Proposed Road A mendments Existing Roads
- Met Mast Location

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Drawing Title
Habitat Map with development overlay (Southern Section)

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
CH	CC
Project No.	Drawing No.
231103	Figure 3-2
Scale	Date
1:10,270.6	17.06.2025

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Improved Agricultural Grassland (GA1)

The majority of the land cover within the Proposed Wind Farm site were characterised as **Improved Agricultural Grassland (GA1)** pasture (See Plate 3-1). The sward within GA1 fields was dominated by perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*) with creeping buttercup (*Ranunculus repens*) abundant in many fields, while species such as annual meadow grass (*Poa annua*), red clover (*Trifolium pratense*) and white clover (*Trifolium repens*) were recorded frequently. Common bent grass (*Agrostis capillaris*), sweet vernal grass (*Anthoxanthum odoratum*), common daisy (*Bellis perennis*), meadow buttercup (*Ranunculus acris*), creeping thistle (*Cirsium arvense*), common dandelion (*Taraxacum officinale*), common sorrel (*Rumex acetosa*), curly dock (*Rumex crispus*), common chickweed (*Stellaria media*) and common mouse-ear chickweed (*Cerastium fontanum*) were recorded occasionally throughout this habitat. Rarely recorded species included meadow foxtail (*Alopecurus pratensis*), Fat-hen (*Chenopodium album*), common wheat (*Triticum aestivum*), springy turf moss (*Rhytidiadelphus squarrosus)* and cuckoo flower (*Cardamine pratensis*). These areas of grassland were under intense agricultural management and grazed by livestock.



Plate 3-1. An example of improved agricultural grassland (GA1) in the vicinity of the proposed location for Turbine 2, in the northwest section of the Proposed Wind Farm site.

Wet Grassland (GS4)

Wet Grassland (GS4) was recorded within agricultural fields throughout the Proposed Wind Farm site, with the greatest concentration of this habitat located in the vicinity of Turbine 4 in the centre of the site. This habitat type (see Plate 3-2) within the Proposed Wind Farm site was dominated by grasses such as common bent and yorkshire fog and rushes, such as soft rush (*Juncus effusus*) and hard rush (*Juncus inflexus*) which were recorded in abundance. Other species recorded within this habitat included perennial ryegrass, meadow buttercup, curly dock, broadleaved dock, meadow foxtail grass, white clover, cuckoo flower and common daisy. A small area of wet grassland habitat adjacent to

Turbine 4 supported a small number of devil's bit scabious (*Succisa pratensis*) plants, this area had been heavily poached by cattle at the time of survey. Devil's-bit scabious is a positive indicator species for the Annex I habitat type Molinia meadows [6410]. However, as this was the only positive indicator species for this Annex I habitat type recorded, it can be concluded that the Wet Grassland (GS4) habitat recorded within the Proposed Wind Farm site does not align with the Annex I habitat type *Molinia* meadows [6410].



Plate 3-2: Wet grassland (GS4) recorded in the vicinity of the proposed location for Turbine 4.

Scrub (WS1)

Scrub (WS1) habitat was only recorded in a small number of areas within the Proposed Wind Farm site and was predominantly associated with areas of mixed broadleaved woodland or where scrub species from hedgerows began to encroach into fields. Where scrub habitat had started to develop it was dominated by willow (*Salix spp.*), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus*) (see Plate 3-3).



Plate 3-3: An area of scrub habitat (WS1) adjacent to Turbine 6.

Hedgerow (WL1)

Hedgerow habitat was recorded throughout the Proposed Wind Farm site with the majority forming field boundaries within the site. The majority of the hedgerows were intact and well-managed and were often associated with dry drainage ditches (See Plate 3-4). However, in parts of the site, hedgerows were outgrown and top heavy. Some hedgerows across the Proposed Development site demarcated townland boundaries, and were therefore, of cultural heritage significance (See Plate 3-5). These hedgerows had a richer and more diverse floristic composition than other hedgerows across the site. The majority of the hedgerows were dominated by hawthorn (*Crataegus monogyna*), with blackthorn (*Prunus spinosa*), ivy (*Hedera helix*), elder (*Sambucus nigra*), and honeysuckle (*Lonicera periclymenum*). Other hedgerow species also recorded included hazel (*Corylus avellana*), holly (*Ilex aquifolium*), wild rose, and spindle (*Euonymus europaeus*). Individual trees such as beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), pedunculate oak (*Quercus robur*), goat willow (*Salix caprea*), alder (*Alnus glutinosa*), and aspen (*Populus tremula*) were growing as individual trees within hedgerows.

Some of the hedgerows across the site had well developed understories and a diverse ground flora associated with them with species such as lords and ladies (*Arum maculatum*), cow parsley (*Anthriscus sylvestris),* bluebells (*Hyacinthoides non-scripta*), greater stitchwort (*Stellaria holostea*), primrose (*Primula vulgaris*), golden saxifrage (*Chrysosplenium oppositifolium*), common dog violet (*Viola riviniana*), wood avens (*Geum urbanum*), and lesser celandine (*Ficaria verna*) recorded.



Plate 3-4: Heavily managed Hedgerow (WL1) within the boundaries of the Proposed Wind Farm.



Plate 3-5: Outgrown Hedgerow (WL1) of high significance within the boundaries of the Proposed Wind Farm.

Treeline (WL2)

Where linear 'hedgerow' features were over 5m in height and were made up of semi-mature to mature trees, these were characterised as treelines, with ash(*Fraxinus excelsior)*, oak (*Quercus* sp.), beech, and sycamore *(Acer pseudoplatanus)* species making up the majority of the treelines on the Proposed Wind Farm site, occasional treelines of broadleaved species were also recorded comprising of ash, sycamore and silver birch *(Betula pendula)* (Plate 3-6).



Plate 3-6: Mature treeline (WL2) forming a field boundary within the Proposed Wind Farm site.

Earth Banks (BL2)

Earh banks (BL2), where present, were generally associated with hedgerows (Wl1) or treelines (WL2). These banks were generally composed of clay and were often bordered by drainage ditches. Most were completely vegetated and usually supported abundant grasses or species such as foxglove (*Digitalis purpurea*), ferns and ivy. However, some earth banks were bare and species such as the ashy mining bee (*Andrena cineraria*) were recorded nesting within the banks (See Plate 3-7).



Plate 3-7: South facing dry earth bank located north of Turbine 6.

Drainage Ditches (FW4)

A number of drainage ditches were recorded across the Proposed Wind Farm site. These drains were mostly associated with field boundaries such as hedgerows and treelines and were approximately 0-100cm wide. They varied in vegetation composition. The majority of the drains on site were dry. Species such as nettles (*Urtica dioica*), brambles, and docks (*Rumex* spp.) were recorded in dry drains. Aquatic species such as watercress (*Nasturtium officinale*) were recorded in drains that appeared to be predominantly wet most of the year (See Plate 3-8).



Plate 3-8: Drainage ditch (FW4) dominated by watercress recorded within the boundaries of the Proposed Wind Farm.

Buildings and Artificial Surfaces (BL3)

Existing farm tracks within the Proposed Wind Farm site were categorised as buildings and artificial surfaces (BL3). Any private dwellings, agricultural buildings and/or old ruins within the site were also categorised as BL3 (See Plate 3-9)



Plate 3-9: Ruins of an old stone building (BL3) recorded within an area of scrub

Arable Crops (BC1)

A number of agricultural fields within the northern section of the Proposed Wind Farm site were characterised as Arable crops (BC1) (See Plate 3-10). These fields were cultivated and managed for the production of arable crops, including cereals such as wheat, barley and oats. Species such as common poppy (*Papaver rhoeas*) and wild carrot (*Daucus carota*) were recorded along the verges of these fields.



Plate 3-10: Arable crops (BC1) field recorded within the footprint of Turbine 3.

Tilled Land (BC3)

An area of Tilled Land (BC3) was recorded in the northern section of the Proposed Wind Farm site (see Plate 3-11). This field had been recently tilled in preparation for planting and was therefore devoid of vegetation.



Plate 3-11: Tilled land (BC3) recorded in the vicinity of Turbine 3.

(Mixed) Broadleaved woodland (WD1)

Several areas of (Mixed) Broadleaved Woodland (WD1) were recorded across the Proposed Wind Farm site and immediately adjacent to the Proposed Wind Farm boundary. These areas were dominated by species such as oak, ash, and sycamore. Understory species recorded within areas included hawthorn, gorse, hazel, elder, holly and willow. Honeysuckle (*Lonicera periclymenum*), bracken (*Pteridium aquilinum)*, fern spp., bluebells, and ivy were recorded within the ground flora (See Plate 3-12).



Plate 3-12: (Mixed) broadleaved woodland (WD1) recorded east of Turbine 1 outside the boundaries of the Proposed Wind Farm site.

(Mixed) Broadleaved / Conifer woodland (WD2)

One small area of (Mixed) Broadleaved / Conifer Woodland (WD2) was recorded within the Proposed Wind Farm site. This area was located north-east of Turbine 6 and was dominated by ash and *Pinus* spp. Understory species recorded within this area included hawthorn, elder, and ivy. Abundant Lady's fern (*Athyrium filix-femina*), lesser celandine, cow parsley, hart's tongue fern (*Asplenium scolopendrium*), and bluebells were recorded in the ground flora (See Plate 3-13). An earth bank (BL2) with a stone wall beneath it ran through this area of woodland. A swallow hole was recorded within this area of woodland (See Section 6.4.5 in Chapter 6 Biodiversity for further details).



Plate 3-13: (Mixed) broadleaved / conifer woodland (WD2) recorded north-east of Turbine 6.

Wet willow-alder ash woodland (WN6)

An area of wet willow-alder- ash woodland (WN6) dominated by willow and ash species was recorded north-west of Turbine 8 (See Plate 3-14). The ground flora was dominated by bramble and nettles, however other species recorded included enchanters; nightshade, meadowsweet, herb robert, lesser celandine, creeping buttercup, ivy, cleavers, narrow dock, Lords-and-Ladies (*Arum maculatum*), water cress, ground ivy, woundwort, feather moss, royal fern, Carex spp., and Juniper haircap (*Polytricium junipercarum).*



Plate 3-14: Area of Wet willow-alder-ash woodland (WN6) recorded north-west of Turbine 8.

Eroding Upland River (FW1)

A section of the Durrow Townparks (Nore_110) was recorded along part of the northern boundary of the Proposed Wind Farm site. This was categorised as an ***Eroding/ upland river*** **(FW1).** This watercourse flowed in a north-easterly direction and flowed into the River Nore (See Plate 3-15). At the time of the aquatics survey the section of river within the site was noted to be largely unwetted at the time of survey, with isolated sections of shallowly wetted, undefined channel. Channel substrate was largely clay, earth and silt, with infrequent, largely unwetted stone-based substrata at the upstream extent. Any wetted sections of channel were 0.01–0.05m in depth and heavily silted and turbid even when undisturbed, with a brown water colouration.



Plate 3-15: Durrow townparks classified as an Eroding / upland river (FW1).

3.2.1.2 Habitats along the Proposed Grid Connection Route

The underground cabling required to facilitate the Proposed Grid Connection Route will be laid beneath the surface of the internal site road network and public road. It is proposed that the Proposed Grid Connection Route will originate at the onsite 38kV substation, which is located within an area of improved agricultural grassland (GA1) in the eastern vicinity of the Proposed Wind Farm site. The cable will run east towards the national road, N77 (Buildings and artificial surfaces (BL3)) and will continue south towards Ballyragget, Co. Kilkenny for 2.2km. The cable will run along the road verge to the point of the lauch pit where the cable will travel under the River Nore, (classified as a Depositing/ Lowland River (FW2), by Horizontal Directional Drilling (HDD) and arrive at the reception pit within improved agricultural grassland (GA1). From here, the cable will cut through a hedgerow (WL1) and Improved agricultural grassland (GA1) to reach the Ballyragget 110kV substation (See Plate 3-16 – 3-17).

The River Nore which runs in a southerly direction to the east of the Proposed Wind Farm site was classified as a Depositing / lowland river (FW2) and was characterised by slow moving, deep glides (See Plate 3-18). While sections of the river surveyed for the Proposed Grid Connection crossing displayed a generally straight channel profile, the River Nore displayed a meandering profile throughout the wider landscape. The channel substrate was predominantly compacted cobble, with a patchy distribution of filamentous green algae growth and moderate siltation atop channel bed substrata. Vegetated earthen banks, dominated by cock's foot, Yorkshire Fog and *Poa spp.*, as well as nettle, creeping buttercup, meadow buttercup, and cuckoo flower extended into Improved Agricultural Grassland (GA1). Earthen

banks were eroded and undercut in places, and in combination with overhanging vegetation, provided marginal refugia. Water was very clear when undisturbed, with plumes of silt evident when channel substrate was disturbed underfoot, particularly along marginal silt beds (See Plate 3-19). The channel was largely unshaded, with the exception of marginal and emergent stands of reed canary grass (*Phalaris arundinacea*), great willowherb (*Epilobium hirsutum*) and branched bur-reed (*Sparganium erectum*) which provided instream refugia. Overhanging willow branches provided further shading to the channel margins.



Plate 3-16: Improved Agricultural Grassland (GA1) and hedgerow (WL1) through which the Proposed Grid Connection will travel. Photo looking north towards Ballyragget substation.



Plate 3-17: Hedgerow through which the Proposed Grid Connection will travel.



Plate 3-18: The River Nore which was classified as a Depositing / lowland river (FW2).



Plate 3-19: Well vegetated banks either side of the River Nore.

3.2.1.3 Watercourse Crossings

There will be two watercourse crossings as part of the Proposed Development. The first watercourse crossing is within the Proposed Wind Farm site, located north of T8. This drain crossing will involve the construction of a clear span crossing. The second watercourse crossing will involve the crossing of the River Nore for the Proposed Grid Connection. This will require Horizontal Directional Drilling (HDD).

No instream works are required for any watercourse crossings associated with the Proposed Development.

Table 3-3: Bridge/Watercourse crossing infrastructure

Crossing	Works Proposed	Photo
Drainage Ditch (Proposed Windfarm Site)	Clear-span crossing	
River Nore (Grid Route)	HDD (no instream works).	

3.2.1.4 Habitats – Turbine Delivery Route

Accommodation Area

Road and junction widening are sometimes required along proposed turbine delivery routes to accommodate the large vehicles used to transport turbine components to site. The proposed turbine delivery route route for the Proposed Development has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment (Chapter 15 of the EIAR) and also detailed in Chapter 4 of the EIAR (Appendix 2 of this NIS). There are sections on the route where the vertical alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process. Accommodation areas will be required at two locations on the N77 National Secondary Road between the town of Durrow, Co. Laois, and the main Proposed Development site entrance in the townland of Ballynaslee, Co. Kilkenny. These areas will be

temporary in nature and only used for the purposes of abnormal load delivery. The locations of the accommodation areas are shown in Figures 1-2 of Chapter 1.

It has been identified that accommodation works at Location 1 (see Figure 4-22, Chapter 4) will require the temporary removal of a small number of semi-mature trees, ornamental furniture signage and electricity/telecommunication poles, within and around the green space categorized as Improved amenity grassland (GA2), see 3-20 below.

It has been identified that accommodation works at Location 2 (see Figure 4-23, Chapter 4) will involve the temporary covering of the grass area categorised as Improved amenity grassland (GA2) with crushed stone. Upon the completion of the construction phase, the accommodation area will be covered with a layer of topsoil and reseeded.



Plate 3-20: Photo showing receiving habitat at along turbine delivery route (Accommodation Area 1).

3.2.1.5 Annex I Habitats

The most recent NPWS data on the recorded distribution of EU Habitats Directive Annex I listed habitats was reviewed in relation to the Proposed Development.

Available NPWS datasets were downloaded and overlain on the Proposed Development. No polygon or point data contained within datasets was identified within the Proposed Development Site Boundary. Following a review of the Irish Semi-natural Grasslands Survey (ISGS) no areas of the lands within the Proposed Development Site Boundary were found to have been surveyed as part of the ISGS.

A 94.5ha area of alluvial woodland is located approx. 0.75km upstream of survey site WF 7, and a further 47ha of alluvial woodland is located 5.8km and 7.2km upstream of the mainstem River Nore confluences with the Erkina and Durrow Townparks watercourses, along which survey sites WF 7 and WF 6 are located, respectively.

3.2.1.6 Invasive species

No invasive species listed on the Third Schedule were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection Route.

3.2.2 Fisheries and Aquatic Fauna

Full details of results of aquatic surveys undertaken in July 2024 are provided in the Aquatic Baseline Report (Appendix 1) and are summarised in this section. All survey locations (n=8) are shown in Figure 1-1 and Figure 1-2 in the Aquatic Baseline report. The following summary has been extracted from the baseline report. In addition, otter surveys were also conducted along the Proposed Grid Connection.

3.2.2.1 Watercourses

Watercourses surveyed within the vicinity of the Proposed Development site consisted primarily of modified ***Eroding/Upland (FW1)*** watercourses, surrounded predominantly by agricultural and pastural land use. Consequently, many watercourses within the vicinity of the wind farm (WF 1– WF 5, sites inclusive) exhibited visible enrichment, with sewage fungus and excessive filamentous green algae growth across channel bed substrate. Despite the presence of abundant patches of sewage fungus as a result of surrounding, high activity urban land use, site WF 7 provided the highest value fisheries habitat, which displayed a river profile more closely associated with a ***Depositing/Lowland (FW2)*** river.

3.2.2.2 Fish Species

The following paragraphs summarise the fish species that were found during the aquatic baseline surveys. The below paragraphs should be read in conjunction with Figure 1-1 and Figure 1-2 (survey locations) in the Aquatic Baseline Report (Appendix 1):

- **Salmonids** were present at 5 no. sites in total, with **brown trout** present at 4 of these (i.e. WF 1, WF 2, WF5, WF 7) **Atlantic salmon** present at 3 of these (i.e. WF 3, WF 5, WF 7).
- **Cyprinidae** were present at one site in total, with **Minnow** were present at 1 no. sites (i.e. WF 7)
- **European eel** was recorded at 3 sites (WF 2, WF 5, WF 7).

3.2.2.3 White-clawed crayfish & crayfish plague

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the survey and no crayfish remains were identified in otter spraint recorded during the survey. However, white-clawed crayfish was detected from eDNA surveys (discussed further below). Crayfish plague was not detected during the eDNA surveys.

3.2.2.4 eDNA analysis

White-clawed crayfish was detected from eDNA in a water sample collected from one site, WF 3. No crayfish eDNA was detected at any of the other sites. eDNA surveys provided no positive results for crayfish plague (*Aphanomyces astaci*) in the vicinity of the Proposed Development site.

No freshwater pearl mussel eDNA was detected in the vicinity of the Proposed Development site.

3.2.2.5 Kick-sampling and Q-Value

The following summarise the results of kick-sampling and Q-Value evaluation carried out:

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from the 7 sites in July 2024. No rare or protected macrophytes/aquatic bryophytes were recorded at any of the aquatic survey locations.

Site WF 5 achieved **Q4 (good status)** water quality and thus met the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters)(Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). The sites WF 2 and WF 3 achieved **Q3-4 (moderate status),** while WF 1 and WF 7 achieved **Q3 (poor status).** Due to a lack of sufficiently wetted channel, kick-sampling and electrofishing could not take place at either survey site WF 4 or WF 6.

The biological water quality of the survey area was generally poor, with the majority of the water courses in the study area significantly impacted via eutrophication, siltation and or historical modifications (hydromorphology).

3.2.2.6 Otter

All watercourses (including drainage ditches) within the Proposed Wind Farm site and along the Proposed Grid Connection route were surveyed for signs of otter. No signs of were recorded within the boundaries of the Proposed Wind Farm site. During aquatic surveys, otter spraint and prints were recorded at two of the aquatic survey locations in the wider locality namely WF 2 and WF 5 (see Appendix 1 for further detail). Signs of otter were recorded along the Proposed Grid Connection route where it runs adjacent and crosses the River Nore (See Figure 3-3). Multiple signs of otter were recorded in the form of prints (See Plate 3-21), spraints and feeding remains (See Plate3-22). A potential otter holt was recorded along the bank of the River Nore. Following the deployment of a trail camera from 19th December 2024 to 14th January 2025, the holt was confirmed to be active (See Plate 3-23). The holt was in regular use by a single individual during the time of camera deployment. Based on the footage captured it is not considered to be a breeding holt.



Plate 3-21: Otter print recorded within the vicinity of the Proposed Grid Connection crossing point during the multidisciplinary walkover survey.



Plate 3-22: Otter spraint (left photo) and salmon head (feeding remains) recorded downstream of the Proposed Grid Connection crossing point.



Plate 3-23: Otter recorded by trail camera approximately 165m upstream of Proposed Grid Connection crossing point.

644000
644250
644500
672250
672000

Map Legend

- Otter holt with 20m buffer
- HDD Launch Pit and Reception Pit
- Potential Grid Route
- WFD River Waterbodies
- Otter Holt 20m Buffer
- EIAR Site Boundary
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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N

SITE LOCATION - NOT TO SCALE

Drawing Title
Fauna signs along Proposed Grid Connection

Project Title
Seskin Renewables Wind Farm

Project No.	Drawing No.	Scale
231103	Figure 3-3	1:2,200
Drawn By	Checked By	Date
BOC	CC	12/06/2025

0 100 200 m

MKO
Email: info@mkoireland.ie/ Website: www.mkoireland.ie

3.2.3 Bird Surveys (Kingfisher)

Detailed Ornithological survey findings are described in Chapter 7 of the EIAR. Only one Special Conservation Interest (SCI) species of relevance to this Appropriate Assessment (based on SPAs within the ZoI of the Proposed Development) was recorded during the surveys, namely kingfisher (*Alcedo atthis*). Kingfisher were observed on five occasions during breeding kingfisher surveys in 2023. Surveys were carried out along the River Nore, 960m from the nearest proposed turbine (T1). Suitable nesting habitat was identified within the survey area in several areas, the closest of which was 950m from the nearest proposed turbine. Most observations were of individuals calling or travelling. There was one observation of two kingfisher, with a male perched and a second bird calling from the riverbank below. This observation indicates a probable nest in this location.

A further kingfisher survey was carried out on the 15th May 2025 of the Proposed Grid Connection crossing point along the River Nore. The survey comprised a search of the river banks for existing kingfisher burrows, and an assessment of the habitat suitability of the banks for nesting kingfisher. The survey encompassed the cable crossing location and extended approximately 300m upstream and downstream of this location. No nesting burrows were recorded within the survey area. The majority of bank habitat within the survey area was assessed as unsuitable nesting habitat for kingfisher (i.e. shallow sloping banks; densely overgrown with no exposed substrate or steep/vertical faces present). A minor section (c.10m) of sub-optimal nesting habitat was identified on the western bank within the cable crossing area (where there has been erosion of a section of bank leaving an exposed sloping soil face extending approximately 1m above water level at time of survey). An additional section of suitable nesting habitat was recorded approximately 130m upstream of the cable crossing location. No burrows were recorded at these locations.

3.2.4 Noise Survey

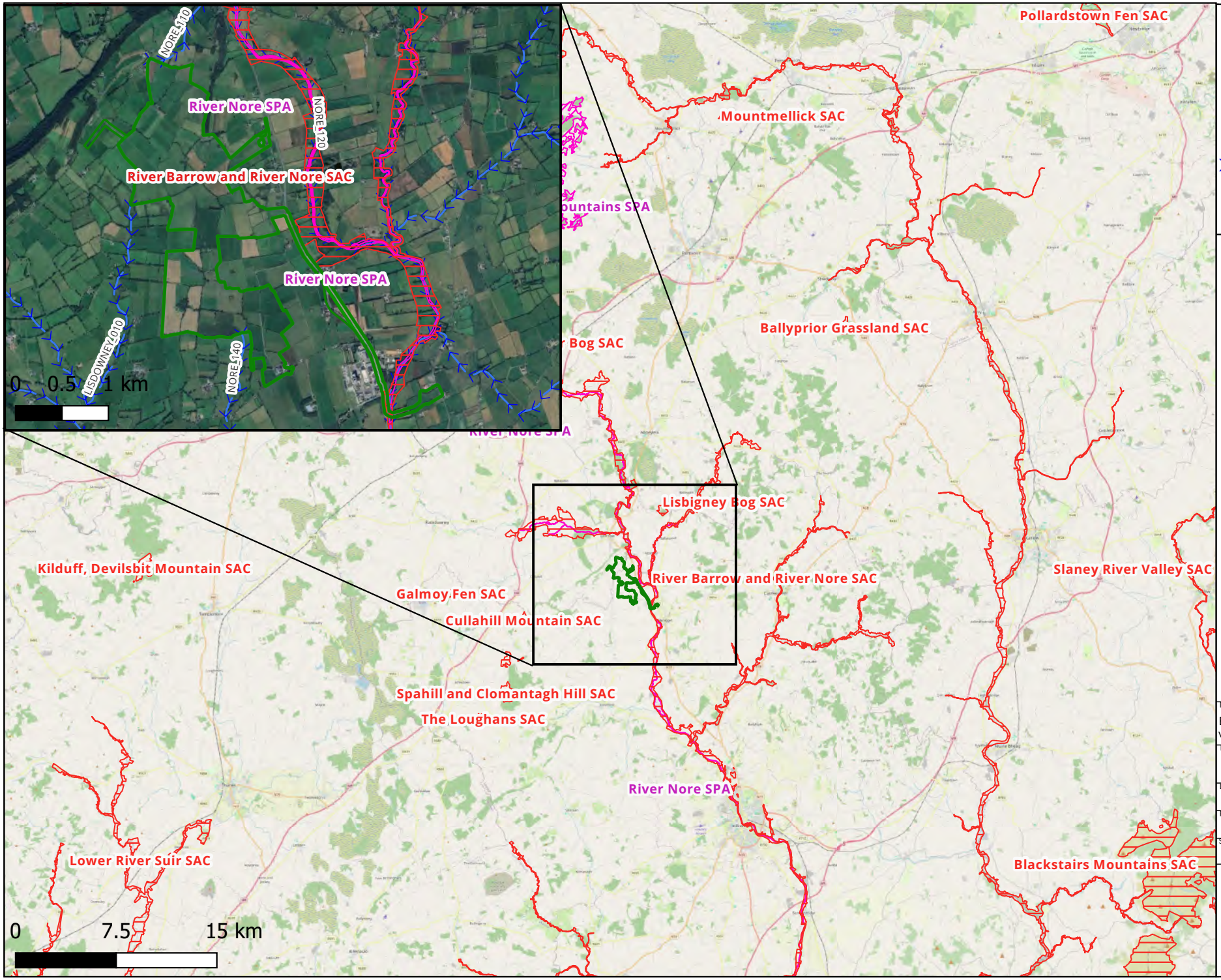
During the noise survey completed by AWN on the 1st July 2026, baseline noise levels, in the vicinity of the proposed HDD crossing point of the River Nore SPA, were measured as 62 dB. Sources of background noise included road traffic on the N77, industrial noise from the Tirlan facility, wind noise and distant construction noise (Please refer to the AWN Consulting Technical Note (Appendix 5 of this NIS) for further details).

4. APPROPRIATE ASSESSMENT SCREENING

4.1 Identification of Relevant European Sites

The following methodology was used to establish any European Sites upon which there is a potential for a likely significant effect to occur either individually or in combination with other plans and projects as a result of the proposed development:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie).
- All European Sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European Sites surrounding the development site are shown on Figure 4-1. Information on these sites according to the site-specific conservation objectives is provided in Table 4-1. Sites that were further away from the proposed development were also considered and no complete source-pathway-receptor chain for significant effect was identified for any other European Site.
- The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any European Sites. The hydrological catchments are also shown in Figure 4-1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, '*Assessing Connectivity with Special Protection Areas* (SPA)' (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 4-1, provides details of all relevant European Sites as identified in the preceding steps and assesses the potential for likely significant effects on each.
- The assessment considers any likely direct or indirect impacts of the Proposed Development, both alone and in combination with other plans and projects, on European Sites by virtue of criteria including the following: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Likely Significant Effect are identified, the site is included within the Likely Zone of Influence and further assessment is required within the NIS.
- The potential for the Proposed Development to result in cumulative impacts on any European Sites in combination with other plans and projects was considered in the assessment that is presented in Table 4-1. Plans and projects considered include those that are listed in Chapter 2 of the EIAR and Section 8 of this report.



Map Legend

- Site Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD River Waterbodies

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Drawing Title
European Designated Sites within the vicinity of the Proposed Developemnt

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
CH	CC
Project No.	Drawing No.
231103	Figure 4-1
Scale	Date
1:367,099	17.06.2025

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Table 4-1 Identification of European Sites within the Likely Zone of Influence

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Special Areas of Conservation (SAC)				
River Barrow and River Nore SAC [002162] Distance: 0km from Proposed Grid Connection Route (located adjacent to the SAC) ~500m east of the Proposed Development site	› [1016] Desmoulin's Whorl Snail *Vertigo moulinsiana* › [1029] Freshwater Pearl Mussel *Margaritifera margaritifera* › [1092] White-clawed Crayfish *Austropotamobius pallipes* › [1095] Sea Lamprey *Petromyzon marinus* › [1096] Brook Lamprey *Lampetra planeri*	Detailed conservation objectives for this site, (Version 2 ~~1~~, ~~19 July 2011~~[4]~~),~~ 6th June 2025[5]) were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). Both the Proposed Wind Farm and the Proposed Grid Connection are hydrologically connected to the SAC. The majority of the Proposed Wind Farm site drains into the River Nore (River Barrow and River Nore SAC) via the Lisdowney Stream (Nore_140), including its tributaries: Archerstown stream, Aharney stream, and the Ballyconra stream. The Durrow Townparks (Nore_110) watercourse drains the northeast of the site to the River Nore just south of Durrow and flows into the SAC approximately 2.2km	**Yes**

[4] ~~https://www.npws.ie/protected-sites/sac/002162~~

[5] *NPWS (2025) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. Available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf*

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
~6.2km downstream (by channel length) from the Ballyconra stream (near T8) and 8.1km downstream of the upper reaches of the Archerstown stream (380m from T4)	› [1099] River Lamprey *Lampetra fluviatilis* › [1103] Twaite Shad *Alosa fallax* › [1106] Atlantic salmon (*Salmo salar*) (only in fresh water) › [1355] Otter *Lutra lutra* › [1421] Killarney Fern *Trichomanes speciosum* › ~~[1990] Nore Pearl Mussel *Margaritifera durrovensis*~~ › [1130] Estuaries › [1140] Mudflats and sandflats not covered by seawater at low tide › [1170] Reefs › [1310] *Salicornia* and other annuals colonising mud and sand › [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		downstream. There is potential for works associated with the Proposed Development to result in drainage and seepage water resulting from infrastructure excavations, run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream. The Proposed Wind Farm site is located within the same hydrological sub-catchment (Nore_SC_070) and groundwater catchment (Nore) as the SAC. Potential hydraulic connections via groundwater flow exist over a generally long distance (kilometres), i.e. the regional groundwater flow towards the River Nore. No significant karst features were identified within the Proposed Development site (see Appendix 3 for further detail). However, large volumes of concrete will be required associated with construction of turbine foundations, therefore taking a precautionary approach potential impacts on ground water quality were also considered. Therefore, a pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways. The construction of the Proposed Grid Connection will involve the crossing of the River Nore and thus the River Barrow and River Nore SAC. Horizontal Directional Drilling (HDD) is proposed to eliminate any in-stream works or the construction of any clearspan crossing structure at this location. However, HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Therefore, a pathway for indirect effects on the aquatic qualifying	

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	› [1410]Mediterranean salt meadows (*Juncetalia maritimi*) › [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation › [4030] European dry heaths › [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels › [7220] *Petrifying springs with tufa formation (*Cratoneurion*) › [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles › [91E0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior		interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Development to result in likely significant effects on this European Site. **The SAC is considered to be within the Likely Zone of Influence of the Proposed Development and further assessment is required.**	

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	(Alno-Padion, Alnion incanae, Salicion albae)			
Lisbigney Bog SAC [000869] **Distance**: 4.3km from Proposed Development site 5.1km from Proposed Grid Connection Route	› [1016] Desmoulin's Whorl Snail *Vertigo moulinsiana* › [7210] Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*	Detailed conservation objectives for this site, (Version 1, 13 December 2021), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 4.3km north of this SAC, while the Proposed Grid Connection Route is located over 5.1km from the site. There is no surface water hydrological connectivity between the Proposed Development and this SAC. The Proposed Development is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Development and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Development. Therefore it is not considered further in this assessment.**	No
Cullahill Mountain SAC [000831] **Distance**:	› [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates	Detailed conservation objectives for this site, (Version 1, 11 November 2021), were reviewed as part of the assessment and	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 6.6km north of this SAC, while the Proposed Grid Connection Route is located over 8.6km from the site.	No

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
6.6km from Proposed Development site 8.6km from Proposed Grid Connection Route	(Festuco-Brometalia) (* important orchid sites)	are available at www.npws.ie	There is no surface water hydrological connectivity between the Proposed Development and this SAC. The Proposed Development is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Development and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Development. Therefore it is not considered further in this assessment.**	
Spahill and Clomantagh Hill SAC [000849] **Distance**: 8.4km from Proposed Development site 10.2km from Proposed Grid Connection Route	› [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Detailed conservation objectives for this site, (Version 1, 11 November 2021), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 8.3km north of this SAC, while the Proposed Grid Connection Route is located over 10.2km from the site. There is no surface water hydrological connectivity between the Proposed Development and this SAC. The Proposed Development is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Development and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is**	No

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			not within the Likely Zone of Influence of the Proposed Development. Therefore it is not considered further in this assessment.	
Galmoy Fen SAC [001858] **Distance**: 11.7km from Proposed Development site 13.1km from Proposed Grid Connection Route	› [7230] Alkaline fens	Detailed conservation objectives for this site, (Version 1, 17 July 2019), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 11.7km north of this SAC, while the Proposed Grid Connection Route is located over 13.1km from the site. There is no surface water hydrological connectivity between the Proposed Development and this SAC. The Proposed Development is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Development and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Development. Therefore it is not considered further in this assessment.**	No
The Loughans SAC [000407] **Distance**:	› [3180] Turloughs*	Detailed conservation objectives for this site, (Version 1, 16 December 2020), were reviewed as part	There will be no direct effects on this SAC. The Proposed Wind Farm site is located approximately 13km north of this SAC, while the Proposed Grid Connection Route is located over 14km from the site.	No

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
13km from Proposed Development site 14.6km from Proposed Grid Connection Route		of the assessment and are available at www.npws.ie	There is no surface water hydrological connectivity between the Proposed Development and this SAC. The Proposed Development is also located in a separate sub-catchment and groundwater body. No complete source-pathway-receptor chain exists between the Proposed Development and this SAC and therefore no potential for direct or indirect effects were identified. **No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. This site is not within the Likely Zone of Influence of the Proposed Development. Therefore it is not considered further in this assessment.**	
Special Protection Area (SPA)				
River Nore SPA [004233] **Distance**:	› [A229] Kingfisher (*Alcedo atthis*)	Detailed ~~First Order Site specific~~ conservation objectives for this site, (~~12/10/2022~~ Version 1,July 2024[6]), were reviewed as part of	There will be no direct effects as the Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SPA. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SPA will be by Horizontal Directional Drilling (HDD), the launch pits of	**Yes**

[6] *NPWS (2024) Conservation Objectives: River Nore SPA 004233. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage*

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
0.36km from Proposed Development site 0m from the Proposed Grid Connection Route		the assessment and are available at: www.npws.ie	which will be located within the N77 road verge and agricultural lands outside the SPA boundary (see Figure 3-3). **Direct Impacts (habitat loss, disturbance)** The watercourses within the Proposed Windfarm site do not support suitable kingfisher nesting habitat. Kingfisher were observed on five occasions during breeding kingfisher surveys in 2023 along the River Nore. Surveys were carried out along the River Nore, 900m from the nearest proposed turbine. Suitable nesting habitat was identified within the survey area in several areas, the closest of which was 950m from the proposed turbine layout. Most observations were of individuals calling or travelling. There was one observation of two kingfisher, with a male perched and a second bird calling from the riverbank below. This observation indicates a probable nest in this location. Kingfisher surveys carried out at the Proposed Grid Connection crossing point confirmed that there were no nesting burrows within the survey area (300m up and downstream of the proposed crossing point). The majority of bank habitat within the survey area was assessed as unsuitable nesting habitat for kingfisher (i.e. shallow sloping banks; densely overgrown with no exposed substrate or steep/vertical faces present). A minor section (c.10m) of sub-optimal nesting habitat was identified on the western bank within the cable crossing area (where there has been erosion of a section of bank leaving an exposed sloping soil face extending approximately 1m above water level at time of survey). An additional section of suitable	

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			nesting habitat was recorded approximately 130m upstream of the cable crossing location. No burrows were recorded at these locations. A disturbance buffer for kingfisher of between 50-100m has been recommended by Goodship & Furness (2022)[7]. The Proposed Grid Connection Route works will mainly be confined to the existing road network and involve minor works over a short period, broadly analogous to existing activities in the general area (i.e. farm machinery, road works, vehicle movements etc.). No instream works are proposed as part of the Proposed Grid Connection Route as the ~~all~~ watercourse crossing~~s~~ will be by way of HDD, the launch pits of which will be located over 50m from the River Nore. As such the potential for direct impacts in relation to habitat loss on populations of SCI species associated with the SPA as a result of the Proposed Development have been ruled out. With regards potential noise-related disturbance effects, sudden loud noises in a quiet environment have the greatest potential to cause disturbance (Cutts et al., 2013[8]). Based on the noise level information provided by AWN in response to Item 3 of the RFI, baseline noise levels at the proposed HDD location are in the region of 62 dB. Predicted noise levels for the proposed HDD works are estimated to be in the region of 77 dB at a distance of 10m from the launch pit,	

[7] https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance

[8] https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/8f/bd/8fbdd7e9-ea6f-4474-869f-ec1e68a9c809/11367.pdf

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			which is located outside the boundary of this SPA. This is a low to moderate ~~to low~~ noise stimulus as per Cutts et al. criteria (2013). Noise levels are predicted to reduce to below baseline noise levels (60 dB) at 40m. It should also be noted that the duration of HDD works is predicted to be approx. 2-3 weeks. Therefore, disturbance associated with HDD works would be temporary in nature. No kingfisher burrows were recorded in the vicinity of the proposed HDD works. However, were new burrows to be established within ~~the~~ 100m of the proposed works area prior to construction works commencing there is potential for disturbance, as a result of the proposed HDD works, to kingfisher utilising these burrows. There is an uneven distribution of the species in the River Nore. As outlined in the SPA site conservation objectives[9], in 2010, densities of 0.10-0.14 territories/km length of channel were recorded for this site (Cummins et al., 2010). Despite the low rate of occurrence in a given 1km length of channel, following the precautionary principle, foraging cannot be ruled out locally and therefore effects on kingfisher as a result of construction related disturbance, albeit of short duration, cannot be excluded. Considering the above, while it cannot be excluded that kingfisher forage within the zone of potential disturbance (i.e. within 50-100m of the HDD location), the likelihood is that they do not.	

[9] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf*

European Sites and distance from Proposed Development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			Indirect impacts: Habitat Degradation via Surface Water: Both the Proposed Wind Farm and the Proposed Grid Connection are hydrologically connected to the SPA (ground and surface water) as noted above for the River Barrow and River Nore SAC. There is potential for works associated with the Proposed Development to result in drainage and seepage water resulting from infrastructure excavations, run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream. The construction of the Proposed Grid Connection will involve the crossing of the SPA by HDD. HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Therefore, a pathway for indirect effects on the SPA and associated SCI. A deterioration in water quality within the River Nore could potentially result in habitat degradation and reduced prey availability for kingfisher **A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Development to result in likely significant effects on this European Site. The SPA is considered to be within the Likely Zone of Influence of the Proposed Development and further assessment is required.**	

4.2 Appropriate Assessment Screening Conclusion

It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Development, individually or in combination with other plans and projects, would be likely to have a significant effect on the following European Sites:

- River Barrow and River Nore SAC
- River Nore SPA

As a result, an Appropriate Assessment of the Proposed Development is required. Information to enable the competent authority to carry out an AA of the Proposed Development is presented in Sections 5 – 9 of this report.

5. INFORMATION TO INFORM APPROPRIATE ASSESSMENT

The potential for likely significant effects on the following European Sites in the absence of any mitigation, individually or cumulatively with other plans or projects, was identified in the preceding section:

- River Barrow and River Nore SAC
- River Nore SPA

The following sections consider each European Site individually to:

1. Determine which individual qualifying features have the potential to be adversely affected by the Proposed Development.
2. Provide information with regard to the Conservation Objectives and site-specific pressures and threats for those qualifying features that have the potential to be adversely affected.

5.1 Identification of relevant Qualifying Features

5.1.1 River Barrow and River Nore SAC

The potential for impacts on this SAC were identified in Section 4.1 above. The identified pathways for effect include the following:

- A pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction and operation of the Proposed Development.

Table 5-1 below lists the QIs of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.1.1 Identification of Individual Qualifying Interest species with the Potential to be Affected.

Table 5-1 Assessment of Qualifying Interest species potentially affected.

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011~~[10] 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
[1016] Desmoulin's whorl snail *Vertigo moulinsiana*	To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC.	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD),	No

[10] ~~https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf~~
[11] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		the launch pits of which, although located within the SAC boundary, are located within the N77 road verge and agricultural land (see Figure 3-3). *Vertigo moulinsiana* is a terrestrial species associated with vegetation of wetland habitats often bordering waterbodies such as canals, ditches lakes and rivers (Long and Brophy, 2019[12]). Both habitats within which the launch pits are situated provide unsuitable habitat for this QI species *Vertigo moulinsiana* and as such there is no potential for direct impacts on this QI species (e.g. loss of occupied sites within the SAC, population density etc.). Given this QI species is terrestrial in nature potential indirect impacts associated with deterioration of water quality within the SAC as a result of the Proposed Development would have no effect on this terrestrial QI species. **No further assessment is required.**	
~~[1990] Nore freshwater pearl mussel *Margaritifera durrovensis*~~	~~To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC~~	~~The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid.~~ ~~The current distribution of the Nore freshwater pearl mussel mapped habitats (as per Map 7 of the SSCOs for this SAC) are not hydrologically connected as the Proposed Development site is~~	~~Yes~~

[12] https://www.npws.ie/sites/default/files/publications/pdf/IWM104_0.pdf

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		~~located downstream of these mapped habitats. However, the COs for this species is to restore the favourable conservation status of the species within the SAC and specific conservation targets for this species relate to water quality and the maintenance of their host fish species, specially to maintain sufficient juvenile salmonids to host glochidial larvae. Deterioration in water quality within the SAC would undermine both of these conservation objectives in particular and prevent the Nore freshwater pearl mussel for regaining favourable conservation status within the SAC.~~ **~~A complete source pathway receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.~~**	
[1029] Freshwater pearl mussel *Margaritifera margaritifera*	~~The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site specific conservation objective is set for this species. Please note that the Nore freshwater pearl mussel (*Margaritifera durrovensis*) remains a qualifying species for this SAC.~~ To restore the favourable conservation condition of the Freshwater pearl mussel (*Margaritifera margaritifera*) in the River Barrow and River Nore SAC.	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. No freshwater pearl mussel eDNA was detected in the vicinity of the Proposed Wind Farm site (see Aquatic Baseline Report, Appendix 1). These results were considered as evidence of the species absence within the survey area, in keeping with the known trend of declining numbers in the Nore population since 2010 (Moorkens, 2012, 2014, 2017, 2020). It should be noted that as per the site-specific conservation objectives document for this SAC (NPWS, 2025), genetic research has placed the Nore population (formerly *Margaritifera durrovensis*, Species code 1990) within the *Margaritifera margaritifera* taxon (Fiend et al., 2016; Geist et al., 2018). The conservation objective is to "restore the favourable conservation condition" of this species within the SAC. Specific conservation targets for this species relate to water quality and the	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		maintenance of their host fish species, specially to maintain sufficient juvenile salmonids to host glochidial larvae. Deterioration in water quality within the SAC, which could occur during the excavation of the HDD launch and reception pits, would undermine both of these conservation objectives in particular and prevent the freshwater pearl mussel from regaining favourable conservation status within the SAC. ~~distribution (absence) of the species in the wider survey area. However, given the status of the species within the SAC is currently under review, and taking a precautionary approach, this species is still considered a QI of the SAC for the purposes of this assessment. SSCO's for Nore freshwater pearl mussel would be considered applicable to the freshwater pearl mussel and as such deterioration in water quality within the SAC would also be considered to impact on this species if present.~~ In addition, due to the hydrological proximity of the River Barrow and River Nore SAC to the Proposed Wind Farm site (6.2km) and the Grid Connection route (0km), most notably the HDD crossing of the River Nore, designated as part of the River Barrow and River Nore SAC, a potential pathway for indirect effects on this QI species exists via the deterioration of water quality, resulting from pollution entering watercourses in the vicinity of the Proposed Wind Farm site, associated with the construction and operational phases of the development. A deterioration in surface water quality could directly undermine the conservation objectives in relation to this species, specifically those targets relating to water quality. Therefore, pollution of surface waters in the vicinity of the Proposed Wind Farm site or Grid Connection route, in particular where HDD is proposed, has the potential to result in likely significant effects on this QI species, in the absence of mitigation. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1092] White-clawed crayfish *Austropotamobius pallipes*	To maintain the favourable conservation condition of White-	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD),	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
	clawed crayfish in the River Barrow and River Nore SAC	the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Surveys undertaken as part of the Proposed Development, specifically eDNA surveys detected white-clawed crayfish in a water sample collected from one site, WF3. No crayfish eDNA was detected at any other sites (See Appendix 1 for Aquatic Baseline Report). This QI species is therefore presumed present within the ZoI of the Proposed Development. A deterioration in water quality as a result of the Proposed Development would have the potential to undermine the conservation objectives for this species. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1106] Atlantic salmon (*Salmo salar*) (only in fresh water)	To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Surveys undertaken as part of the Proposed Development identified that salmonids were present at 5 no. sites in total, with Atlantic salmon present at 3 of these sites (i.e WF3, WF5, and WF7 (See Figure 2-1, Aquatic Baseline Report, Appendix 1). Both WF3 and WF3 are located downstream of the Proposed Wind Farm. This QI species is therefore present within the ZoI of the Proposed Development. A deterioration in water quality as a result of the	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		Proposed Development would have the potential to undermine the conservation objectives for this species. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1095] Sea lamprey *Petromyzon marinus*	To restore the favourable conservation condition of Sea lamprey in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Surveys undertaken as part of the Proposed Development did not record any sea lamprey *Petromyzon marinus* during target electro-fishing and was considered to reflect the lack of suitable nursery (soft sediment) habitat within the vicinity of the Proposed Wind Farm development, in addition to the presence of sub-optimal or absent suitable spawning habitat and poorly connected, unwetted sections of watercourse, particularly at sites WF 4 and WF 6 (See Aquatic Baseline Report, Appendix 1). Although this species was not recorded, there is still potential for it to be present downstream of the Proposed Development site. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Development. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn.	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[1096] Brook lamprey *Lampetra planeri*	To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Surveys undertaken as part of the Proposed Development did not record any brook lamprey *Lampetra planeri* during target electro-fishing and was considered to reflect the lack of suitable nursery (soft sediment) habitat within the vicinity of the Proposed Wind Farm development, in addition to the presence of sub-optimal or absent suitable spawning habitat and poorly connected, unwetted sections of watercourse, particularly at sites WF 4 and WF 6 (See Aquatic Baseline Report, Appendix 1). Although this species was not recorded, there is still potential for this species to be present downstream of the Proposed Development site. The SSCO for the SAC don't specify where this QI species may be present within the SAC. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Development. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn.	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[1099] River lamprey *Lampetra fluviatilis*	To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Surveys undertaken as part of the Proposed Development did not record any river lamprey *Lampetra fluviatilis* during target electro-fishing and was considered to reflect the lack of suitable nursery (soft sediment) habitat within the vicinity of the Proposed Wind Farm development, in addition to the presence of sub-optimal or absent suitable spawning habitat and poorly connected, unwetted sections of watercourse, particularly at sites WF 4 and WF 6 (See Aquatic Baseline Report, Appendix 1). Although this species was not recorded, there is still potential for this species to be present downstream of the Proposed Development site. The SSCO for the SAC don't specify where this QI species may be present within the SAC. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach this QI it is considered to be within the ZoI of the Proposed Development. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this species in particular in relation to extent and distribution of spawning habitat. This species requires clean gravels to spawn.	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.	
[1103] Twaite shad *Alosa fallax*	To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC	The Proposed Development is hydrologically linked to the River Barrow and River Nore SAC. Surveys undertaken as part of the Proposed Development did not detect this species. The SSCO for this species note that regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore. The overall conservation objective is to restore favourable conservation status of this QI. Therefore, taking a precautionary approach to this QI, it is considered to be within the ZoI of the Proposed Development. A deterioration in water quality could have the potential to undermine the conservation objectives for this species in particular in relation to water quality (oxygen levels) and maintenance of suitable spawning habitat (gravels free of fines material and algal growth which can be exacerbated due to deterioration on water quality. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	**Yes**
[1355] Otter *Lutra lutra*	To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC	No suitable habitat for otter was recorded within the Wind Farm site. Signs of otter, including spraints, prints, and feeding remains were recorded upstream and downstream along the River Nore at the point where the Proposed Grid Connection route crosses the River Nore (See Figure 3-3). A confirmed non-breeding otter holt was recorded over 45m from the grid cable route and over 150m from the proposed HDD launch pits. The holt was in regular use by a single individual during the time of camera deployment. Based on the footage captured it is not considered to be a breeding holt. For the Proposed Grid Connection Route, only minor underground cabling installation works are proposed within the verge of the public road (N77) while crossing of the Nore will be by HDD. Given the proposed works, no significant habitat loss will occur affecting otter. There will be no loss of holts/resting sites related to the proposed works and all works will be outside	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		any zone of disturbance for otter (150m for breeding natal holts and 20m for active non-breeding holts). Therefore, there is no potential for the Proposed Development to result in mortality, habitat loss/fragmentation for otter and no significant disturbance impacts are predicted. Given the scale and nature of the works and distance from the non-breeding holt no significant impacts to otter are predicted. No works will be undertaken within 20m of the otter holt. Therefore, there will be no loss of resting or breeding places and no direct mortality related impacts on this species are anticipated. Otter have been confirmed as using the River Nore for commuting and foraging. There is potential for construction works to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Proposed Wind Farm and along the Proposed Grid Connection Route. This has the potential to impact on the conservation objectives for this species in particular in relation to fish biomass, for example degradation in water quality could impact on prey resource for otter. **A complete source-pathway-receptor chain for adverse effects on this species was identified as such this species is considered further in the assessment.**	
[1421] Killarney fern *Trichomanes speciosum*	To maintain the favourable conservation condition of Killarney Fern in the River Barrow and River Nore SAC	The Proposed Development is located outside the SAC, as such there is no potential for direct impacts on this QI species. As per Map 7 of the SSCOs for this SAC, the nearest known location of this QI species is located approx. 24.7km southeast of the Proposed Development. Given this QI species is terrestrial in nature potential indirect impacts associated with deterioration of water quality within the SAC as a result of the Proposed Development would not have an effect on this QI species. **No further assessment is required.**	No

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC	The full distribution of this habitat and its sub-types within the SAC is currently unknown. Taking a precautionary approach, the potential for significant effect on this QI habitat cannot be excluded. A deterioration in water quality, in particular from silt laden runoff, could have the potential to undermine the conservation objectives for this QI habitat which requires the substratum to be free from fine sediment. **A complete source-pathway-receptor chain for adverse effects on this habitat was identified as such this habitat is considered further in the assessment.**	**Yes**
[1130] Estuaries	To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore SAC	The Proposed Development site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >50km downstream of the Proposed Development site, any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Development (separation distance of over >50km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[1140] Mudflats and sandflats not covered by seawater at low tide	To maintain the favourable conservation condition of the Mudflats and sandflats not covered by seawater at low tide in the River Barrow and River Nore SAC	The Proposed Development site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >50km downstream of the Proposed Development site, any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Development (separation distance of over >50km) along with the attenuating and diluting property of the intervening waterbody.	No

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		No further assessment is required.	
[1170] Reefs	To maintain the favourable conservation condition of Reefs in the River Barrow and River Nore SAC.	According to Map 4 of the NPWS Conservation Objectives document, the nearest known location of this QI habitat is located in excess of 70km from the Proposed Wind Farm site. The Site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located >80km downstream of the Site. Any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Development (separation distance of >80km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[1310] *Salicornia* and other annuals colonizing mud and sand	To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the River Barrow and River Nore SAC	The Proposed Development site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >50km downstream of the Proposed Development site, any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Development (separation distance of over >50km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	To restore the favourable conservation condition of Atlantic salt	The Proposed Development site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >50km downstream of the Proposed Development site, any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for	No

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
	meadows in the River Barrow and River Nore SAC	this QI habitat given nature, scale and location of the Proposed Development (separation distance of over >50km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	
[1410] Mediterranean salt meadows (*Juncetalia maritimi*)	To restore the favourable conservation condition of Mediterranean salt meadows in the River Barrow and River Nore SAC	The Proposed Development site although hydrologically linked to the SAC has a weak hydrological connection to this QI habitat which is located over >50km downstream of the Proposed Development site, any changes in water quality as a result of the Proposed Development would not have the potential to undermine any of the conservation objectives for this QI habitat given nature, scale and location of the Proposed Development (separation distance of over >50km) along with the attenuating and diluting property of the intervening waterbody. **No further assessment is required.**	No
[4030] European dry heaths	To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). This habitat was not recorded within the agricultural grassland therefore there is no potential to impact on this terrestrial QI habitat. **No further assessment is required.**	No

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). This habitat was not recorded within the agricultural grassland therefore there is no potential to impact on this terrestrial QI habitat. **No further assessment is required.**	No
[7220] * Petrifying springs with tufa formation (*Cratoneurion*)	To maintain the favourable conservation condition of Petrifying springs with tufa formation (*Cratoneurion*) in the River Barrow and River Nore SAC	The full extent of this QI habitat within the SAC is currently unknown. However, as per Map 6 ~~7~~ of the SSCOs the nearest known record for this QI habitat is located in excess of 25km from the Proposed Development site. This habitat was not recorded within the study area. As per guidance (SEPA, 2024) a buffer of 250m is required from sensitive ground water dependant habitats where excavations will exceed 1m, and 100m where excavations will not exceed 1m. Based on best available data for this habitat within the SAC and the separation distance from the works associated with the Proposed Development (well in excess of 250m) direct impacts to this QI habitat as a result of the Proposed Development can be excluded. The Proposed Wind Farm site is located within the same hydrological sub-catchment (Nore_SC_070) and groundwater catchment (Nore) as the SAC. Potential hydraulic connections via groundwater flow exist over a generally long distance (kilometres), i.e. the regional groundwater flow towards the River Nore. No significant karst features were identified within the Proposed Development site. However, large volumes of concrete will be required associated with construction of turbine foundations, therefore taking a precautionary approach potential impacts on ground water quality were also considered. Therefore, a pathway for indirect effects on this QI habitats of the SAC exist in the form of water quality deterioration and habitat degradation via ground water pathways.	**Yes**

Qualifying feature	Conservation Objective (NPWS, Version ~~1, July 2011[10]~~ 2, June 2025[11])	Rationale	Potential for Adverse Effects Yes/No
		A complete source-pathway-receptor chain for adverse effects on this habitat was identified as such this habitat is considered further in the assessment.	
[91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	To restore the favourable conservation condition of Old oak woodland with *Ilex* and *Blechnum* in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). This habitat was not recorded within the agricultural grassland therefore there is no potential to impact on this terrestrial QI habitat. **No further assessment is required.**	No
[91E0] * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) in the River Barrow and River Nore SAC	The Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SAC. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works are proposed within the public road and the crossing of the SAC will be by Horizontal Directional Drilling (HDD), the launch pits of which although located within the SAC boundary are located within the N77 road verge and agricultural land (see Figure 3-3). This habitat was not recorded within the agricultural grassland therefore there is no potential to impact on this terrestrial QI habitat. **No further assessment is required.**	No

5.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[13] for the River Barrow and River Nore SAC the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Development. These are provided in Table 5-2 below.

Table 5-2: Site-specific threats, pressures and activities for the River Barrow and River Nore SAC (002162)

Negative Impacts	
Rank	**Threats and Pressures (* Items in bold are of relevance to the Proposed Development)**
High	Agricultural intensification
High	**Pollution to surface waters (limnic, terrestrial, marine & brackish)**
High	Modifying structures of inland water courses
High	Dykes and flooding defence in inland water systems
High	Erosion
Low	Removal of hedges and copses or scrub
Low	Sand and gravel quarries
Low	Port areas
Low	'Industrial or commercial areas
Low	Intensive fish farming, intensification
Low	Netting
Low	'Leisure fishing
Medium	Intensive cattle grazing

[13] https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0002162

Negative Impacts	
Rank	Threats and Pressures (* Items in bold are of relevance to the Proposed Development)
Medium	Forest and Plantation management & use
Medium	Use of fertilizers (forestry)
Medium	Forestry activities not referred to above
Medium	Peat extraction
Medium	Fishing and harvesting aquatic resources
Medium	Invasive non-native species
Medium	**Human induced changes in hydraulic conditions**
Medium	Dredging/ removal of limnic sediments
Medium	Water abstractions from surface waters
Medium	Reduction in migration/ migration barriers
Medium	Changes in abiotic conditions

5.1.1.3 QI Specific Information

Information pertaining to individual QI habitats and species associated with the River Barrow and River Nore SAC and SCI bird species associated with the River Nore SPA is presented in the below subsections.

~~5.1.1.3.1 [1990] Nore freshwater pearl mussel *Margaritifera durrovensis*~~

~~According to the Article 17 Report (NPWS, 2019), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is 'Deteriorating', unchanged since the 2013 assessment.~~

~~The current distribution of the Nore freshwater pearl mussel mapped habitats (as per Map 7 of the SSCOs for this SAC) are not hydrologically connected as the Proposed Development site is located downstream of these mapped habitats. However, the COs for this species is to restore the favourable conservation status of the species within the SAC and specific conservation targets for this species relate to water quality and the maintenance of their host fish species, specially to maintain sufficient juvenile salmonids to host glochidial larvae. Deterioration in water quality within the SAC would undermine~~

~~both of these conservation objectives in particular and prevent the Nore freshwater pearl mussel for regaining favourable conservation status within the SAC.~~

Targets and Attributes - Nore freshwater pearl mussel

Table 5.3 Targets and attributes associated with the site specific conservation objectives for

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution	Maintain at 15.5km. See map 7	**Yes** - deterioration in water quality and habitat degradation could impact on host fish species, resulting in reduction in overall distribution
Population size: adult mussels	Restore to 5,000 adult mussels	**Yes** - deterioration in water quality and habitat degradation could impact on host fish species which could prevent this target being achieved.
Population structure: recruitment	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	**Yes** - deterioration in water quality and habitat degradation could impact on host fish species which could prevent this target being achieved.
Population structure: adult mortality	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	No (direct impacts will not occur)
Habitat extent	Restore suitable habitat in length of river corresponding to distribution target (15.5km; see map 7) and any additional stretches necessary for salmonid spawning	**Yes** - deterioration in water quality and habitat degradation could impact on host fish species, silt laden run off could also impact on salmonid spawning grounds (habitat degradation) which could prevent this target being achieved.
Water quality: Macroinvertebrates and phytobenthos (diatoms)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	**Yes** - deterioration in water quality could impact prevent this target being achieved.
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants	Restore substratum quality - filamentous algae: absent or trace (<5%)	**Yes** - deterioration in water quality could result in increased algae in the system.
Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	**Yes** - construction of the Proposed Development has the potential to result in silt laden run off in the absence of mitigation.
Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate	**Yes** - deterioration in water quality could impact prevent this target being achieved.
Hydrological regime: flow variability	Restore appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Development will not occur)

~~Host fish~~	~~Maintain sufficient juvenile salmonids to host glochidial larvae~~	~~**Yes** - deterioration in water quality and habitat degradation, including smothering of spawning grounds could impact on host fish species which could prevent this target being achieved.~~

5.1.1.3.2 [1029] Freshwater pearl mussel *Margaritifera margaritifera*

~~The status of the Freshwater Pearl Mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. Given the status of the species within the SAC is currently under review taking a precautionary approach this species is still considered a QI of the SAC for the purposes of this assessment. In the absence of SSCO for the freshwater pearl mussel SSCO's for Nore freshwater pearl mussel (as outlined in Table 5-3 above) would be considered applicable and as such similar impacts in relation to deterioration in water quality and habitat degradation would apply.~~

The distribution and suitable habitat targets of freshwater pearl mussel within the River Barrow and River Nore SAC is illustrated on Map 8 of the site-specific conservation objective document (NPWS, 2025). There are three distinct known distribution areas within the SAC; Nore (within the River Nore catchment) and Mountain and Ballymurphy (within the River Barrow catchment). The document states that for each of the three distributions, given the severe decline in mussel numbers recently it is likely that the ranges have contracted.

This species was not recorded at the Site during the surveys undertaken. However, following the precautionary principle a potential pathway for adverse effect on the conservation objectives of the species was identified in the form of deterioration of water quality that could have an adverse effect on the habitat within the downstream SAC.

Targets and Attributes: Freshwater pearl mussel *Margaritifera margaritifera*

Individual targets and attributes for this conservation objective are considered in Table 5-3 below:

Table 5-3: Targets and attributes associated with the site-specific conservation objectives for Freshwater Pearl Mussel

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution: Ballymurphy	Restore distribution at 3.91km.	**No** - there is no feasible hydrological connection to the Ballymurphy catchment which supports this population
Distribution: Mountain	Restore distribution at 9.45km.	**No** - there is no feasible hydrological connection to the Mountain catchment which supports this population
Distribution: Nore	Restore distribution at 21.13km.	**Yes** - deterioration in water quality and habitat degradation could prevent the restoration of this species' target distribution.
Population size: Ballymurphy	Restore Ballymurphy population to at least 1,000 adult mussels	**No** - there is no feasible hydrological connection to the

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
		Ballymurphy catchment which supports this population
Population size: Mountain	Restore Ballymurphy population to at least 4,000 adult mussels	**No -** there is no feasible hydrological connection to the Mountain catchment which supports this population
Population size: Nore	Restore Ballymurphy population to at least 5,000 adult mussels	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration of this species' target population size.
Population structure: recruitment	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration of recruitment targets.
Population structure: adult mortality. Ballymurphy	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	**No -** there is no feasible hydrological connection to the Ballymurphy catchment which supports this population
Population structure: adult mortality. Mountain	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	**No -** there is no feasible hydrological connection to the Mountain catchment which supports this population
Population structure: adult mortality. Nore	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration of the target population structure.
Suitable habitat: extent	Restore suitable habitat in more than 3.91km in the Ballymurphy, 5.3km in the Mountain and 16.72km in the Nore system and any additional stretches necessary for salmonid spawning	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration of the target extent of suitable habitat.
Suitable habitat: condition	Restore condition of suitable habitat	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration of the target suitable habitat condition.
Water quality: macroinvertebrates and phytobenthos (diatoms)	Restore water quality – macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	**Yes -** deterioration in water quality could undermine this target.
Substratum quality: filamentous algae (macroalgae); macrophytes	Restore substratum quality- filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
(rooter higher plants)		
Substratum quality: sediment	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off could undermine this target.
Substratum quality: oxygen availability	Restore to no more than 20% decline from water column to 5cm depth in substrate	**Yes -** deterioration in water quality and habitat degradation could prevent the restoration target for oxygen availability within the substratum,
Hydrological regime: flow variability	Restore appropriate hydrological regime	**No –** the Proposed Development will not result in any alteration to the existing hydrological regime.
Host fish	Maintain sufficient juvenile salmonids to host glochidial larvae	**Yes -** deterioration in water quality and habitat degradation could affect the number of juvenile salmonids present within the SAC, which would in turn limit the number of host fish available.
Fringing habitat: area and condition	Restore the area and condition of fringing habitats necessary to support the population	**No –** the Proposed Development will not prevent the restoration of fringing habitat and condition of same.

5.1.1.3.3 *[1092]* White-clawed crayfish *Austropotamobius pallipes*

According to the Article 17 Report (NPWS, 2025a ~~2019~~), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is 'Deteriorating'.

White-clawed crayfish was detected from eDNA in a water sample collected from one site, WF 3. No crayfish eDNA was detected at any of the other sites. eDNA surveys provided no positive results for crayfish plague (*Aphanomyces astaci*) in the vicinity of the Proposed Development site.

However, following the precautionary principle a potential pathway for adverse effect on the conservation objectives of the species was identified in the form of deterioration of water quality that could have an adverse effect on the habitat within the downstream SAC.

Targets and Attributes – white-clawed crayfish

Individual targets and attributes for this conservation objective are considered in Table 5-4 below:

Table 5-4: Targets and attributes associated with the site-specific conservation objectives for White-clawed Crayfish.

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution	No reduction from baseline. See Map 7 of the site-specific conservation objectives document.	**Yes -** deterioration in water quality and habitat degradation could result in reduced distribution of this species.
Population structure: recruitment	Juveniles and/or females with eggs in at least 50% of positive samples	**Yes -** deterioration in water quality and habitat degradation could result in reduced distribution of this species.
Negative indicator species	No alien crayfish species	No (alien crayfish species not known to be present within the system)
Disease	No instances of disease	No (eDNA surveys provided no positive results for crayfish plague (*Aphanomyces astaci*) in the vicinity of the Proposed Development site (See Aquatic Baseline Report, Appendix 1).
Water quality	At least Q3-4 at all sites sampled by EPA	**Yes -** deterioration in water quality could undermine this target.
Habitat quality: heterogeneity	No decline in heterogeneity or habitat quality	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.4 [1106] Atlantic salmon *(Salmo salar)* (only in fresh water)

According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2016[14]), the freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

Surveys undertaken as part of the Proposed Development identified that salmonids were present at 5 no. sites in total, with Atlantic salmon present at three of these (i.e. WF 3, WF 5, WF 7). This QI species is therefore present within the ZoI of the Proposed Development. A deterioration in water quality as a result of the Proposed Development would have the potential to undermine the conservation objectives for this species.

[14] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf

According to the Article 17 Report (NPWS, 2025a ~~2019~~), the overall Conservation Status for this species is ~~'Inadequate'~~ 'Bad' and the overall Conservation Trend is ~~'Stable'~~ 'Deteriorating'.

Targets and Attributes – Atlantic salmon

Individual targets and attributes for this conservation objective are considered in Table 5-5 below:

Table 5-5: Targets and attributes associated with the site-specific conservation objectives for Atlantic Salmon

Attribute	Target	Potential for Proposed ~~Project~~ Development to Undermine Conservation Objective Target
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	No (Proposed Development will not result in any barriers to movement)
Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Out-migrating smolt abundance	No significant decline	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality	At least Q4 at all sites sampled by EPA	**Yes -** deterioration in water as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.5 [1095] Sea lamprey *Petromyzon marinus*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~2011a~~), artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravels. Surveys undertaken as part of the Proposed Development did not record Lamprey ammocoetes (*Lampetra sp.)* at any of the aquatic survey locations during targeted electro-fishing. The SSCO for the SAC don't specify where this QI species may be present within the SAC, taking a precautionary approach this species could be present downstream of the Proposed Development.

According to the Article 17 Report (NPWS, 2025a ~~2019~~), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is ~~'Stable'~~ ' Deteriorating'.

Targets and Attributes – sea lamprey

Individual targets and attributes for this conservation objective are considered in Table 5-6 below:

Table 5-6: Targets and attributes associated with the site-specific conservation objectives for Sea lamprey.

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution	Access to all watercourses down to first order streams	No (Proposed Development will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups present	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Juvenile density at least 1/m²	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.6 [1096] Brook lamprey *Lampetra planeri*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~2011a~~), artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravel.

Surveys undertaken as part of the Proposed Development did not record Lamprey ammocoetes (*Lampetra sp.)* at any of the aquatic survey locations during targeted electro-fishing. The SSCO for the SAC don't specify where this QI species may be present within the SAC, taking a precautionary approach this species could be present downstream of the Proposed Development.

River and brook lamprey are indistinguishable as larvae. It is not feasible or practical to survey for this species at the national scale, however, the current range is assessed as approximately equal to the Favourable Reference Range, based on expert opinion and on the monitoring of index sites. Based on expert opinion, the current population for Brook Lamprey is estimated to be approximately equal to the Favourable Reference Population (less than 5% smaller) (NPWS, 2025a). ~~The inability to distinguish~~

~~between river lamprey and brook lamprey larvae, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken (NPWS,2019).~~ The overall Conservation Status for this species is therefore assessed as 'Favourable' (NPWS, 2025a). ~~'Unknown' (NPWS, 2019).~~

Targets and Attributes – brook lamprey

Individual targets and attributes for this conservation objective are considered in Table 5-7 below:

Table 5-7: Targets and attributes associated with the site-specific conservation objectives for Brook lamprey.

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution	Access to all watercourses down to first order streams	No (Proposed Development will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups of brook/river lamprey present	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.7 [1099] River lamprey *Lampetra fluviatilis*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~-2011a~~), artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water and lampreys spawn in clean gravel.

Surveys undertaken as part of the Proposed Development did not record Lamprey ammocoetes (*Lampetra sp.)* at any of the aquatic survey locations during targeted electro-fishing. The SSCO for the SAC don't specify where this QI species may be present within the SAC, taking a precautionary approach this species could be present downstream of the Proposed Development.

River and brook lamprey are indistinguishable as larvae. For Ireland there is a paucity of records for adult River lamprey which impacts upon any conservation assessment. Due to the limited data, therefore, the true Range and Population size could not be estimated for this species and they are therefore regarded as 'Unknown' (NPWS, 2025a). ~~The inability to distinguish between river lamprey and brook lamprey larvae, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken (NPWS,2019).~~ The overall Conservation Status for this species is therefore assessed as ~~'Unknown'~~ 'Inadequate' (NPWS, 2025a ~~2019~~).

Targets and Attributes – river lamprey

Individual targets and attributes for this conservation objective are considered in Table 5-8 below:

Table 5-8: Targets and attributes associated with the site-specific conservation objectives for River lamprey

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution: extent of anadromy	Greater than 75% of main stem and major tributaries down to second order accessible from estuary	No (Proposed Development will not result in any barriers to movement)
Population structure of juveniles	At least three age/size groups of brook/river lamprey present	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Availability of juvenile habitat	More than 50% of sample sites positive	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.8 [1103] Twaite shad *Alosa fallax*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~2011a~~) in some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore. According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2024 ~~2016~~), this site is one of only a handful of spawning grounds in the country for Twaite Shad. ~~Surveys undertaken as part of the Proposed Development did not detect this species.~~

Surveys undertaken as part of the Proposed Development did not record this species, however, taking a precautionary approach this species could be present downstream of the Proposed Development.

According to the Article 17 Report (NPWS, 2025a ~~2019~~), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is ~~'Stable'.~~ 'Deteriorating'.

Targets and Attributes – twaite shad

Individual targets and attributes for this conservation objective are considered in Table 5-9 below:

Table 5-9: Targets and attributes associated with the site-specific conservation objectives for Twaite shad

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary	No (Proposed Development will not result in any barriers to movement)
Population structure: age classes	More than one age class present	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality: oxygen levels	No lower than 5mg/l	**Yes** - deterioration in water quality could undermine this target.
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.

5.1.1.3.9 [1355] Otter *Lutra lutra*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~2011a~~), otter distribution based on 1980/81 survey findings, is 88% in SACs. Current range in south-east estimated at 73% (Bailey and Rochford, 2006). Watercourses within the Proposed Wind Farm site were not suitable to support otter, however, a number of signs of otter were recorded at water courses in the wider area as outlined in Aquatic Baseline Report (see Appendix 1). The Proposed Grid Connection crosses one watercourse, the River Nore. Multiple signs of otter were recorded along this section of the River Nore. A confirmed non-breeding otter holt was recorded over 45m from the grid cable route and over 150m from the proposed HDD launch pit. The holt was in regular use by a single individual during the time of camera deployment. Based on the footage captured it is not considered to be a breeding holt.

According to the Article 17 Report (NPWS, 2025a ~~2019~~), the overall Conservation Status for this species is 'Favourable'.
Targets and Attributes – otter

Individual targets and attributes for this conservation objective are considered in Table 5-10 below:

Table 5-10: Targets and attributes associated with the site-specific conservation objectives for Otter

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Distribution	No significant decline	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target (reduced prey availability)
Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds	No (Proposed Development will not result in any reduction in terrestrial otter habitat)
Extent of marine habitat	No significant decline. Area mapped and calculated as 857.7ha	No (Proposed Development will not result in any reduction in marine otter habitat)
Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 616.6km	No (Proposed Development will not result in any reduction in freshwater (river) otter habitat)
Extent of freshwater (lake) habitat	No significant decline. Area mapped and calculated as 2.6ha	No (Proposed Development will not result in any reduction in freshwater (lake) otter habitat)
Couching sites and holts	No significant decline	No (Proposed Development will not result in any loss of confirmed couching or resting sites)
Fish biomass available	No significant decline	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target (via reduced prey availability)

5.1.1.3.10 *[3260] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation*

According to the SSCO document for the River Barrow and River Nore SAC (NPWS, 2025 ~~2011a~~), the full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the riverbed in the Kings tributary of the Nore (Heuff, 1987). Other examples of this or other sub-types may be present within the SAC.

According to the Site Synopsis document for the River Barrow and River Nore SAC (NPWS, 2024 ~~2016~~), Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include water-starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), the pondweed *Potamogeton* x *nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and crowfoots (*Ranunculus* spp.).

According to the Article 17 Report (NPWS, 2025b ~~2019~~), the overall Conservation Status for this habitat is 'Inadequate' and the overall Conservation Trend is 'Deteriorating'.

Targets and Attributes – Water courses of plain to montane levels

Individual targets and attributes for this conservation objective are considered in Table 5-11 below:

Table 5-11: Targets and attributes associated with the site-specific conservation objectives for Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Habitat area	Area stable or increasing, subject to natural processes	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Habitat distribution	No decline, subject to natural processes	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Hydrological regime: river flow	Maintain appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Development will not occur)
Hydrological regime: groundwater discharge	The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation	No (changes to hydrological regime as a result of the Proposed Development will not occur)

Attribute	Target	Potential for Proposed Development to Undermine Conservation Objective Target
Substratum composition: particle size range	The substratum should be dominated by large particles and free from fine sediments	**Yes -** deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water chemistry: minerals	The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality: suspended sediment	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Water quality: nutrients	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could undermine this target.
Vegetation composition: typical species	Typical species of the relevant habitat sub-type should be present and in good condition	**Yes** - deterioration in water quality and habitat degradation as a result of silt-laden run-off and other pollutants could affect the composition and condition of vegetation associated with this QI habitat.
Floodplain connectivity	The area of active floodplain at and upstream of the habitat should be maintained	**No** - the Proposed Development will not result in any change to the area of active floodplain associated with this SAC.

5.1.1.3.11 [7220] * Petrifying springs with tufa formation (*Cratoneurion*)

The full extent of this QI habitat within the SAC is currently unknown (NPWS, 2025 ~~2019~~). However, as per Map 6 of the SSCOs the nearest known record for this QI habitat is located in excess of 25km from the Proposed Development site.

According to the Article 17 Report (NPWS, 2025b ~~2019~~), the overall Conservation Status for this habitat is 'Inadequate' ~~'Bad'~~ and the overall Conservation Trend is 'Stable' ~~'Deteriorating'~~.

Targets and Attributes – Petrifying springs with tufa formation (Cratoneurion)

Individual targets and attributes for this conservation objective are considered in Table 5-12 below:

Table 5-12: Targets and attributes associated with the site-specific conservation objectives for Petrifying springs with tufa formation

Attribute	Target	Potential for Proposed ~~Project~~ Development to Undermine Conservation Objective Target
Habitat area	Area stable or increasing, subject to natural processes.	**Yes -** deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Habitat distribution	No decline	**Yes -** deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Hydrological regime: height of water table; water flow	Maintain appropriate hydrological regimes	No (changes to hydrological regime as a result of the Proposed Development will not occur)
Water quality	Maintain oligotrophic and calcareous conditions	**Yes -** deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.
Vegetation composition: typical species	Maintain typical species	**Yes -** deterioration in ground water quality as a result of silt-laden run-off and other pollutants could undermine this target.

5.2 Identification of relevant Qualifying Features

5.2.1 River Nore SPA

The potential for impacts on this SPA were identified in Section 4.1 above. The identified pathways for effect include the following:

- A pathway for indirect effects on the SCI species (kingfisher) of the SPA exists in the form of disturbance and water quality deterioration via surface water pathways during construction of the Proposed Development which could lead to a degradation in habitat quality and a reduction in prey availability.
- Disturbance effects on populations of commuting and foraging kingfisher, associated with the SPA, in the vicinity of the Proposed Grid Connection underground cabling works beneath the River Nore.

Table 5-13 below lists the qualifying interests of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.2.1.1 Identification of Individual Qualifying Interest species with the Potential to be Affected.

Table 5-13 Assessment of Qualifying Interest species potentially affected.

Qualifying feature	Conservation Objective (NPWS, Version 1 July 2024 ~~2022~~[15])	Rationale	Potential for Adverse Effects Yes/No
[A229] Kingfisher (*Alcedo atthis*)	To maintain ~~or restore~~ the favourable conservation of Kingfisher in the River Nore ~~the bird species listed as~~	There will be no direct effects as the Proposed Wind Farm is located outside of this designated site. The Proposed Grid Connection Route crosses this SPA. However, no instream works are required as part of the Proposed Grid Connection route. Only minor cabling installation works	**Yes**

[15] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf

Qualifying feature	Conservation Objective (NPWS, Version 1 July 2024 ~~2022~~[15])	Rationale	Potential for Adverse Effects Yes/No
	~~Special Conservation Interests for this~~ SPA.	are proposed within the public road and the crossing of the SPA will be by Horizontal Directional Drilling (HDD), the launch pits of which will be located within the N77 road verge and agricultural lands outside the SPA boundary (see Figure 3-3). Kingfisher surveys carried out at the Proposed Grid Connection crossing point confirmed that there were no nesting burrows within the survey area (300m up and downstream of the proposed crossing point). The majority of bank habitat within the survey area was assessed as unsuitable nesting habitat for kingfisher (i.e. shallow sloping banks; densely overgrown with no exposed substrate or steep/vertical faces present). A minor section (c.10m) of sub-optimal nesting habitat was identified on the western bank within the cable crossing area (where there has been erosion of a section of bank leaving an exposed sloping soil face extending approximately 1m above water level at time of survey). An additional section of suitable nesting habitat was recorded approximately 130m upstream of the cable crossing location. No burrows were recorded at these locations. A disturbance buffer for kingfisher of between 50-100m has been recommended by Goodship & Furness (2022)[16]. The Proposed Grid Connection Route works will mainly be confined to the existing road network and involve minor works over a short period, broadly analogous to existing activities in the general area (i.e. farm machinery, road works, vehicle movements etc.). No instream works are proposed as part of the Proposed Grid Connection Route as all watercourse crossings will be by way of HDD, the launch pits of which will be located 50m from the River Nore and outside the boundary of this SPA. As such the potential for direct impacts in relation to habitat loss on populations of SCI species associated with the SPA as a result of the Proposed Development have been ruled out.	

[16] https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance

Qualifying feature	Conservation Objective (NPWS, Version 1 July 2024 ~~2022~~[15])	Rationale	Potential for Adverse Effects Yes/No
		With regards potential noise related disturbance effects, sudden loud noises in a quiet environment have the greatest potential to cause disturbance (Cutts et al., 2013[17]). Based on the noise level information provided by AWN in response to Item 3 of the RFI, baseline noise levels at the proposed HDD location are in the region of 62 dB. Predicted noise levels for the proposed HDD works are estimated to be in the region of 77 dB at a distance of 10m. This is a moderate to low noise stimulus as per Cutts et al. criteria (2013). Noise levels are predicted to reduce to below baseline noise levels (60 dB) at 40m. It should also be noted that the duration of HDD works is predicted to be approx. 2-3 weeks. Therefore, disturbance associated with HDD works would be temporary in nature. No kingfisher burrows were recorded in the vicinity of the proposed HDD works. However, were new burrows to be established within the 100m of the proposed works area prior to construction works commencing there is potential for disturbance, as a result of the generation of noise related to the proposed HDD works, to kingfisher utilising these burrows. While it cannot be ruled out that kingfisher forage within the zone of potential disturbance (i.e. within 50-100m of the HDD location), the likelihood is that they do not. The rationale for this is that there is an uneven distribution of the species in the River Nore. As outlined in the SPA site conservation objectives[18], in 2010, densities of 0.10-0.14 territories/km length of channel were recorded for this site (Cummins et al., 2010). Despite the low rate of occurrence in a given 1km length of channel, and short duration of proposed HDD works, following the precautionary principle, foraging cannot be ruled out locally, and therefore, in the absence of mitigation, effects on kingfisher as a result of construction related disturbance cannot be excluded.	

[17] https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/8f/bd/8fbdd7e9-ea6f-4474-869f-ec1e68a9c809/11367.pdf

[18] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf

Qualifying feature	Conservation Objective (NPWS, Version 1 July 2024 ~~2022~~[15])	Rationale	Potential for Adverse Effects Yes/No
		Both the Proposed Wind Farm and the Proposed Grid Connection are hydrologically connected to the SPA (ground and surface water) as noted above for the River Barrow and River Nore SAC. There is potential for works associated with the Proposed Development to result in drainage and seepage water resulting from infrastructure excavations, run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream. The construction of the Proposed Grid Connection will involve the crossing of the SPA by HDD. HDD has the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Therefore, a pathway for indirect effects on the SPA and associated SCI. A deterioration in water quality within the River Nore could potentially result in habitat degradation and reduced prey availability for kingfisher In the absence of mitigation the Proposed Development has the potential to undermine the favourable conservation status of this SCI species through disturbance and a deterioration of water quality during the construction phases of the Proposed Development..	

5.2.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form[19] for the River Nore SPA the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Development. These are provided in Table 5-14 below.

Table 5-14: Site-specific threats, pressures and activities for the River Nore SPA (004233)

Negative Impacts	
Rank	**Threats and Pressures (* Items in bold are of relevance to the Proposed Development)**
Medium	Port areas
Medium	Landfill, land reclamation and drying out, general

5.2.1.3 QI Specific Information

5.2.1.3.1 [A229] Kingfisher (*Alcedo atthis*)

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher (NPWS, 2011b[20]). Kingfisher is currently on the Amber-list (medium conservation concern) in the Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et al., ~~and Lewis (~~2021).

Kingfisher were observed on five occasions during breeding kingfisher surveys in 2023. Surveys were carried out along the River Nore, 900m from the nearest proposed turbine. Suitable nesting habitat was identified within the survey area in several areas, the closest of which was 950m from the nearest proposed turbine. Most observations were of individuals calling or travelling. There was one observation of two kingfisher, with a male perched and a second bird calling from the riverbank below. This observation indicates a probable nest in this location.

During an additional kingfisher survey carried out on the 15th May 2025 of the Proposed Grid Connection crossing point along the River Nore, no nesting burrows were recorded within the survey area. The majority of bank habitat within the survey area was assessed as unsuitable nesting habitat for kingfisher (i.e. shallow sloping banks; densely overgrown with no exposed substrate or steep/vertical faces present). A minor section (c.10m) of sub-optimal nesting habitat was identified on the western bank within the cable crossing area (where there has been erosion of a section of bank leaving an exposed sloping soil face extending approximately 1m above water level at time of survey). An additional section of suitable nesting habitat was recorded approximately 130m upstream of the cable crossing location. No burrows were recorded at these locations.

[19] https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004233

[20] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004233.pdf

CO Targets and Attributes – Kingfisher

Individual targets and attributes for this conservation objective are considered in Table 5-15 below:

Table 5-15: Targets and attributes associated with the site-specific conservation objectives for Kingfisher

Attribute	Target	Potential for Proposed ~~Project~~ Development to Undermine Conservation Objective Target
Population size	No significant decline in the long term	No (changes to kingfisher population size will not occur as a result of the Proposed Development).
Productivity rate	Sufficient productivity to maintain the population trend as stable or increasing	No (changes to kingfisher productivity rate will not occur as a result of the Proposed Development).
Spatial distribution of territories	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation	No (changes to kingfisher Spatial distribution of territories will not occur as a result of the Proposed Development).
Extent and quality of nesting banks and other suitable nesting features	Sufficient area of high quality nesting habitat to support the population target	No (Extent and quality of nesting banks and other suitable nesting features will not occur as a result of the Proposed Development).
Forage spatial distribution, extent, abundance and availability	Sufficient number of locations, area of suitable forage habitat and available forage biomass to support the population target	No (changes to Forage spatial distribution, extent, abundance and availability will not occur as a result of the Proposed Development).
Water quality	Both biotic (i.e. Q-value) and abiotic indices reflect overall good-high quality status	**Yes** - (potential for changes to water quality as a result of the Proposed Development).
Barriers to connectivity	No significant increase	No (barriers to connectivity will not occur as a result of the Proposed Development).
Disturbance to breeding sites	Disturbance occurs at levels that do not significantly impact upon breeding Kingfisher	Yes. Whilst the project is unlikely to result in any impact on breeding kingfisher, adopting a highly precautionary approach, impacts as a result of construction related disturbance to commuting and foraging kingfisher in have not been excluded.

Attribute	Target	
Favourable Conservation Status of Habitat is achieved	Its natural range, and area it covers within that range, are stable or increasing, and	No (changes to kingfisher habitat anticipated)
	The specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future	No (changes to kingfisher habitat anticipated)
	the conservation status of its typical species is favourable.	No (changes to kingfisher habitat anticipated)
The Favourable conservation status of a species is achieved	Population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and	Yes - deterioration in water quality and habitat degradation as a result of silt laden run-off and other pollutants could undermine this target (reduced prey availability)
	The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and	Yes - deterioration in water quality and habitat degradation as a result of silt laden run-off and other pollutants could undermine this target (reduced prey availability)
	There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.	No (changes to kingfisher habitat anticipated)

6. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED MITIGATION

This section of the NIS assesses the potential effects of the Proposed Development on the identified relevant Qualifying Interests/Special Conservation Interests. This assessment is undertaken in the absence of any mitigation and in respect of the conservation objectives of the European Site. The Conservation Objectives for each of the European Sites assessed were reviewed. The Conservation Objectives for these sites are available at the following locations:

River Barrow and River Nore SAC:

- https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf

River Nore SPA:

- https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf

Following the initial impact assessment, mitigation is prescribed where necessary to avoid adverse effects on the Conservation Objectives of the relevant QIs.

6.1 Potential for Direct Effects on the European Sites

There will be no direct effects on the QIs/SCIs of any European site identified in this NIS.

6.2 Potential for Indirect Effects on the European Sites

6.2.1 Hydrological Impact - Water Quality/Habitat Degradation

River Barrow and River Nore SAC

A potential for indirect effect on the following QI species/habitats of River Barrow and River Nore SAC in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction and operation of the Proposed Development.

Species

- ~~Nore freshwater pearl mussel~~
- Freshwater Pearl Mussel
- White-clawed Crayfish
- Atlantic salmon (only in fresh water)
- Sea Lamprey
- Brook Lamprey
- River Lamprey
- Twaite Shad
- Otter

Habitats

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Petrifying springs with tufa formation (Cratoneurion)

River Nore SPA

Likewise, there is potential for indirect effect on the following QI species of the River Nore SPA in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction, operation and decommissioning of the Proposed Development, and indirect disturbance effects during construction:

- Kingfisher (*Alcedo atthis*)

6.2.1.2 Construction Phase

6.2.1.2.1 *Otter*

Mitigation measures for the protection of ground and surface waters during the construction of the Proposed Development are detailed in Sections 6.2.1.2.3 – 6.2.1.2.11 which will ensure indirect impacts on otter in relation to a deterioration in water quality will not occur.

To ensure no significant disturbance to otters during construction works a 20m buffer will be identified around the confirmed active non-breeding holt, no works will take place within this 20m buffer (see Figure 3-3). This exclusion zone should be identified to personnel working on the construction of the project during a tool box talk.

Given the time that can lapse between baseline surveys being undertaken and construction works commencing it is recommended that a pre-construction survey for otter is undertaking at the proposed grid connection crossing point to ensure baseline conditions in relation to otter have not changed (e.g. new holts established, change is status of holt). Any changes to the baseline would need to be addressed following National and European legislation and additional measures where required instructed by an ecologist to ensure no significant disturbance impacts to otter.

6.2.1.2.2 *Kingfisher*

Mitigation measures for the protection of ground and surface waters during the construction of the Proposed Development are detailed in Sections 6.2.1.2.3 – 6.2.1.2.11 which will ensure indirect impacts on kingfisher in relation to a deterioration in water quality will not occur.

Given the time that can lapse between baseline surveys being undertaken and construction works commencing it is recommended that a pre-construction survey for kingfisher is undertaking at the proposed grid connection crossing point to ensure baseline conditions in relation to kingfisher have not changed (e.g. new burrows established). Any changes to the baseline would need to be addressed following National and European legislation and additional measures where required instructed by an ecologist to ensure no significant disturbance impacts to kingfisher.

6.2.1.2.3 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities that will require earthworks resulting in the removal of vegetation cover and excavation of mineral subsoil (where present), and bedrock in certain areas, are detailed in Chapter 4: Description of the Proposed Development ~~Project~~. Excavated soil/subsoil will be backfilled at the proposed borrow pit and any excess will be used for landscaping throughout the Site or accommodated in linear berms alongside the Proposed Wind Farm site access roads and turbine hardstands.

Potential sources of sediment laden water include:

- Drainage and seepage water resulting from infrastructure excavations;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the Grid Connection underground cabling, resulting in entrainment of sediment from the excavations during construction; and,
- Erosion of sediment from emplaced site drainage channels (although these are limited in scale and channel length).

These activities can result in the generation of suspended solids in drainage water, and as there are no large drainage outlets (other than 2 no. small streams at SW1 and SW2) across the Wind Farm site, there is a risk that sediment laden recharge water could also enter the underlying aquifer.

Along the Proposed Grid Connection underground cabling route, there is 1 no. surface water crossing point across the River Nore. The crossing exists at a location with no existing bridge, therefore the crossings will need to be made via directional drilling under the River Nore or a similar method (refer to Chapter 4, Section 4.8.2.4.1, of the EIAR). The Proposed Grid Connection underground cabling will be emplaced along the road carriageway, therefore no instream works will occur.

Surface water runoff that will occur at Proposed Wind Farm infrastructure will be recharged locally into subsoils or in limited cases, will discharge to existing surface watercourses following attenuation through the treatment train as detailed in Figure 9-15 in Chapter 9 of the EIAR. The potential effects on groundwater quality are assessed separately in Section 9.4.2.5, 9.4.2.6 and 9.4.2.8 of Chapter 9 of the EIAR.

Pathways: Drainage and surface water discharge routes – these are largely absent across the Proposed Wind Farm site. This is primarily related to the permeability of the soil/subsoil. Only 2 no. turbines have the potential to drain to a surface watercourse – T4 which is 380m from Archerstown 15 stream and T8 which is 50m from field drains which lead to the Ballyconra stream. There is a very small flow in both these watercourses, measured at ~0.1-0.25l/s over several site walkovers at both sites respectively. T1 exists 700m south of the Durrow Townparks stream, however T1 will not drain to this stream due to the topography at this location. There is a short watercourse associated with the fault zone, situated ~200m north of T6. This stream discharges to a swallow hole ~180m north of turbine T6. As the topography at T6 slopes east, there is no pathway for a hydraulic connection between the proposed turbine and this stream/swallow hole, either through groundwater flows or surface water.

Receptors: Down-gradient rivers and water dependant ecosystems near the Proposed Wind Farm site which include:

- Rivers – River Nore

Down gradient rivers and dependant ecosystems along the Proposed Grid Connection underground cabling route which include:

- Rivers – River Nore

Pre-Mitigation Potential Impact:

Indirect, negative, slight, temporary, unlikely impact within the Proposed Wind Farm site (receptors listed above).

Indirect, negative, significant, temporary, unlikely impact along the Proposed Grid Connection underground cabling route (receptors listed above).

Proposed Mitigation Measures

Wind Farm site

The key mitigation measures typically employed during the construction phase of Wind Farms is the avoidance of sensitive aquatic areas where possible, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to all mapped drains). Where buffer zones cannot be applied, i.e. at watercourse crossing points, further mitigation measures are employed to prevent negative effects.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:

- Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment;
- Avoid excavations within close proximity to surface watercourses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Spoil management areas for excess soil/subsoil will be localised primarily to the borrow pit. Any additional soil and subsoil will be used for site landscaping or will be placed alongside site access roads and turbine hardstands (avoiding environmentally constrained areas). These small scale areas of spoil placement will be designed and constructed with the minimal amount of surface area exposed. In these areas of spoil placement, the vegetative top-soil layer will be removed and re-instated or reseeded directly after construction, allowing for re-vegetation which will mitigate against erosion.

Grid Connection underground cabling route

The majority of the underground electrical cabling connection route is >50m from any nearby watercourse. It is proposed to limit any works in any areas located within 50m of any watercourse/waterbody including the stockpiling of excavated soils and subsoils.

There is 1 no. watercourse crossing included as part of the development along the grid connection route, whereby the River Nore will be crossed at a location near E243985, N171860, 250m south of the Tirlán facility. No in-stream works are required at this crossing, however due to the proximity of the streams to the construction work at the crossing location, there is a potential for surface water quality impacts during trench excavation work. Mitigation measures are outlined below.

A constraint/buffer zone will be maintained for all crossing locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:

- Avoid physical damage to watercourses, and associated release of sediment;
- Avoid excavations within close proximity to surface watercourses; and,
- Avoid the entry of suspended sediment from earthworks into watercourses.

Mitigation by Avoidance:

A key mitigation measure adopted during the design phase is the avoidance of infrastructure close to surface water features across the Proposed Wind Farm site. From Figure 9-2 of Chapter 9 of the EIAR it can be seen that the Proposed Wind Farm site is significantly distal from any significant surface water course, the nearest being the River Nore located 450m east of the Proposed Wind Farm site.

The Proposed Grid Connection underground cabling route crosses 1 no. watercourse, the River Nore. Additional control measures, which are outlined further on in this section, will be undertaken at this location.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:

- Avoid physical damage to watercourses, and associated release of sediment;
- Avoid excavations within close proximity to surface watercourses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, by allowing all surface water/recent rainfall to infiltrate to ground at the Proposed Wind Farm site (refer to Appendix 4-3, Drainage Design drawings).

Mitigation by Design:

- Source controls:
  - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
  - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
  - Interceptor drains, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
  - Silt-buster system or equivalent.

Silt Fences

Silt fencing will be emplaced downgradient of turbines, to prevent any runoff of sediment laden water. Silt fences are effective at removing heavy settleable solids. Inspection and maintenance of these structures will be carried out during construction phase. They will remain in place throughout the entire construction phase.

Double silt fences will also be emplaced where the Proposed Grid Connection is near sensitive areas, as outlined in Section 9.4.2.9 of Chapter 9 of the EIAR (*i.e.* watercourse crossing under River Nore).

Silt Bags

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing

filtered water to pass through. The discharge from the silt bags will be directed to the settlement ponds, where the water will be allowed to naturally infiltrate to ground.

Pre-emptive Site Drainage Management

The works programme for the initial construction stage of the Proposed Wind Farm site will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the Site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works should be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures should be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

Management of Runoff from Areas of Spoil Placement

It is proposed that excavated subsoil will be primarily used to backfill the borrow pit. Any excess will be used for landscaping throughout the Site or accommodated in linear berms alongside the Proposed Wind Farm site access roads and turbine hardstands.

Proposed surface water quality protection measures regarding the areas of spoil placement are as follows:

- During the initial emplacement of spoil at the borrow pit, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.
- Drainage from areas of spoil placement will be directed to settlement ponds as required or will overflow through controlled overflow pipes (not required for borrow pit as runoff will remain in pit).
- Discharge from areas of spoil placement will be intermittent and will depend on preceding rainfall amounts.
- Once the areas of spoil placement have been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

Therefore, of the development of the spoil placement areas, the above mitigation measures will be implemented to protect downstream water quality.

Timing of Site Construction Works

Construction of the drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

Monitoring

An inspection and maintenance plan for the on-site drainage system will be prepared in advance of the commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended.

Any excess build-up of silt levels at infiltration outfall points or within the short drainage channels, that may decrease the effectiveness of the drainage feature, will be removed.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken at drainage outfall locations, and specifically following heavy rainfall events (as per the SWMP – Appendix 4-3 of the accompanying EIAR). The inspections will include ensuring that all surface water is infiltrating to ground as per the Drainage Design, with no surface water runoff from the Wind Farm site.

Residual Effect: Following the implementation of the mitigation by avoidance measures, which has involved an iterative process of optimising the design and layout of the Proposed Development ~~Project~~ to minimise the potential for effects due to earthworks, as well as the mitigation by design measures which involves the detailed and site-specific drainage management plan, the residual impact is considered to be - Negative, indirect, imperceptible, short term, unlikely impact on:

Underlying groundwater systems and down-gradient rivers near the Proposed Wind Farm site which include:

- Groundwater – underlying Poor and Regionally Important aquifers
- Rivers – River Nore

Down gradient rivers along the Proposed Grid Connection underground cabling route which include:

- Rivers –River Nore

Significance of Effects: No significant effects on the aforementioned receptors will occur.

6.2.1.2.4 *Potential Effects on Groundwater Flows and Levels due to alteration of recharge (including activation of potential karst)*

Wind Farm site.

For the Proposed Wind Farm site, a comprehensive site investigation dataset has been accrued. The collated site investigation dataset for the Site has not identified any significant karst features within the underlying bedrock, following the drilling of 4 no. monitoring wells, 1 no. rotary core borehole and 27 no. trial pits.

The west and northwest of the site is mapped within a Poor Aquifer, which comprises sandstone, siltstone, mudstone and shale with some minor coals in the Moyadd Coal Formation. This bedrock is not susceptible to karstification.

Within the areas of the Site mapped as Limestone, the completed drilling has demonstrated that the bedrock is not significantly water bearing with only small-moderate groundwater strikes. Furthermore, the static groundwater level in the Limestone typically exists at 15-40mbgl, which is considerably below any foundations required for the proposed turbines (typically 3-5m deep). Although mapped as a regionally important karst aquifer, there is no indication of karstification of the bedrock at the Proposed Wind Farm site or along the Proposed Grid connection route.

A reduction in recharge, which would be accompanied by an increase in surface water drainage, would clearly reduce the volume of water infiltrating to the bedrock aquifer and therefore lead to a reduction in groundwater levels. The drainage management design of the Proposed Wind Farm site has been optimised to ensure the volume of rainfall infiltrating through the subsoils to the groundwater aquifer will not change.

Grid Connection

Changes in the permeability of the ground along the Proposed Grid Connection underground cabling route can impact on groundwater recharge to the underlying aquifer. As the cable trench will be shallow (~1.3m) and either within an existing road carriageway or within existing agricultural lands, the trench will be excavated within the soil/subsoil layer. Following the excavation of the trench, the cable will be laid and the soil/subsoil removed will be backfilled within the excavation (in the same order as it was removed). As such, the overall permeability of the ground along the Proposed Grid Connection underground cabling route will not be altered to a significant degree. Where tarmacadam or other hardstanding is removed, this will be reinstated and as such the permeability will not change as a result of the Proposed Grid Connection underground cabling route.

Pathways:

Groundwater Flow - Groundwater flow paths (typically slow, non-karstic)

Groundwater levels – Rainfall Infiltration (recharge)

Receptors: Downgradient aquifers (Poor Aquifer, Regionally Important Aquifer and Gravel Aquifer) and downgradient connected waterbodies (River Nore).

Pre-Mitigation Potential Effects: Indirect, negative, moderate, medium term, very unlikely impact.

Mitigation by Avoidance - Groundwater Flows:

Wind Farm site

The construction of the turbines, met mast, access roads and other ancillary features of the Proposed ~~Project~~ Development could impact groundwater flows within the Proposed Wind Farm site, if a particular pathway *e.g.* karst conduit, existed near the development, however based on all the available site investigation data no reasonable pathways have been identified. The identification and avoidance of any potential karst features has been a key aim of the intrusive and extrusive site investigations, through geophysical surveys, drilling and trial pit excavations and is considered to be the most rational method of mitigating against affecting flow paths, by avoiding any potential karst areas.

The Site data outlined, within Section 9.3.6.2 and 9.3.6.3 of Chapter 9 (Hydrology) of the EIAR and outlined in more detail within Chapter 8 of the EIAR provides sufficient scientific data to say, with a high degree of certainty, that the construction of the turbine foundations, met mast, site access roads, substation and other relatively near surface constructs, will not interact with or alter the existing groundwater recharge, and underlying groundwater flow, regimes.

Grid Connection

The Proposed Grid Connection underground cabling route will be routed along an existing road carriageway and within agricultural lands. The trench will be excavated to a depth of ~1.3m with the soil/subsoil removed and backfilled in place. As such there will be no significant change in the permeability of the lands occupied by the Proposed Grid Connection underground cabling route.

Mitigation by Design - Groundwater Levels:

As mentioned above, the critical driver of groundwater levels and the potential to affect them is through groundwater recharge. The drainage design of the Proposed Wind Farm site has been designed to mimic the existing hydrological regime within the Site, whereby surface water runoff pathways are generally short and rainfall readily percolates to ground. The drainage design incorporates check dams to reduce velocities, and level spreaders to allow water to infiltrate to ground.

Residual Effects: Due to the siting of the Wind Farm site infrastructure guided by the knowledge accrued through the various phases of site investigations, as well as the design measures incorporated within the drainage management plan, the residual effects are considered to be - No effects on groundwater flows or groundwater levels.

Due to the nature and extent of the Proposed Grid Connection underground cabling route, along an existing road carriageway/agricultural lands, the residual effects are considered to be – No effects on groundwater flows or groundwater levels.

Significance of Effects: No significant effects on groundwater flows and groundwater levels will occur.

6.2.1.2.5 *Potential Effects on Groundwater Levels and Local Groundwater Well Supplies During Excavation Works*

Temporary dewatering of turbine foundations during construction has the potential to impact on local groundwater levels. The local groundwater levels which have been monitored over a 12-month period and a full understanding of local prevailing hydrogeological conditions has been gained. Groundwater level effects are not anticipated to be significant due the known local hydrogeological regime, and due to the proposed excavation method as outlined below. Groundwater levels across the Proposed Wind Farm site are well defined through monitoring of numerous groundwater wells and site investigation boreholes.

The known groundwater levels within the Proposed Wind Farm site are summarised in Section 9.3.6.6 of Chpater 9 (Hydrology) in the EIAR. Briefly, they range between 56.45 – 202.2mOD across the Proposed Wind Farm site and surrounding area. Monitored groundwater levels are below the proposed formation levels of all turbines and the formation level of the proposed borrow pit and as such there will be no groundwater dewatering requirements during turbine base construction or extraction of bedrock.

No groundwater level effects are anticipated from the construction of the Proposed Grid Connection underground cabling trench due to the shallow nature of the excavation (i.e. ~1.3m), the excavation of the trench within the road carriageway and the unsaturated nature of the subsoil/bedrock to be excavated.

Pathway: Groundwater recharge and groundwater flowpaths.

Receptor: Groundwater levels in the underlying bedrock aquifers surrounding the Proposed Wind Farm site and the associated groundwater levels in mapped and unmapped wells near the Proposed Wind Farm site which source groundwater from the aquifer as well as groundwater levels along the Proposed Grid Connection underground cabling route.

Pre-Mitigation Potential Effects: Indirect, slight, short term, unlikely impact on groundwater levels and local groundwater well supplies near the Proposed Wind Farm site and the Proposed Grid Connection underground cabling route.

Indirect, slight, short term, very unlikely impact on groundwater levels and local groundwater well supplies along the Proposed Grid Connection underground cabling route.

Impact Assessment – Proposed Wind Farm

Based on the engineering design, bedrock may be exposed where road and hardstand area excavations are proposed. Elsewhere, the proposed turbine base excavations will be within the subsoil strata and do not involve excavation into bedrock. The bedrock underlying the Site has been classified by the GSI as a Poor Aquifer to the west/northwest of the Site and as a Regionally Important Aquifer to the east/southeast. The site data from HES boreholes and site investigation boreholes indicates that within the Regionally Important Aquifer groundwater is not met within the 0-10mgbl and was met first in borehole MW3 as a seepage at 15mbgl *i.e.* low permeability in the bedrock underlying the turbine locations. Within the Poor Aquifer, a very slow water strike was met at 8mbgl at MW1. As outlined above, no groundwater dewatering will be required during the construction phase in any element of the Proposed Wind Farm.

The topographical and hydrogeological setting of turbine locations means no groundwater dewatering will be required. Moreover, direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management. For the avoidance of doubt, dewatering is defined as a requirement to permanently drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor. We consider that this example (the quarry example) is very different in scale and operation from the proposed operation of a temporary shallow excavations (3-5m), where the groundwater aquifer units (water strikes) are known to exist at depth. In order to explain this thoroughly we will outline our reasoning in a series of bullet points as follows:

- Firstly, the turbine locations are located on lands where the ground elevations are between ~80 and 180m OD;
- The elevations of the turbine foundations are above the elevations of groundwater levels recorded in monitoring wells and local domestic/farm wells, and therefore of the known groundwater levels within the Proposed Wind Farm site. The turbine foundations will be

excavated to 3-5mbgl and as such will not intercept any aquifer units, but will be excavated within the overlying subsoil and near-surface bedrock;

- The local bedrock comprises a mixture of sandstone, mudstone, siltstone and shale to the west/northwest and medium hard to hard Limestone to the east/southeast. The bedrock has been shown to be generally unfractured and unproductive (not water bearing) during site investigations. This means that groundwater flows at depth, beneath the turbine foundations, will be relatively minor;
- No regional groundwater flow regime, i.e. large volumes of groundwater flow, will be encountered at these elevations (as proven by the Site investigation drilling);
- Therefore, shallow inflows will be fed by recent rainfall, and possibly by limited seepage from localised permeable subsoils;
- As such any shallow groundwater seepage (within the subsoils) will be small in comparison to the expected surface water flows following any heavy rainfall events; and,
- Hence, it is considered that the management of surface water will form the largest proportion of water to be managed and treated, although where permeable subsoils are encountered, rainfall may infiltrate to ground rather than ponding at any excavation.

Any potential dewatering of excavations will take place above the local groundwater level, within excavations with ponded surface water. The water will be pumped a short distance to settlement ponds where it will recharge to ground. There will be no net change in runoff/recharge, other than the displacement of the recharge by a short distance (10's of metres).

In terms of the local well supplies (GWS and domestic wells) included in Section 9.4.2.10 and 9.4.2.11 of Chapter 9 (Hydrology) in the EIAR, as well as any potentially unmapped wells, the implementation of the drainage design measures ensures that recharge to the aquifer will not be altered, thus downgradient water levels will not be altered. As such, there are no well supplies down-gradient of the Proposed Wind Farm site that can be affected by temporary dewatering during turbine base construction.

Impact Assessment – Proposed Grid Connection

The Grid Connection underground cabling trench depth will only be approximately ~1.3 m in depth, the excavation will be temporary and transient, and the cable trench will be backfilled with excavated material and/or hardcore material, depending on site conditions. Therefore, there will be no net loss of permeability across the 1.3m depth. As a result, and given the shallow depth, there will be very limited potential for groundwater level effects to occur.

Residual Effect: *Proposed Wind Farm:* Based on the underlying groundwater levels (above the level of excavations), the requirement for groundwater dewatering of groundwater will not exist. There may be an occasional requirement for dewatering of surface water which may pond within the excavation bases. Any pumped water will be directed (by temporary pumping) to a settlement pond to infiltrate to ground slightly downgradient of the excavation, thus recharge rates will not be altered. The residual effects are considered to be - No effects on groundwater quantity or levels reaching local domestic wells. Groundwater quality leaving the Site is dealt with in Sections 9.4.2.5, 9.4.2.6 and 9.4.2.7 of Chapter 9 (Hydrology) in the EIAR.

Proposed Grid Connection: Based on the typical depth of grid excavation trenches, the lack of interaction with groundwater levels, the short-term nature of the works and the spatial extent of the trench, the residual impact is considered to be: Indirect, imperceptible, temporary, very low probability impact on local groundwater levels.

Significance of Effects: No significant effects.

6.2.1.2.6 Potential Effects Associated with Piled Foundations

While gravity bearing foundations are considered suitable for the turbine base foundations at the Proposed Wind Farm site, the potential effects of piling are considered here, although this is considered a highly unlikely scenario. A piled foundation may be required at Turbine T3, where the geophysics indicates a layer of deep firm silt/clay.

The following potential scenarios arise in respect of proposed piling works:

- Creation of preferential pathways, through a low permeability subsurface layer (an aquitard such as clay), to allow downward flow into the underlying aquifer; and,
- Creation of a blockage to regional groundwater flow within the underlying aquifer due to placement of pile clusters.
-
- These pathways are analogous to pathways described for piling works associated with contaminated land sites, as detailed in Environment Agency (2001)[21].

Pathway: Groundwater flowpaths (upward and/or downward pathways, and regional groundwater flows).

Receptor: Groundwater quality in the underlying GWBs and groundwater hydrochemistry.

Pre-Mitigation Potential Effect: Negative, moderate, direct, short term, likely effect on groundwater quality/hydrochemistry.

Proposed Mitigation Measures:

The proposed mitigation measures designed for the protection of downstream surface water quality and groundwater quality within the Wind Farm site will be implemented at all construction work areas.

- Mitigation measures for sediment control are detailed in Section 9.4.2.1 of the EIAR.
- Mitigation measures for the control of hydrocarbons during construction works are detailed in Section 9.4.2.5 of the EIAR.
- Mitigation measures for the control of cement-based products during construction works are detailed in Section 9.4.2.7 of the EIAR.

Proposed mitigation measures relative to piling works will comprise:

- Where driven piles are used, they will have a cross section without re-entrant angles;
- Strict QA/QC procedures for piling works will be followed;
- Piles will be kept vertical during piling works;
- Good workmanship will be employed during all piling works; and,
- Where required bentonite seals will be used to prevent upward/downward movement of surface water/groundwater.

[21] *UK Environment Agency's (UKEA) document Model Procedures for the Management of Land Contamination: Contaminated Land Report No.11*

6.2.1.2.7 *Potential Effects on Surface Water and topographically downgradient Surface Water bodies*

Surface water draining from an active construction site can contain elevated levels of suspended sediment, which can impact on downstream surface water bodies. The surface water can also contain cementitious runoff and/or hydrocarbons depending on the nature of the construction activity. Any alteration in the drainage regime within a site can impact on the volume of runoff which leaves the site. These effects can affect the quantity and quality of downstream surface waterbodies (where a flow path exists between the site and the waterbody).

As noted above, there are only two minor surface water pathways which exist between the Proposed Wind Farm site and downgradient watercourses (Archerstown stream and Ballyconra stream). Surface water in the area of T4 will drain southwest towards the Archerstown stream which is situated 380m from T4. Surface water from T8 may drain towards a field drain which leads to the Ballyconra stream. This field drain is 50m from T8. A new watercourse crossing will be emplaced at this location (field drain northwest of turbine T8. Given the lack of flow in this field drain (monitored during site visits between April 2024-April 2025), these works can most likely be completed between the months of May-October with minimal consequence as the field drain will be dry. The remaining rainfall falling at the Site will discharge via groundwater recharge and groundwater flow.

There is 1 no. watercourse crossing along the Proposed Grid Connection underground cabling route. Potential sources of suspended sediment include runoff from spoil excavated from the cabling trench. The mitigation measures outlined in Section 9.4.2.1 will ensure that there are no effects on downgradient surface waterbodies.

Pathway: Surface water recharge, and groundwater flow

Receptor: Downgradient surface waterbodies – Ballyconra stream, Archerstown stream, Lisdowney stream, Durrow Townparks stream and River Nore

Pre-Mitigation Potential Effects:

Wind Farm Site - As no significant direct surface water pathways exist between the Proposed Wind Farm and these watercourses (apart from 2 very small streams) - Indirect, negative, slight, short term, unlikely impact.

Grid Connection - Indirect, negative, significant, temporary, unlikely impact along the Proposed Grid Connection underground cabling route.

Mitigation by Avoidance:

The primary mitigating factor in relation to downgradient surface water bodies is the general lack of surface water courses across the Proposed Wind Farm site and the surrounding area. The rainfall falling on the Proposed Wind Farm site recharges to the underlying groundwater aquifer.

The exceptions to this are at turbine T8, where a small seepage face runs into a field drain, before discharging to the Ballyconra stream, as well as at T4, where the Archerstown stream exists ~ 380m southwest of turbine T4. These works will be completed between the months of May-October with minimal consequence as the field drain will be dry.

Along the Proposed Grid Connection underground cabling route, the cabling will be emplaced within existing road carriageways and existing bridges. The utilisation of the existing roadways and bridges avoids any in-stream works.

Mitigation by Design:

Mitigation measures relating to the protection of surface water drainage regimes and surface water quality within the Site have been detailed in Section 9.4.2.1 (earthworks) , Section 9.4.2.5 (Surface water), Section 9.4.2.6 (Hydrocarbons) Section 9.4.2.7 (wastewater), Section 9.4.2.8 (cement-based products) and Sections 9.4.2.9 and 9.4.2.10 (morphological changes) of Chapter 9 (Hydrology) in the EIAR.

Similarly, mitigation measures for the protection of groundwater quantity and quality have been detailed in Section 9.4.2.2 (groundwater recharge), Section 9.4.2.3 (groundwater levels), Section 9.4.2.6 (hydrocarbons), Section 9.4.2.7 (wastewater) and Section 9.4.2.8 (cement based products) of Chapter 9 (Hydrology) in the EIAR..

We summarise that there will be no significant effects on GWB or SWB WFD status for the following reasons:

- The small footprint (7.6ha) of the Proposed ~~Project~~ Development in relation to the scale of the underlying GWBs (Lisdowney GWB has a total area of 54km^2 [54,000,000 ha], whilst the Durrow GWB has a total area of 217km^2 [217,000,000 ha);
- The Proposed ~~Project~~ Development does not involve any alteration of drainage patterns, therefore, the quantitative status of the receiving surface and groundwaters will remain unaltered;
- There will be no direct discharge from the Proposed ~~Project~~ Development site to receiving waters; and,
- Mitigation measures for the protection of surface and groundwater water quality will be implemented during the construction phase of the Proposed ~~Project~~ Development to ensure that there is no deterioration in local or downstream water quality. These mitigation measures will ensure the qualitative status the receiving waterbodies remains unaltered by the Proposed ~~Project~~ Development.

Wind Farm Site - To ensure the continuation of the existing hydrological regime, whereby the majority of rainfall percolates to ground and does not discharge as surface water runoff (hence the low surface drainage density at the Site), the drainage design has incorporated natural attenuation of flows and allows for collected rainwater to be primarily recharged back into the underlying aquifer rather than leaving as surface water flows. The drainage design also includes mitigation measures to ensure that any collected surface water is treated prior to discharge/recharge back into the ground, and therefore will not contain suspended sediment. The drainage design which was developed for the Proposed Wind Farm site is included in Appendix 9-7 and summarised in Section 9.3.13 of Chapter 9 (Hydrology) in the EIAR.

Grid Connection – The mitigation measures outlined in Section 9.4.2.1 of Chapter 9 (Hydrology) in the EIAR will ensure that surface water leaving the site will be of a high quality and control measures such as double silt fencing at watercourse crossings will protect downgradient surface water bodies.

Residual Effect:

Wind Farm - Due to the general lack of surface water drainage from the Site, as well as the proposed drainage management plan which ensures the continuation of the existing hydrological/hydrogeological regime (groundwater recharge, with no runoff), along with the in-line treatment such as check dams, settlement ponds and Terrastop silt fencing outlined in Section 9.4.2.1 - the residual effect is considered to be: No impact on downgradient surface waterbodies.

Grid Connection – With the implementation of the mitigation measures outlined in Section 9.4.2.1 of Chapter 9 (Hydrology) in the EIAR, the residual effect is – No residual effect on downgradient surface waterbodies.

Significance of Effects: No significant effects.

6.2.1.2.8 *Potential Release of Hydrocarbons during Construction and Storage*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in the death of aquatic organisms.

The pathways for the rapid transport of any potential spilt chemicals are limited at this site, due to the absence of any surface water drainage routes (rivers, streams *etc*). The primary pathway is through infiltration through the subsoil and bedrock and eventually reaching the underlying groundwater aquifer.

The potential release of hydrocarbons can occur during the works within the Proposed Wind Farm site and during works along the Proposed Grid Connection underground cabling route.

Pathway: Groundwater flowpaths and site drainage network within the Proposed Wind Farm. Groundwater flowpaths and surface water drainage network along the Proposed Grid Connection underground cabling route.

Receptor: *Proposed Wind Farm:* Surface watercourses (Ballyconra and Archerstown streams discharging to Lisdowney stream/River Nore). Groundwater within the underlying bedrock aquifer.

Proposed Grid Connection: Surface watercourses downgradient of the Grid Connection underground cabling route (River Nore) and the underlying groundwater aquifer.

Pre-Mitigation Potential Impact: Due to the nature and depth of subsoils across the Proposed Wind Farm site and the ability of subsoils to attenuate pollutants - Indirect, negative, slight, short term, unlikely effect on local groundwater quality.

Due to the relatively isolated nature of the surface water features at the site, the distance involved to the small drainage features, the nature and depth of subsoils across the Proposed Wind Farm site and the ability of subsoils to attenuate pollutants - Indirect, negative, slight, short term, unlikely effect on local surface water and groundwater quality.

Due to the proximity of surface watercourses to the Proposed Grid Connection underground cabling route - Indirect, negative, slight, short term, possible impact on local surface water quality and groundwater quality.

Proposed Mitigation Measures:

Mitigation measures proposed to avoid release of hydrocarbons at the Proposed Wind Farm site and along the Proposed Grid Connection underground cabling route are as follows:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station;
- On site re-fuelling of machinery will be carried out using a mobile double skinned refuelling truck.
    - A refuelling truck will be used to refuel construction equipment used on site.
    - The refuelling truck will also carry fuel absorbent material and pads in the event of any accidental spillages.

- The fuel truck will be parked on a level area in the construction compound when not in use and 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;

- Onsite refuelling will be carried out by trained personnel only;
- Fuels stored on site will be minimised. Fuel storage areas if required 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;
- Surface water runoff from temporary construction compounds will be collected and drained via silt traps and hydrocarbon interceptors prior to recharge to ground;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be contained within Construction and Environmental Management Plan (Appendix 4.2 of the EIAR). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.

Residual Effect: *Proposed Wind Farm:* Based on the mitigation measures outlined, such as refuelling off site, the appropriate safe use and handling of hydrocarbons on-site where necessary including fuel bunds and the inclusion of hydrocarbon interceptors, the residual effects within the Wind Farm Site are considered to be - Indirect, negative, imperceptible, short term, very unlikely impact on groundwater and downgradient surface waters.

Proposed Grid Connection: Based on the mitigation measures outlined, such as refuelling off site, the appropriate safe use and handling of hydrocarbons along the Proposed Grid Connection underground cabling route where necessary including fuel bunds, the residual effects along the Proposed Grid Connection underground cabling route are considered to be - Indirect, negative, imperceptible, short term, very unlikely impact on surface water and groundwater.

Significance of Effects: For the reasons outlined above, and with the application of the listed mitigation measures, no significant effects on surface water and groundwater quality will occur.

6.2.1.2.9 Groundwater and Surface Water Contamination from Wastewater Disposal

Release of effluent from wastewater treatment systems has the potential to impact on groundwater and surface waters if site conditions are not suitable for an on-site percolation unit. There are 2 no. construction compounds proposed for the Proposed ~~Project~~ Development.

There are no surface water pathways which drain the areas of the construction compounds.

The construction compounds will be used as a base during the construction phase of the Proposed Wind Farm and the Proposed Grid Connection works.

Pathway: *Proposed Wind Farm:* Groundwater flowpaths and site drainage network.

Proposed Grid Connection underground cabling *route:* Groundwater flowpaths and drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality within the Proposed Wind Farm site and along the Proposed Grid Connection underground cabling route Groundwater - Durrow GWB, River Nore Sand & Gravel Aquifer. Surface water – River Nore

Pre-Mitigation Potential Impact:

- Indirect, negative, significant, temporary, unlikely impact to surface water quality.
- Indirect, negative, moderate, temporary, unlikely impact to local groundwater.

Proposed Mitigation by Avoidance:

- A self-contained port-a-loo system with an integrated wastewater holding tank will be used at the 2 no. temporary construction compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- Water supply for the Site office and other sanitation will be brought to site and removed after use from the Site to be discharged at a suitable off-site treatment location; and,
- No water for sanitation purposes will be sourced on the Site or discharged to the Site.

Residual Effect: Based on the fact that there will be no discharge of wastewater to either the Proposed Wind Farm or along the Proposed Grid Connection underground cabling route and that wastewater will be managed by an appropriately licensed waste contractor, there will be no effect.

Significance of Effects: For the reasons outlined above, no significant effects on surface water or groundwater quality will occur.

6.2.1.2.10 *Release of Cement-Based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative effects on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293/1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ±0.5 of a pH unit. Entry of cement-based products into surface watercourses represent a risk to freshwater ecology along the Proposed Grid Connection underground cabling route.

At the Proposed Wind Farm site, there are 2 no. potential pathways for surface water effects (Ballyconra stream field drain and Archerstown stream), furthermore the release of cement-based products to the Site drainage system could potentially percolate to ground, given the overall high effective recharge at the Site. Batching of wet concrete on Site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution to surface waters and to the underlying groundwater system. Mitigation measures will be put in place to protect water quality.

Pathway: *Proposed Wind Farm:* Site drainage network/ recharge to groundwater.

Proposed Grid Connection: Nearby surface watercourses

Receptor: *Proposed Wind Farm:* Surface water in Ballyconra stream and Archerstown stream. Groundwater within the underlying Lisdowney and Durrow GWB.

Proposed Grid Connection: Groundwater (River Nore Upper Sand & Gravel Aquifer) and Downgradient surface water bodies – River Nore.

Pre-Mitigation Potential Impact: *Proposed Wind Farm:* Indirect, negative, moderate, short term, very unlikely impact to surface water and groundwater within the Wind Farm Site.

Proposed Grid Connection: Indirect, negative, moderate, short term, unlikely impact to surface water or groundwater along/near the Grid Connection underground cabling route.

Proposed Mitigation Measures:

The following mitigation measures are proposed for the Proposed Wind Farm site and the Proposed Grid Connection underground cabling route:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and emplacement of pre-cast elements, will take place;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds;
- Weather forecasting will be used to plan dry days for pouring concrete;
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event; and,
- Sand blinding, Damp-proof Membrane (DPM) and concrete blinding are to be provided at turbine formation level to create a vertical cut-off barrier and to mitigate the risk of concrete leakage into the ground below the turbine foundations.

Residual Impact: Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect during the construction of the Proposed Development will be - Negative, imperceptible, indirect, short term, unlikely effect on surface and groundwater quality.

Significance of the Effect: For the reasons outlined above, no significant effects on surface water quality will occur.

6.2.1.2.11 *Potential Effects from Morphological Changes to Surface Watercourses within the Proposed Wind Farm*

As part of the Proposed ~~Project~~ Development, there is 1 no. watercourse crossing location within the Wind Farm Site over a field drain which leads to the Ballyconra stream. The crossing location is outlined below:

- Wind Farm Site - A new proposed crossing over a field drain which leads to the mapped Ballyconra stream (mapped by EPA as beginning 500m south of T8). This crossing is ~50m north of turbine T8 at E241958, N172960.

Pathway: Site drainage network.

Receptors: Wind Farm Site – Surface Waters (Ballyconra stream)

Pre-Mitigation Potential Effect: Negative, moderate, direct, long-term, likely effect on surface water flows, local stream morphology and surface water quality.

Proposed Mitigation Measures:

The Proposed ~~Project~~ Development design has been optimised to utilise the existing infrastructure (i.e. existing site roads) where practicable. Only 1 no. new crossing is proposed. Due to the existing hydrological/hydrogeological regimen, characterised by high recharge through the soils/subsoils, there is a very limited site drainage network.

Mitigation measures for the crossings are detailed below:

- The proposed new stream crossing will be clear span crossing and the existing banks will remain undisturbed. No in-stream excavation works are proposed at these locations and therefore there will be no direct impact on the stream at the proposed crossing locations. Abutments will be constructed from precast units combined with in-situ foundations;
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)[22] is incorporated into the design of the proposed crossings;
- All drainage measures will be installed in advance of the works;
- Plant and equipment will not be permitted to track across the watercourse;
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required;
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse;
- Once the foundation base has been completed, the clear-span structure will be installed with no contact with the watercourse;
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations;
- Underground cabling ducting will be contained within the road make-up of the proposed crossing;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase; and,
- All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

The watercourse crossing will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Confirmatory inspections of the proposed new watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

Residual Effect: Proven and effective measures to protect water quality have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, long-term, unlikely effect on downstream water quality and aquatic habitats.

[22] *Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

Significance of Effects: For the reasons outlined above, no significant effects on stream morphology or stream water quality will occur at crossing locations.

6.2.1.2.12 *Potential Effects from Morphological Changes to Surface Watercourses along the Proposed Grid Connection Cabling Route*

The Proposed Grid Connection underground cabling route includes a total of 1 no. new crossing over the River Nore. The new proposed crossing over the River Nore is proposed near E243985, N171860, 250m south of the Tirlán plant.

The proposed crossing method is as follows:

- Horizontal Directional Drilling (HDD) will be completed at the new proposed crossing. HDD is required due to the span, depth and volume of the river, along with the sensitive nature of the River Nore (as a designated site – River Barrow and River Nore SAC). Horizontal drilling will be started ~50m from the river bank and finished ~50m from the opposing bank to allow for a buffer zone to the works;
-

The HDD method of duct installation will be carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant, for the directional drilling at the proposed crossing. The launch and reception pits will be approximately 0.55m wide, 2.5m long and 1.5m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod, and the operator shall commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore shall continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the Site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch and reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exits.

Pathways: Runoff and surface water flowpaths.

Receptors: River Nore and associated water-dependent ecosystem.

Pre-Mitigation Potential Effect: Negative, moderate, indirect, temporary, likely effect on downstream surface water flows and surface water quality.

Prior to the commencement of cable trenching or crossing works the following key temporary drainage measures will be installed:

- A double silt fence perimeter will be placed along the road verge on the down-slope side of any works areas that are located inside the watercourse 50m buffer zone;
- Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions;
- The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material / equipment or overnight parking of machinery inside the hydrological buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed between the works area and the River Nore;
- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be cleaned up immediately and contained in an adequately sized skip before been taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed settlement pond area at least 50m from the watercourse;
- The discharge of water onto vegetated ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire infiltration area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion;
- The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,

- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.
-

Residual Effect: Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect will be a negative, imperceptible, direct, short term, likely effect on surface water flows and surface water quality.

Significance of Effects: For the reasons outlined above, no significant effects on surface water flows and surface water quality will occur.

6.2.1.3 Operation

6.2.1.3.1 *Progressive Replacement of Natural Ground Surface with Lower Permeability Surfaces*

Proposed Wind Farm

Progressive replacement of the vegetated surface with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network, if the drainage design included surface water runoff leaving the Site. However, at this site, the drainage design has been optimised to allow for all rainfall which may fall on impermeable surfaces (such as at turbine hardstands) to recharge to ground as would normally occur at the Site.

Proposed Grid Connection

Along the Proposed Grid Connection underground cabling route, a trench will be excavated for the emplacement of the grid connection cabling. Once installed, this trench will be backfilled and the road surface or soil/subsoil reinstated. As such, there will be no change in the permeability along this route.

Pathway: Proposed Wind Farm site drainage network and recharge to underlying groundwater in the Durrow GWB and Lisdowney GWB.

Proposed Grid Connection underground cabling route – excavate and reinstate.

Receptor: Underlying groundwater aquifers.

Pre-Mitigation Potential Impact: Indirect, negative, slight, permanent, unlikely effect on groundwater quality and quantity within the Durrow GWB and the Lisdowney GWB.

Impact Assessment/Mitigation Measures

As summarised in Section 9.3.14 and outlined in detail in Appendix 9-7 of Chapter 9 (Hydrology) in the EIAR, the drainage design for the Proposed Wind Farm includes for the release of any surface water captured within the interceptor drains to recharge back to ground, with a very nominal spatial diversion of the water (10's of metres). In doing so, all rainfall which falls on the Site will still infiltrate to ground. There will be no net increase in runoff from the Proposed Wind Farm site or along the Proposed Grid Connection underground cabling route.

Proposed Mitigation by Design:

Proposed Wind Farm site

The operational phase drainage system of the Proposed Wind Farm site will be installed and constructed in conjunction with the road and hardstanding construction work as described below:

- Interceptor drains will be installed up-gradient of 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 slowly re-distributed over the ground surface and infiltrate through the soil and subsoils;
- Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the Proposed Wind Farm site, likely to have entrained suspended sediment, and channel it to infiltration areas for sediment settling; and,
- Check dams will be used along sections of access road drains to attenuate flows and intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock.

Proposed Grid Connection

The trench associated with the Proposed Grid Connection underground cabling route will be backfilled and reinstated following the laying of the cable. As such, the permeability of the ground will remain unchanged.

Residual Impact:

Proposed Wind Farm site

Due to the retention of the groundwater recharge regime, with no increase in surface water drainage from the Proposed Wind Farm site, as well as the relative short displacement of any surface water before natural infiltration occurs and the mitigation measures to ensure the quality of the surface water, the residual effect is considered to be - indirect, negative, imperceptible, permanent, very unlikely effect on groundwater quality and quantity within the Durrow GWB and Lisdowney GWB.

Proposed Grid Connection underground cabling route

Due to the temporary and transient nature of the works along the grid route and the reinstatement of the ground following completion of the cable laying, the residual effect is considered to be – no effect on groundwater quality and quantity.

Significance of Effects: No significant effects on surface water and groundwater quality or quantity are anticipated during the operational phase of the Proposed ~~Project~~ Development.

6.2.1.3.2 Potential Hydrological and Hydrogeological Effects on Designated Sites

The potential water environment effects on designated sites from the Proposed ~~Project~~ Development are principally related to the construction process, through potential sources such as sediment generation, cement-based materials and hydrocarbon spillages and potential pathways created during the excavation and movement of soils/subsoils and in some cases bedrock.

During the operational phase of the Proposed ~~Project~~ Development, these potential sources and pathways no longer exist. Any potential effects then on designated sites are related to the operational maintenance of the wind farm infrastructure.

Pathway: Rainfall infiltration through soils/subsoils and groundwater flow towards designated sites

Receptor(s): River Barrow and River Nore SAC, River Nore SPA

Pre-Mitigation Potential Impact: Indirect, negative, moderate, short term, unlikely impact to designated sites.

Mitigation Measures:

Mitigation measures to protect designated sites during the operational phase of the Proposed ~~Project~~ Development include:

- Regular maintenance of the on-site drainage system. The maintenance schedule will be reduced once natural vegetation is re-established, which will provide consistent filtration through the soil/subsoil;
- The use of fuel storage bunds for any hydrocarbons (fuel/oils) and the ongoing maintenance of the bund structures; and,
- Any maintenance works which may involve soil movement (such as the removal of sediment from the settlement ponds) will take place during the dry months of the year (May - September).

Residual Effect: Based on the considerable reduction in the potential sources of effects during the operational phase, as well as the ongoing mitigation measures the residual effect is considered to be – No effect.

Significance of Effects: None.

6.2.1.4 Decommissioning

Decommissioning is fully described in Chapter 4 (Section 4.9) of the EIAR which accompanies this application. There will be no additional habitat loss associated with the decommissioning of the Proposed Development and therefore there will be no significant effects in this regard.

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of the operational life of the wind farm, the wind turbines may be retained and the operational life extended or replaced with a new set of turbines, subject to planning permission being obtained. In the event that neither of the above options are implemented, the Proposed Development will be decommissioned fully as agreed with the Planning Authority. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Seskin Renewables Wind Farm, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the Proposed Development by the time the decommissioning of the Proposed Development is to be considered, and therefore it may be more appropriate to leave the Site roads in situ for future use. It is envisaged that the roads will provide a useful means of transport as agricultural roads for the pastoral farming on the Site.

The underground grid connection cabling and on-site substation will remain in place as it will be under the ownership and control of the ESB and Eirgrid.

A Decommissioning Plan has been prepared and included as Appendix 4-5 of this EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the proposed renewable energy development have been assessed in this EIAR.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Development to result in significant effects on biodiversity.

6.2.2 Impacts to Kingfisher- Disturbance

No kingfisher nesting sites were recorded within or in proximity to the location of the proposed crossing of the Proposed Grid Connection underground cabling route beneath the River Nore by HDD. Therefore, there will be no significant effects on breeding kingfisher due to disturbance.

However, the river at this location provides suitable habitat for commuting and foraging Kingfisher. Noise and vibration surveys carried out by AWN have revealed that the baseline noise levels at the proposed HDD location were measured in the range of 62 dB. Regarding the predicted noise levels associated with the proposed HDD works, noise levels vary with, among other things, the site conditions, but are predicted to be slightly above baseline noise levels, i.e. approx. 77 dB at a distance of 10m from the source (i.e. from the HDD rig). This is a moderate to low noise stimulus as per Cutts et al. (2013) criteria. The launch pit of the proposed HDD will be in excess of 50m from the River Nore, within agricultural grassland habitat, at which point noise levels associated with the HDD works would be below baseline noise (e.g. 60 dB at a distance of 40m).

Disturbance (visual and noise) has been observed in this species within 50-100m (Goodship & Furness, 2022). There is, therefore, a noise/vibration stimulus within this potential zone of disturbance, i.e. within 50-100m.

As previously outlined, there are no kingfisher breeding sites within this potential zone of disturbance; therefore, no adverse effects on breeding sites are predicted for the SPA.

While it cannot be ruled out that kingfisher forage within the zone of potential disturbance (i.e. within 50-100m of the HDD location), the likelihood is that they do not. The rationale for this is that there is an uneven distribution of the species in the River Nore. As outlined in the SPA site conservation objectives[23], in 2010, densities of 0.10-0.14 territories/km length of channel were recorded for this site (Cummins et al., 2010). Despite the low rate of occurrence in a given 1km length of channel, following the precautionary principle, foraging cannot be ruled out locally. Without intervention, following the precautionary principle, adverse effects cannot therefore be ruled out for the foraging kingfisher of the SPA at the HDD crossing point.

To avoid potential adverse effects with regard to potential disturbance effects on this SCI species, the following mitigation measure is prescribed:

- The HDD works proposed beneath the River Nore will be undertaken outside the bird nesting season (i.e. outside March and July inclusive). This measure will effectively eliminate any possibility of an adverse effect for kingfisher during the breeding season.

Notwithstanding the above, the following additional mitigation measure is prescribed:

- A pre-commencement kingfisher survey will be undertaken prior to any HDD works to confirm the absence of kingfisher nest sites within 100m (i.e. the upper end of the predicted zone of influence for noise effects) of the proposed crossing point. If breeding sites are identified and occupancy confirmed, all construction works within 100m will be suspended until the nest is no longer occupied.

[23] *https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004233.pdf*

7. ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

The potential for residual adverse effects on each of the individual relevant Qualifying Features of the Screened In European Sites following the implementation of mitigation, is assessed in this section of the report.

Based on the above, in view of best scientific knowledge, on the basis of objective information, there is no potential for adverse effect on the identified QIs/SCIs and their associated targets and attributes, or on any European Site Potential pathways for effect have been robustly blocked through measures to avoid impacts and the incorporation of best practice/mitigation measures into the project design.

Taking cognisance of measures to avoid impacts and best practice/mitigation measures incorporated into the project design which are considered in the preceding section, the Proposed Development will not have an adverse effect on the integrity of any European Site.

The Proposed Development will not prevent the QIs/SCIs of European Sites from achieving/maintaining/ restoring favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

> *'conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2; The conservation status will be taken as 'favourable' when:*
>
> - *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
> - *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
> - *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.'*

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Development will not adversely affect the Qualifying Interests/SCI species associated with any European Sites including the following:

- River Barrow and River Nore SAC
- River Nore SPA

8. IN-COMBINATION EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This assessment focuses on the potential for cumulative in-combination effects on the European Sites where potential for adverse effects was identified in Section 5 of this report. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects. A list of the plans and projects considered is provided in Appendix 4. The following Development Plans have been reviewed and taken into consideration as part of this assessment and the review is provided in Appendix 4:

8.1 Assessment of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Laois County Council Development Plan 2021 - 2027
- Kilkenny City and County Development Plan 2021-2027
- 4th National Biodiversity Action Plan 2023-2027
- Regional Spatial and Economic Strategy for the Southern Region (2020-2032)

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of Annex I habitats were also reviewed. No potential for in-combination effects were identified between the Proposed Development in-combination with the aforementioned plans.

8.2 Assessment of Projects

Assessment material for this in-combination impact assessment was compiled on the relevant developments within the vicinity of the Proposed ~~Project~~ Development and was verified in May 2025. The material was gathered through a search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. All relevant projects were considered in relation to the potential for in-combination effects. All relevant data was reviewed (e.g. individual NIS, EISs/EIARs, layouts, drawings etc.) for all relevant projects where available.

The plans and projects considered include those listed in Appendix 4. The residual construction, operational and decommissioning impacts of the Proposed ~~Project~~ Development are considered cumulatively with other plans and projects. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed ~~Project~~ Development and those that could potentially result in impacts on SCI bird species, surface water, groundwater and QI habitats and species.

Table 6-22: Cumulative Study Areas in relation to ecological receptors (birds are assessed separately within Chapter 7 of this EIAR)

Individual Topic	Maximum Extent	Justification
Biodiversity (including Bats)	10 km from the Proposed Wind Farm	Using the precautionary approach and given the nature and scale of the Proposed Development, the geographical boundary for terrestrial ecological aspects, i.e. habitats, is 10 km for cumulative

Individual Topic	Maximum Extent	Justification
	200 m from Proposed Grid Connection Route. Consideration for the Biodiversity cumulative extent is also given to the Birds and Water Cumulative geographical boundaries.	assessment for the Proposed Wind Farm and 200 m from the Proposed Grid Connection Route.
Water	**Proposed Wind Farm:** Nore Catchment for large infrastructural developments such as wind farms, energy and public transport developments. River Sub Basins for all smaller proposed, permitted or existing plans or projects (i.e. private and commercial type developments). **Proposed Grid Connection Route:** Within a 200m buffer zone of the Proposed Grid Connection Route.	Regional surface water catchments are used for cumulative impact assessment with regard large infrastructural developments such as wind farms, energy and public transport developments. The potential for cumulative effects for these developments likely exists on a regional catchment scale (i.e. significant works likely existing in several sub-basins). Therefore, other wind-farm developments are considered within the Shannon Catchment for cumulative effects. River Sub Basins are used for smaller developments (i.e. private & commercial type developments). These developments are not likely to present a significant cumulative impact risk on a regional catchment scale as any effects would likely be imperceptible as a result of the setback distances and localised nature of the associated works. Given the nature and scale of the proposed works and the lack of hydrological cumulative impact potential beyond the river sub basin scale, the Water cumulative study area is defined by river sub basins in which the Proposed Wind Farm is located. Due to the narrow nature of the Proposed Grid Connection Route trench (~0.6m wide), a 200m buffer zone is an appropriate scale when considering potential cumulative effects on the water environment.

8.2.1 Proposed Grid Connection Underground Cabling Route

A desk-based planning search was undertaken to identify permitted developments within 500m vicinity of the Proposed Grid Connection Route. The projects within this boundary are provided in Appendix 4. 40 projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, as well as agriculture and energy and telecoms. Projects with the potential for in-combination effects were reviewed in detail and included the following:

- Ballyragget & Parksgrove Solar PV Farms: cable connection. The NIS for this project[24] was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Nore SPA (disturbance and reduction in water quality effects on Kingfisher) and River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed ~~Project~~ Development specifically in relation to the River Nore SPA and River Barrow and River Nore SAC were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for Ballyragget & Parksgrove Solar PV Farms: cable connection no potential for in-combination effects were identified.

- Ballynalacken Wind Farm project. The NIS for this project[25] was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Nore SPA (disturbance and reduction in water quality effects on Kingfisher) and River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed ~~Project~~ Developmentspecifically in relation to the River Nore SPA and River Barrow and River Nore SAC were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for Ballynalacken Wind Farm project no potential for in-combination effects were identified.

- Briskalagh Renewable Energy Development. The NIS for this project[26] was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Nore SPA (disturbance and reduction in water quality effects on Kingfisher) and River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed ~~Project~~ Development specifically in relation to the River Nore SPA and River Barrow and River Nore SAC were initially identified. However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for Briskalagh Renewable Energy Development no potential for in-combination effects were identified.

[24] https://idocsweb.kilkenny.ie/ViewFiles.aspx?docid=329879&format=djvu (Accessed 10/06/2025)
[25] https://www.pleanala.ie/publicaccess/EIAR-NIS/322069/Volume%20E%20-%20Appropriate%20Assessment%20Report%202025/Appropriate%20Assessment%20(AA)%20Report%202025.pdf (Accessed 10/06/2025)
[26] https://idocsweb.kilkenny.ie/ViewFiles.aspx?docid=424274&format=djvu (Accessed 10/06/2025)

8.2.2 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 10-kilometre radius of the Proposed ~~Project~~ Development area were considered in further detail below. Details of wind farm projects within 25km of the Proposed ~~Project~~ Development are provided in Appendix 4 and are summarised below. Three wind farms were identified within the cumulative study boundary.

Table 8-1 Wind farm projects within 25k of the Proposed ~~Project~~ Development

Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)	County
Lisdowney Wind Farm	Existing	4	c.4.1km	Co. Kilkenny
Ballynalacken Wind Farm	Proposed	12	c.5.6km	Co. Kilkenny
Pinewoods Wind Farm	Permitted	11	c.9.9km	Co. Laois/ Co. Kilkenny

8.2.2.1 Lisdowney Wind Farm

Lisdowney Wind Farm is an existing wind farm consisting of 4 no. turbines and is approx. 4.1km from the Proposed ~~Project~~ Development site. The Lisdowney wind farm has already been constructed and as such there is no potential for in-combination effects with the Proposed ~~Project~~ Development which identified the potential for significant effects on downstream European sites during construction (in the absence of mitigation). No potential for in-combination effects given the projects will not be constructed at the same time.

8.2.2.2 Ballynalacken Wind Farm

This wind farm consists of 11 no. turbines and is approx. 9.9km from the Proposed ~~Project~~ Development site. The site of the Ballynalacken Wind Farm and that of the Proposed ~~Project~~ Development are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the Ballynalacken Wind Farm project[27] was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Nore SPA (disturbance and reduction in water quality effects on Kingfisher) and River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed ~~Project~~ Development specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation

[27] https://www.pleanala.ie/publicaccess/EIAR-NIS/322069/Volume%20E%20-%20Appropriate%20Assessment%20Report%202025/Appropriate%20Assessment%20(AA)%20Report%202025.pdf *(Accessed 10/06/2025)*

measures outlined within this NIS and the mitigation measures outlined within the NIS for the Ballynalacken Wind Farm **no potential for in-combination effects were identified.**

8.2.2.3 Pinewood Wind Farm

This wind farm consists of 11 no. turbines and is approx. 9.9km from the Proposed ~~Project~~ Development site. The site of the Pinewood Wind Farm and that of the Proposed ~~Project~~ Development are both hydrologically linked to the River Barrow and River Nore SAC and River Nore SPA. The NIS for the Pinewood Wind Farm project[28] was reviewed as part of this assessment. The AA Screening for the project identified potential for likely significant effects on the River Barrow and River Nore SAC (reduction in water quality from release of suspended solids and/or other pollutants into the surface water system). As such the potential for in-combination effects with the Proposed ~~Project~~ Development specifically in relation to the River Barrow and River Nore SAC were initially identified (construction related impacts on water quality). However, with the implementation of mitigation measures outlined within this NIS and the mitigation measures outlined within the NIS for the Pinewood Wind Farm **no potential for in-combination effects were identified.**

8.2.3 Other Projects within the Hydrological Sub catchment

The following paragraphs in Section 8.2.3.1 to 8.2.3.4 are extracted from the hydrological cumulative impact assessment from Chapter 9 of the accompanying EIAR (provided as Appendix 3).

This section presents an assessment of the potential cumulative effects associated with the Proposed ~~Project~~ Development and other developments (existing and/or proposed) on the hydrological and hydrogeological environment.

The main likelihood of cumulative effects is assessed to be associated with the hydrogeological environment, and to a lesser extent the surface water environment (as there is a lack of surface watercourses at the Proposed Development site).

The primary potential for cumulative effects will occur during the construction phase of the Proposed ~~Project~~ Development as this is when earthworks and excavations will be undertaken at the Site. The potential for cumulative effects during the operational phase of the Proposed ~~Project~~ Development will be significantly reduced as there will be no exposed excavations, there will be no sources of sediment to reach watercourses, there will be no use of cementitious materials and fuels/oil will be kept to a minimum at the Site. During the decommissioning phase, the potential cumulative effects are similar to the construction phase, but to a lesser degree with less ground disturbance.

A cumulative hydrological and hydrogeological study area has been delineated and is shown in Figure 9-16 of Chapter 9 of the accompanying EIAR.

The hydrological cumulative study area is delineated as follows:

- The northwestern boundary is delineated by the high ground of the Cullahill mountains which from a ridgeline which also makes up the northwestern boundary of the Lisdowney_010 river sub-basin.
- The remaining land area within the cumulative boundary to the south contains the river sub-basins of the Lisdowney_010, the Nore_120 (west of the River Nore), the Nore_130 (west of the River Nore), and the Nore_140;
- The eastern boundary of the cumulative area is delineated by the River Nore;

[28] https://pinewoodswindfarmsubstationsid.ie/wp-content/uploads/2024/09/10.-Natura-Impact-Statement.pdf *(Accessed 10/06/2025)*

- A further assessment has been completed within a 200m zone of the Proposed Grid Connection. Due to the shallow nature of the underground cabling connection trench, a 200m buffer zone is an appropriate scale when considering potential cumulative effects on the water environment.

8.2.3.1 Cumulative Effects with Agriculture

The delineated cumulative study area is a largely agricultural area.

Agriculture is the largest pressure on water quality in Ireland. Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative effect on local and downstream surface water quality.

In an unmitigated scenario the Proposed ~~Project~~ Development would have the potential to interact with these agricultural activities and contribute to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

However, the mitigation measures detailed above in Section 9.4.2, 9.4.3 and 9.4.4 for the construction, operation and decommissioning phases of the Proposed ~~Project~~ Development will ensure the protection of downstream surface water quality.

For these reasons it is considered that there will not be a significant cumulative effect associated with agricultural activities.

8.2.3.2 Cumulative Effects with Other ~~Wind Farm~~ Renewable Energy Developments

There are no other proposed wind farm developments within the hydrological cumulative study area.

There is 1 no. existing wind farm, the Lisdowney Wind Farm, which exists towards the southern border of the Hydrological Cumulative study area. As construction is complete at this wind farm, there will be no significant cumulative effects.

There is 1 no. solar farm (PL:23/60330), with permission granted, located~1km south of the Proposed Wind Farm site. This application is for planning permission for this solar farm with an associated above ground grid connection. Having reviewed this planning application and the elements proposed, there is no potential for hydrological cumulative effects as a result of this proposed solar farm development with the Seskin Renewable Energy Development.

8.2.3.3 Cumulative Effects with Other Wind Farm Grid Connections

A study was completed to identify any grid connection routes associated with other wind farm developments which overlap with the Proposed Grid Connection underground cabling route. From this study, the following overlaps were recorded:

~130m overlap with the grid connection underground cabling route associated with the proposed Briskalagh Wind Farm. The overlap occurs along the N77. Both grid connections are proposed to cross the Nore via HDD at different locations;

The greatest potential for cumulative effects to occur would be if the construction phase of the underground grid connection routes overlapped with each other. In an unmitigated scenario, there may be some cumulative effects on the downstream receiving watercourses. However, practicalities will make it highly unlikely that the construction phase of the overlapping sections of the grid connections

would occur at the same time as this would result in road closures (two trenches being excavated). Therefore, the overlapping sections of the grid connections cannot be built at the same time.

Furthermore, the EIARs for the above wind farm development detail potential hydrological and hydrogeological issues relating to the construction of the grid connection underground cabling routes. The EIARs propose a suite of best practice mitigation measures designed to ensure that the construction of the grid connection underground cabling routes do not in any way have a negative effect on downstream surface water quality and quantity. Similarly, the mitigation and best practice measures proposed in this EIAR chapter will ensure that the construction of the Proposed Grid Connection does not have the potential to result in significant effects on the hydrological/hydrogeological environment.

Therefore, with the implementation of the proposed mitigation measures (both for the Proposed ~~Project~~ Development and for the other grid connections) there will be no cumulative effects associated with the construction, operational or decommissioning phases of the Proposed ~~Project~~ Development and other grid connections within the cumulative study area.

8.2.3.4 Cumulative Effects with Other Developments

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area for the Proposed Wind Farm site and the Proposed Grid Connection described above.

The planning applications identified within the study area for new dwellings or renovations of existing dwellings, associated wastewater treatment systems as well as for the erection of farm buildings. The planning applications have been reviewed based on their type, scale and proximity to the Proposed Wind Farm site. Based on the scale of the works, their proximity to the Proposed Wind Farm site and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed ~~Project~~ Development (construction, operation and decommissioning phases).

A desk study of planning applications within 200m of the Proposed Grid Connection was undertaken. The majority of these applications relate to the construction or renovation/extension of domestic dwellings, which will not generate potential cumulative effects due to their scale. However, in the vicinity of Ballyragget substation there are applications for the construction battery energy storage systems. A hydrological and hydrogeological assessment report and drainage strategy was submitted along with the Environmental Report for the Power Reserve Project at Ballyragget. This report detailed mitigation measures for the protection of the hydrological and hydrogeological environment through all phases of the development.

The works along the Proposed Grid Connection are minor and transient, similar to roadworks being completed across the country and have no potential for significant cumulative effects on the hydrological or hydrogeological environment.

Construction Phase

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within a combined river sub-basin zone within the vicinity of the Site defined within Appendix 2-3 of the EIAR.

A dataset of 3,910 no. planning applications within the defined potential cumulative boundary (defined by boundaries of downgradient water catchments) has been completed. Of the 3,910 no. applications, 406 no. applications are for agricultural buildings, typically slatted sheds and milking parlors. There are 163 no. commercial units within the dataset and 2,288 no. residential dwellings. There are 22 no. wind farms listed within 25km of the Site, however apart from the Lisdowney Wind Farm considered in Section 9.3.5.3 above, no other wind farm is located within the delineated hydrological cumulative area.

Based on the scale of the works, their proximity to the Proposed Development and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Development.

Operational Phase

During the operational phase of the proposed development, the main sources of potential environmental effects will not exist. There will be no exposed excavations and spoil management will not be in operation. There will be no sources of sediment to reach watercourses. There will be no use of cementitious materials. Fuels/oil will be kept to a minimum at the site. Any oils for turbine maintenance will be stored within bunded areas.

The underground electrical connection cabling route will be reinstated at the end of the construction phase and will remain in-situ during the operational phase. No maintenance of the electrical cabling is envisaged, however any minor maintenance will be completed from inspection points along the route.

During the operational phase of the project, there will be no cumulative effects with other planned projects (as listed in Section 2.13 of Chapter 2) within the sub-basin catchment zone).

Decommissioning

During the decommissioning phase, the potential cumulative effects are similar to the construction phase, but to a lesser degree with less ground disturbance. The substation and grid connection will remain in-situ and will not be decommissioned. There will be increased trafficking and an increased risk of disturbance to underlying soils at the Wind Farm Site, during the decommissioning phase. Any potential effects would be likely to be less than during the construction stage as the drainage system will be fully mature and would provide additional filtration of runoff. Any diesel or fuel oils stored on site will be bunded. During the decommissioning phase of the Proposed Development, the proposed access tracks may be used in the decommissioning process.

During the decommissioning phase, there will be no cumulative effects within the sub-basin zone.

The hydrological impact assessment undertaken above in this chapter outlines that significant effects will not occur during the construction, operational and decommissioning works.

No significant cumulative effects on the hydrology and hydrogeology environment will occur as a result of the Proposed Development within the Wind Farm Site and the associated Grid Connection underground cabling route.

9. CONCLUDING STATEMENT

This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites. It has also assessed the potential for in-combination effects on European sites with other plans and projects.

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Development does not adversely affect the integrity of European sites.

Therefore, it can be objectively concluded that the Proposed Development, individually or in-combination with other plans or projects, will not adversely affect the integrity of any European Site.

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APPENDIX 1

Planning and Environmental Consultants

Seskin Renewables Wind Farm

Aquatic Baseline Report



DOCUMENT DETAILS

Client:	**Seskin Renewable Energy Ltd.**
Project Title:	**Seskin Renewables Wind Farm**
Project Number:	**231103**
Document Title:	**Aquatic Baseline Report**
Document File Name:	**ABR F – 2025.06.03 – 231103**

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Rev	Status	Date	Author(s)	Approved By
01	Final	03/06/2025	NR	AvdGM

Table of Contents

1. INTRODUCTION 1
1.1 Background 1
1.2 Statement of Authority 1
1.3 Survey Locations 1
2. METHODOLOGIES 5
2.1 River Habitat Assessment 5
2.2 Fisheries Habitat Assessment 5
2.3 Electrofishing Surveys 6
2.4 Macroinvertebrate Surveys 6
2.5 Otter Surveys 7
2.6 eDNA Surveys 7
2.7 Biosecurity Measures 7
3. DESK STUDY 9
3.1 EPA Water Quality. 9
3.2 Salmonid River Status 10
3.3 NPWS Data 11
3.3.1 Freshwater Pearl Mussel 11
3.3.2 White-clawed Crayfish 11
3.3.3 Inland Fisheries Ireland 11
3.3.4 Annex I habitats 11
3.3.5 FPO Macrophytes 11
4. FIELD SURVEY RESULTS 12
4.1 Aquatic Survey Results. 12
4.1.1 Proposed Wind Farm Survey Locations 12
4.1.1.1 WF Survey Site 1 (WF 1) 12
4.1.1.2 WF Survey Site 2 (WF 2) 15
4.1.1.3 WF Survey Site 3 (WF 3) 17
4.1.1.4 WF Survey Site 4 (WF 4) 21
4.1.1.5 WF Survey Site 5 (WF 5) 24
4.1.1.6 WF Survey Site 6 (WF 6) 28
4.1.1.7 WF Survey Site 7 (WF 7) 31
4.1.2 Proposed Grid Connection Survey Locations 35
4.1.2.1 GC Survey Site 1 (GC1) 35
4.2 eDNA Results. 40
4.3 Otter Survey Results 40
5. DISCUSSION 41
5.1 Proposed Wind Farm Aquatic Baseline Assessment 41
5.2 Proposed Grid Connection Route Aquatic Baseline Assessment 42
6. CONCLUSION 43
BIBLIOGRAPHY 44

TABLE OF FIGURES

Figure 1-1. Proposed Wind Farm Survey Locations 3
Figure 1-2. Proposed Grid Connection Survey Locations 4

TABLE OF APPENDICES

Appendix I.....Fish Species found at each survey location electrofishing was conducted on.

Appendix II.....Q-Values assigned across all survey locations.

Appendix III.....eDNA results.

1. INTRODUCTION

1.1 Background

MKO has been appointed to conduct an Aquatic Baseline Survey and subsequent Aquatic Baseline Report for the area within and in the vicinity of the proposed Seskin Wind Farm development (henceforth referred to as 'Proposed Development').

Desk studies and Aquatic Baseline Surveys were undertaken in July and December 2024. This report provides a baseline assessment of the aquatic condition of the lands within and in the vicinity of the Proposed Development and acts as an aquatic baseline record to which future records and monitoring can be compared.

1.2 Statement of Authority

Aquatic Baseline Surveys were undertaken by Aoife Joyce (B.Sc.) and Niamh Rowan (B.Sc.) of MKO on 3rd and 4th July 2024, and by Pat Roberts and Corey Cannon on 19th December 2024 (Otter survey). This report has been prepared by Niamh Rowan and has been reviewed by Aran von der Geest Moroney (B.Sc). Aoife, Niamh, Pat, Corey and Aran have extensive experience in undertaking ecological surveys and assessments for large scale infrastructural projects such as wind farms, railways, roads and flood relief schemes.

1.3 Survey Locations

The aquatic baseline surveys for the Proposed Development (Proposed Wind Farm and Proposed Grid Connection) took place in the vicinity Durrow, Co Laois and Ballyragget and Seskin, Co. Laois. Locations for survey sites in the vicinity of the Proposed Wind Farm are shown in Figure 1-1, locations for the Proposed Grid Connection survey sites are shown in Figure 1-2.

Improved agricultural grassland (GA1) is the dominant habitat in the landscape surrounding the survey locations. Aquatic Baseline surveys undertaken within the vicinity of the Proposed Wind Farm and Proposed Grid Connection covered both low order, upper reach streams and downstream, high order rivers. Nomenclature for surveyed watercourses follows that of the Environmental Protection Agency (EPA).

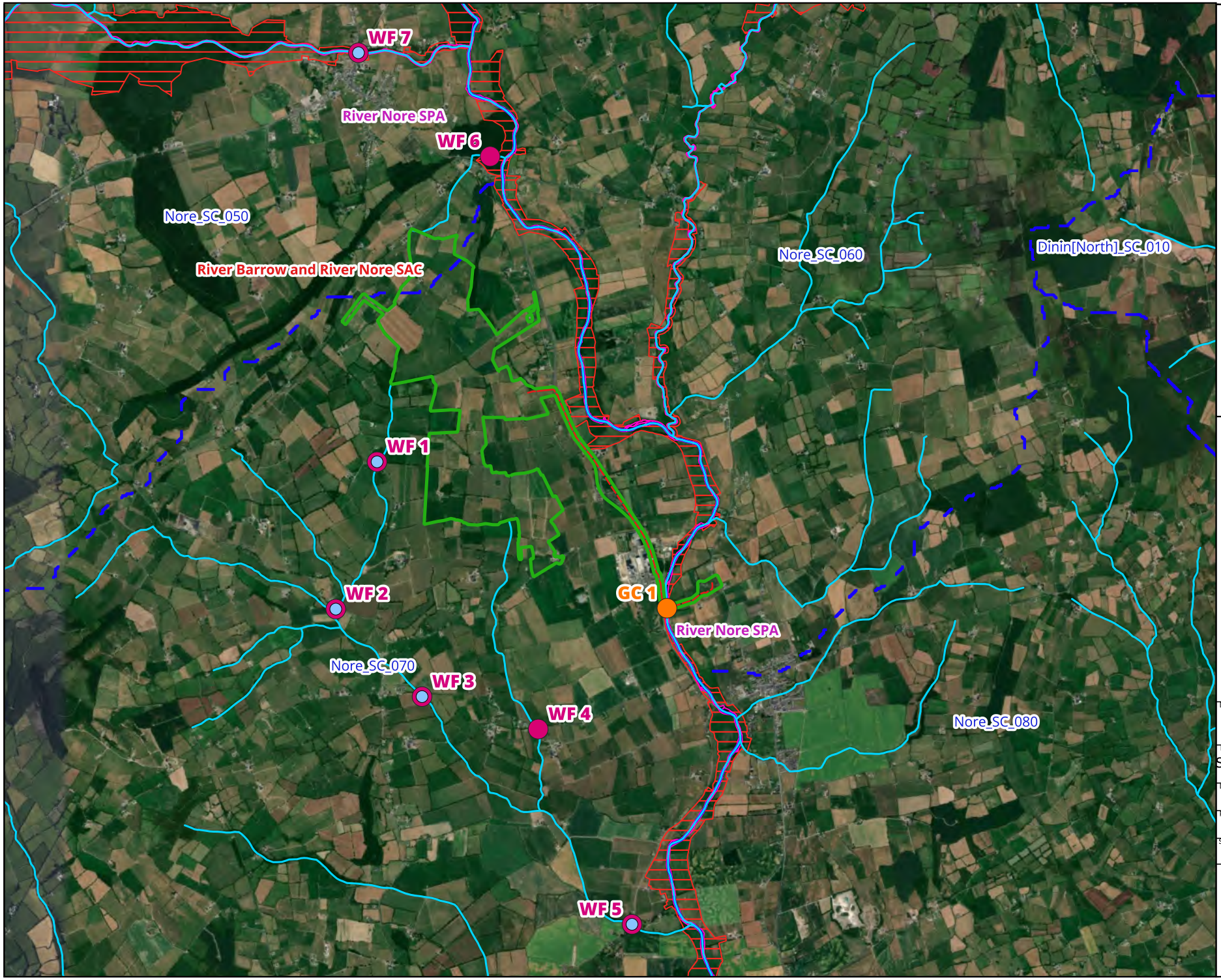
A total of seven Proposed Wind Farm survey sites across four EPA watercourses were selected for assessment (Table 1-1, Figure 1-1). The seven survey sites in the vicinity of the Proposed Wind Farm were located throughout the Nore hydrological catchment (catchment ID: 15), with two sites located within the Nore_SC_050 sub catchment and five sites located within the Nore_SC_070 sub catchment. Surveys were conducted on the Lisdowney_010, Nore_110, Nore_140 and Erkina_050 watercourses.

One survey site, located along River Nore within the within the Nore_SC_060 and Nore_SC_070 sub catchments, was selected for assessment along the Proposed Grid Connection (Table 1-1, Figure 1-2).

Table 1-1. Survey Site Locations within the vicinity of the Proposed Seskin Wind Farm Development.

Site no.	Watercourse	EPA name	EPA code	Hydrological catchment	Hydrological sub catchment	X (ITM)	Y (ITM)
Proposed Wind Farm Survey Locations							
WF 1	Lisdowney_010	Archerstown 15	15A16	Nore	Nore_SC_070	640986	673368
WF 2	Lisdowney_010	Archerstown 15	15A16	Nore	Nore_SC_070	640568	671870
WF 3	Nore_140	Lisdowney Stream	15L02	Nore	Nore_SC_070	641443	670982

WF 4	Nore_140	Ballyconra	15B86	Nore	Nore_SC_070	642622	670652
WF 5	Nore_140	Lisdowney Stream	15L02	Nore	Nore_SC_070	643573	668671
WF 6	Nore_110	Durrow Townparks	15D34	Nore	Nore_SC_050	642134	676464
WF 7	Erkina_050	Erkina	15E01	Nore	Nore_SC_050	640797	677516
Proposed Grid Connection Survey Locations							
GC 1	Nore_120	Nore	15N01	Nore	Nore_SC_060/ Nore_SC_070	643930	671875



Map Legend

- Proposed Wind Farm Survey Sites
- Proposed Grid Connection Survey Sites
- eDNA Survey Sites
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD River Waterbodies
- WFD Hydrological Subcatchments
- EIAR Site Boundary
- Proposed Grid Connection Route

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Drawing Title: Proposed Wind Farm Survey Locations

Project Title: Seskin Renewables Wind Farm

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Project No.	Drawing No.
231103	Figure 1-1
Scale	Date
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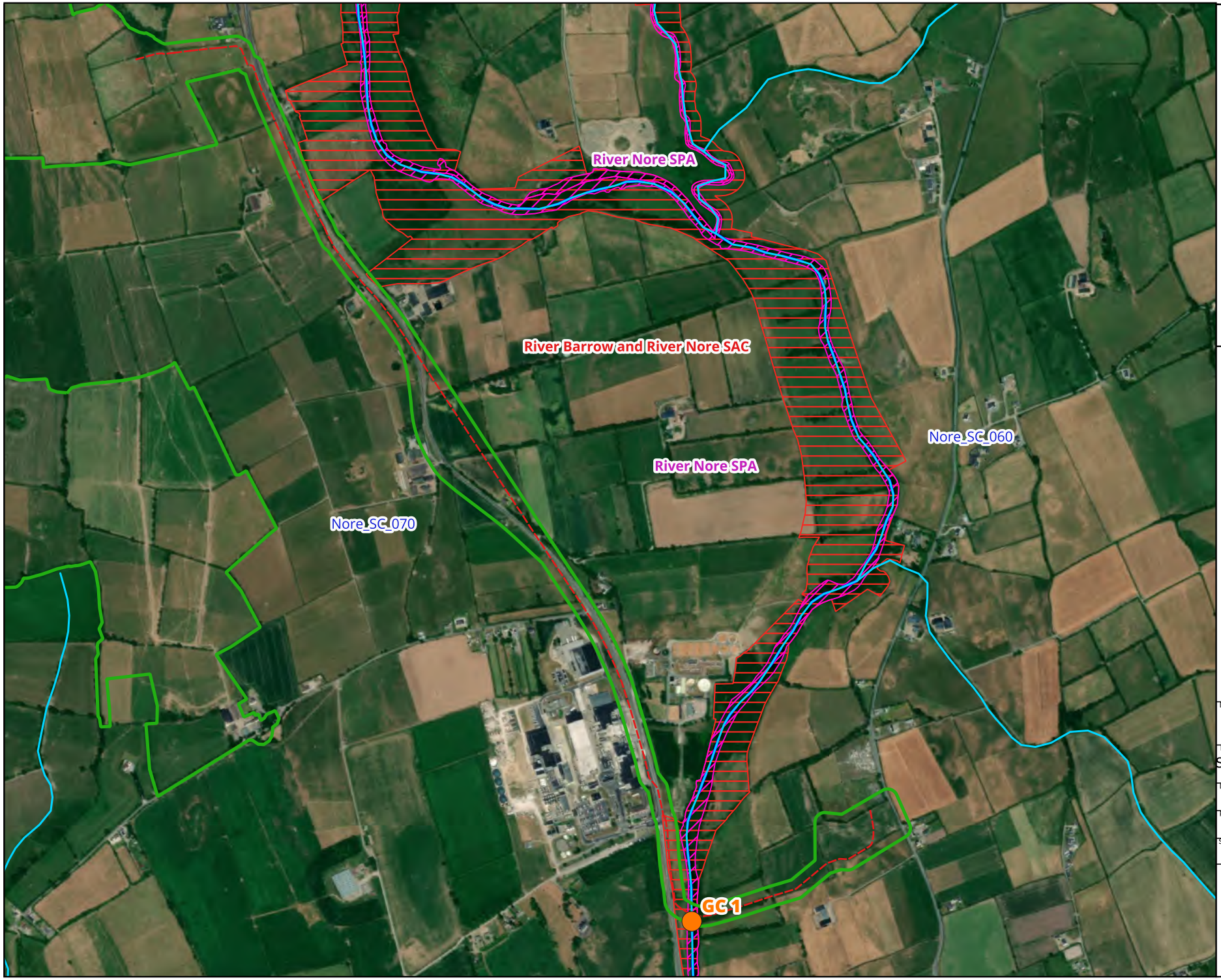

Map Legend

- Proposed Wind Farm Survey Sites
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD River Waterbodies
- WFD Hydrological Subcatchments
- EIAR Site Boundary
- Proposed Grid Connection Route

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Drawing Title
Proposed Grid Connection Survey Location

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
NR	AvdGM
Project No.	Drawing No.
231103	Figure 1-2
Scale	Date
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2. METHODOLOGIES

2.1 River Habitat Assessment

Aquatic Habitat Assessments/ Appraisals were undertaken in order to determine the riverine habitat types present at each of the survey locations within and in the vicinity of the Proposed Development. The survey design and methodologies were derived from current ecological best practice guidance documents. Habitats were classified in accordance with the national habitat classification system used in Ireland - A Guide to Habitats in Ireland (Fossitt, 2000).

Riverine habitat assessments were conducted utilising elements of the following methodologies and literature to characterise the selected sites along the watercourse:

- Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003),
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009),
- Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000).

All sites were assessed in terms of the following variables:

- Channel width and depth.
- Bank profiles, including bank height and composition.
- Substrate type, listing substrate fractions in order of dominance.
- Flow type.
- In-stream macrophyte and aquatic bryophytes occurring and the prominence of each (DAFOR scale).
- Water clarity and colouration.
- Riparian vegetation composition.

The survey was devised to gather ecological baseline information including any habitat features that could potentially support protected Qualifying Interest species associated with EU designated sites within the wider area. In addition, surveys considered the potential presence of problematic invasive alien species, with an emphasis on those species listed on the 'Third Schedule' of Regulations 49 & 50 of the Birds and Natural Habitats Regulations 2011. The assessments have regard to the NRA guidance document - Guidelines on management of noxious weeds and non-native invasive plant species on national roads (National Roads Authority (NRA, 2010)).

During the site visit, additional information on any other species of local biodiversity value occurring within the site was recorded in order to provide a complete baseline understanding of the development site.

2.2 Fisheries Habitat Assessment

An assessment of the riverine habitats at each sample location was undertaken to determine the potential for watercourses within the study area to support fish species, including Salmonids, Lamprey spp., and European eel, among other fish species likely to utilise watercourses within the study area.

Fisheries habitat assessments were conducted utilising elements of the following methodologies and literature to characterise the selected sites along the watercourse:

- Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003)
- Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000).

- 'Channels & Challenges. Enhancing Salmonid Rivers'. Irish Freshwater Fisheries Ecology & Management Series (O'Grady, 2006)
- 'Ecology of the Atlantic Salmon' (Hendry & Cragg-Hine, 2003)
- Life Cycle Unit method (Kennedy, 1984; O'Connor & Kennedy, 2002)
- 'Ecology of the River, Brook, and Sea Lamprey' (Maitland, 2003)
- NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2004; O'Connor, 2006; and O'Connor, 2007)

2.3 Electrofishing Surveys

Electrofishing operations for the purpose of forming baseline fisheries data of the Proposed Wind Farm site were undertaken on the 3rd and 4th July 2024.

A 5- or 10-minute timed electrofishing survey was undertaken at each of the survey locations, to determine the presence/absence of fish species within the study area while adhering to best practice methodology (Electric Fishing in Wadeable Reaches, Central Fisheries Board (CFB, 2008)), as well as European standards for electrofishing (CEN, 2003). Two suitably qualified ecologists conducted electrofishing operations at the electrofishing locations as per Fig 1-1, using an E-fish EF-500B-SYS Electric Fishing Backpack System.

Fish captured during electrofishing operations at each site were kept in a holding container with oxygenated water. Stress to fish via temperature and low oxygen levels via frequent freshwater changes and monitoring of water temperature within the holding container, ensuring temperatures of 20°C were not surpassed. All fish temporarily captured during the survey were identified to species level and measured. All fish temporarily captured were allowed to recover and subsequently returned to the watercourse in the vicinity of where they were collected.

Biosecurity measures were followed as per Section 2.7 below.

2.4 Macroinvertebrate Surveys

A two-minute kick-sample and stone-wash, as well as a 1 min hand search of larger substrata or organic material (e.g., submerged tree limbs/vegetation) was performed at each of the survey locations, as per methodology used by the Environmental Protection Agency (EPA) as part of the Water Framework Directive (WFD) River Monitoring Programme (Toner *et al.,* 2005).

Dislodged fauna were caught in a one metre square standard hand net (250 mm x 250 mm, 300 mm bag depth, 1 mm mesh size) situated downstream of the sampler disturbing the stream/riverbed substrate. The sampler moved upstream and across the channel while performing the kick-sample to ensure all micro-habitats presents within the watercourse were surveyed. All material collected in the net was transferred via rinsing to a white heavy duty plastic tray (485 x 335 x 80mm) filled with water for identification of macroinvertebrates in situ. Large stones and organic material within the sample such as leaves, twigs, algae or bryophytes were examined for any macroinvertebrates present and subsequently removed from the tray.

Specimens present in the sample were identified to the lowest possible taxonomic level using the FBA Guide to Freshwater Invertebrates (Dobson *et al.*, 2012). The Q-value system assigns macroinvertebrate taxonomic groups to one of five WFD status pollution sensitivity groups (from A, most pollution sensitive to E, most pollution tolerant). The Q-value is calculated based on the relative abundance of Pollution Sensitive Group A and B taxa to Pollution Tolerant Group C, D and E taxa within the sample, and the surveyed stretch of watercourse is assigned an associated pollution status. The EPA Quality (Q)-Rating System is summarised in Table 2-1.

Table 2-1. EPA Quality (Q) Rating System.

Biotic Index	Quality Status	Quality Status	Quality Class	Condition
Q5, Q4-5	High	Unpolluted	Class A	Satisfactory
Q4	Good	Unpolluted	Class A	Satisfactory
Q3-4	Moderate	Slightly Polluted	Class B	Unsatisfactory
Q3, Q2-3	Poor	Moderately Polluted	Class C	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously Polluted	Class D	Unsatisfactory

2.5 Otter Surveys

Otter surveys were conducted as per TII/NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all Otter signs, e.g., spraint, scat, prints, slides, trails, couches and holts both upstream and downstream of proposed survey locations. Within the Proposed Wind Farm study area, otter surveys were conducted 150m upstream and downstream of all survey points. Due to the small-scale nature of works proposed to be undertaken along the Proposed Grid Connection, as well as high levels of disturbance from the existing road, Otter surveys were conducted in the vicinity of grid route survey locations. In addition to the width of the rivers, a 10m riparian buffer (both banks) is considered to comprise part of the Otter habitat (NPWS 2009. Threat Response Plan: Otter (2009-2011).

2.6 eDNA Surveys

The Proposed Wind Farm is located almost entirely within the Nore Upper SAC Freshwater Pearl Mussel *(Margaritifera margaritifera)* Catchment, with some of the Proposed Wind Farm and associated survey sites located within the Nore Middle Freshwater Pearl Mussel catchment, classified as having "Other extant populations" of *Margaritifera*. The Proposed Wind Farm and associated survey sites are located downstream of NPWS mapped White-clawed Crayfish *(Austropotamobius pallipes)* records. As such, environmental DNA (eDNA) sampling for both Freshwater Pearl Mussel (FPM) and White-clawed Crayfish (WcC), as well as Crayfish Plague were undertaken in select watercourses within the study area.

To detect populations FPM and WcC, or the presence of Crayfish Plague within the Proposed Wind Farm study area, a composite water sample was collected from the watercourse at each of the selected eDNA survey sites in July 2024 and analysed for FPM, WcC and Crayfish Plague. eDNA sampling sites were strategically chosen to maximise longitudinal (instream) coverage within the catchment, facilitating the likelihood of species detection.

Each composite (500ml) water sample was collected from each watercourse, with 20 x 25ml samples taken along the watercourse, for a representative geographic spread at the site. The composite sample was filtered and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis following return from site.

Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence. Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point.

2.7 Biosecurity Measures

Biosecurity measures which were implemented followed *IFI Biosecurity Protocol for Field Survey Work*, (IFI, 2010). Due to increasingly prevalent spread of crayfish plague in Ireland and to prevent the

spread of aquatic invasive species, all equipment was scrubbed and cleaned prior to and post works with Virkon Aquatic. Additionally, all equipment was cleaned with Virkon Aquatic between survey sites to minimise the potential for the spread of invasives between watercourses/ survey sites. Any instance of invasive species was recorded and conveyed to IFI via electrofishing data returns.

3. DESK STUDY

A Desk Study was conducted to gather baseline information from online sources and records on the aquatic habitats and aquatic dependent species within the vicinity of the survey area.

In preparation of the desk study, the following sources were used to gather information:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA, Water Framework Directive (WFD),
- Review of OS maps and aerial photographs of the survey area.

3.1 EPA Water Quality.

The EPA Envision map viewer was consulted on 2nd July 2024 regarding the water quality status and risk of the rivers which comprise the Proposed Wind Farm and Proposed Grid Connection survey locations.

Table 3-1 presents a summary of the waterbody WFD status for 2013-2018, waterbody WFD status for 2016-2021 and WFD 3rd Cycle River Waterbodies Risk Projection, as well as details of the corresponding Proposed Wind Farm and Proposed Grid Connection survey locations.

Table 3-1. WFD Status and Risk of surveyed watercourses within the vicinity of the Proposed Wind Farm.

Proposed Wind Farm and Proposed Grid Connection survey locations	Watercourse	EPA name	EPA code	Catchment	Sub Catchment	Waterbody WFD Status for 2013-2018	Waterbody WFD Status for 2016-2021	WFD 3rd Cycle River Waterbodies Risk Projection
Proposed Wind Farm Survey Locations								
WF1	Lisdowney_010	Archerstown 15	15A16	Nore	Nore_SC_070	Good	Moderate	At risk
WF 2	Lisdowney_010	Archerstown 15	15A16	Nore	Nore_SC_070			
WF 3	Nore_140	Lisdowney Stream	15L02	Nore	Nore_SC_070	Good	Good	Not at risk
WF 4	Nore_140	Ballyconra	15B86	Nore	Nore_SC_070			
WF 5	Nore_140	Lisdowney Stream	15L02	Nore	Nore_SC_070			
WF 6	Nore_110	Durrow Townparks	15D34	Nore	Nore_SC_050	Good	Good	Not at risk
WF 7	Erkina_050	Erkina	15E01	Nore	Nore_SC_050	Moderate	Moderate	At risk
Proposed Grid Connection Survey Locations								
GC 1	Nore_120	Nore	15N01	Nore	Nore_SC_060/ Nore_SC_070	Good	Moderate	At risk

The EPA Envision map viewer was consulted on 17th December 2024 regarding the water quality status of watercourses which comprise the Proposed Wind Farm and grid route survey locations. There were nine EPA monitoring points within the vicinity of the Proposed Wind Farm and Grid Connection Study areas (Table 3-2).

Table 3-2. EPA Water Quality Data.

Watercourse	Sampling Station	Location	Sampling Year	Q-Value & Water Quality Status
Lisdowny_010 (Lisdowney Stream), 0.55km upstream of survey site WF 3	Bridge North of Lisdowney Crossroads [Station Code: RS15L020100]	E 241096.21, N 171295.01	2022	Q3–4 – Moderate
Nore_140 (Lisdowney Stream), 0.05km upstream of survey site WF 3	Bridge East of Lisdowney Crossroads [Station Code: RS15L020200]	E 241462.38, N 170979.97	1991	Q3 - Poor
Nore_130, 0.9km upstream of confluence with Nore_140	1.5 km d/s Ballyragget [Station Code: RS15N011500]	E 244004, N 169342	1991	Q3–4 – Moderate
Nore_010, 0.35km downstream of survey site WF6	Tallyho Bridge [Station Code: RS15N011300]	E 242319.98, N 176225.61	2022	Q4 - Good
Nore_120, 5.8km downstream of survey site WF 6	Northeast of Ballyconra (u/s of Glanbia) [Station Code: RS15N011380]	E 244169.75, N 172460.47	2020	Q3–4 – Moderate
Nore_120, 7.5km downstream of survey site WF 6, 0.35km upstream of survey site GR 2	0.5 km u/s Ballyragget [Station Code: RS15N011400]	E 244309, N 171108	2020	Q3–4 – Moderate
Nore_130, 7.8km downstream of survey site WF 6, at survey site GR 2	Bridge in Ballyragget [Station Code: RS15N011450]	E 244524.4, N 170820.7	2022	Q4 - Good
Erkina_050 (Erkina), 0.3km upstream of survey site WF 7	Footbridge 0.5 km u/s of Durrow Bridge [Station Code: RS15E010500]	E 240567, N 177481	1991	Q3–4 – Moderate
Erkina_050 (Erkina), 0.05km upstream of survey site WF 7	Durrow Bridge [Station Code: RS15E010550]	E 240891, N 177473	2022	Q3–4 – Moderate

3.2 Salmonid River Status.

Watercourses designated as Salmonid Waters under S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations (1988) are those fresh waters classified under the first schedule, which are *'capable of supporting Salmon (Salmo salar), Trout (Salmo trutta), Char (Salvelinus) and Whitefish (Coregonus)'* species. Survey site GC1 is located along the River Nore, which is a protected river designated under the Salmonid Regulations. Additionally, all Proposed Wind Farm survey sites are located upstream of the mainstem River Nore, with sites WF 5, WF 6 and WF 7 located approx. 0.7km, 0.15km and 1.2km upstream of the confluence of their respective watercourse locations with the mainstem River Nore.

3.3 NPWS Data

3.3.1 Freshwater Pearl Mussel

Proposed Wind Farm aquatic survey locations WF 6 and WF 7 and Proposed Grid Connection survey location GC1 is located within the Nore Upper *Margaritifera* sensitive area, which is listed as catchment of SAC populations of Freshwater Pearl Mussel listed in S.I. 296 of 2009.

The remaining survey sites are located within the Nore Middle catchment, listed as a catchment of other extant populations of Freshwater Pearl Mussel outside of SAC populations.

3.3.2 White-clawed Crayfish

Point distribution incidence of the Annex II and V species White-clawed Crayfish (*Austropotamobius pallipes*) has been recorded by NPWS upstream of the vicinity of the Proposed Wind Farm study area, approx. 5.2km upstream of survey site WF 7, and 12.3km upstream of GC1. There are no records of White-clawed Crayfish within or directly adjacent to the Proposed Wind Farm or Proposed Grid Connection.

3.3.3 Inland Fisheries Ireland

Surveys were conducted by IFI as part of water sampling for the Water Framework Directive, in the immediate vicinity of survey sites WF 3, WF 5 and WF 7 in July-October 2021. Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*), European Eel (*Anguilla anguilla*), Lamprey sp. (*Petromyzontidae*), Minnow (*Phoxinus phoxinus*) and Stone Loach (*Barbatula barbatula*) were recorded during surveys.

3.3.4 Annex I habitats

There are no mapped instances of freshwater Annex I habitats in the immediate vicinity of the Proposed Wind Farm or Proposed Grid Connection study areas. A 94.5ha area of alluvial woodland is located approx. 0.75km upstream of survey site WF 7, and a further 47ha of alluvial woodland is located 5.8km and 7.2km upstream of the mainstem River Nore confluences with the Erkina and Durrow_Townparks watercourses, along which survey sites WF 7 and WF 6 are located, respectively.

3.3.5 FPO Macrophytes

Aquatic plant species protected under the Flora (Protection) Order 2022 (S.I. No. 235/2022) were not recorded within the 10km hectads of S46 or S47.

4. FIELD SURVEY RESULTS

4.1 Aquatic Survey Results.

Aquatic Baseline Surveys undertaken in the vicinity of the Proposed Wind Farm included:

- River habitat assessment,
- Fisheries habitat assessment,
- Electrofishing surveys,
- Macroinvertebrate surveys,
- Otter Surveys,
- eDNA surveys.

Aquatic Baseline Surveys undertaken along the Proposed Grid Connection included:

- River habitat assessment,
- Fisheries habitat assessment,
- Macroinvertebrate surveys,
- Otter Surveys.

Sections 4.1.1 and 4.1.2 summarise survey findings for fisheries, macroinvertebrate and macrophyte assessments at each survey site, as well as the physical attributes and habitats present within each watercourse in the vicinity of the Proposed Wind Farm and Proposed Grid Connection study areas. No significant constraints or limitations in gathering information were encountered.

Appendix I presents a collated record of the species found at each survey location electrofishing was conducted on.

Appendix II presents a collated record of the Q-Values assigned across all survey locations.

4.1.1 Proposed Wind Farm Survey Locations

4.1.1.1 WF Survey Site 1 (WF 1)

Survey site WF 1 was located along the upper reaches of the Archerstown River (EPA code: 15L02, IG Ref.: S 41039 73335). Properties of the watercourse at this sample location are provided in Table 4-1 and a representative photograph of the survey location is shown in Plate 4-1.

This highly modified stretch of **Eroding/Upland River (FW1)** was characterised by a narrow, laterally confined channel with heavily eroded earthen banks. The watercourse profile was comprised of a series of slow flowing, shallow riffle, with sections of standing water with no perceptible flow. Evidence of livestock entry into the watercourse from surrounding pastural land use was indicated by actively poached banks and faecal contamination within the watercourse, resulting in a high degree of siltation, slight brown water colouration and moderately turbid water. Channel substrate was predominantly composed of silt, with isolated areas of heavily compacted cobble and boulder outcrop, also overlain with fine sediments derived from the poached banks.

Water depth was shallow (averaging approx. 0.1m) along the surveyed stretch, with the exception of a silty pool up to 0.3m in depth directly downstream of an under-road 2-span culvert with an instream abutment. The watercourse was also culverted at the downstream survey extent by a concrete pipe culvert and associated concrete livestock crossing.

A sparse vegetative riparian buffer existed between the watercourse margins and surrounding pastural **Wet grassland (GS4).** Emergent and bankside vegetation included Glaucous sedge *(Carex flacca)*, Meadowsweet *(Filipendula ulmaria)*, Perennial ryegrass *(Lolium perenne),* Nettle *(Urtica dioica),* Bramble *(Rubus fructicosus agg.)*, Ribwort Plantain *(Plantago lanceolata),* Creeping buttercup *(Ranunculus repens)*, Daisy *(Bellis perennis),* Crested Dog's-tail *(Cynosurus cristatus),* Yorkshire fog *(Holcus lanatus)*, Hard rush *(Juncus inflexus),* Marsh thistle *(Cirsium palustre)* and *Poa spp.* grass. Submerged and emergent Fool's Watercress *(Heloscadium nodiflorum)* was present along much of the watercourse. The watercourse was unshaded, with no riparian treeline or standalone trees along the entire surveyed stretch.

Table 4-1. Properties of the watercourse at survey location WF 1.

Properties	Record			
Average Depth (m)	0.1			
Average Bank Width (m)	1			
Wet Width (m)	0.6			
Flow	Low			
Colouration	Slightly brown			
Clarity	Slightly turbid			
Bank height (m)	LHB	0.2–0.4	RHB	0.2–0.4
Dominant Substrates	Boulder (>128mm): 5% Cobble (>32–128mm): 30% Gravel (8-32mm): 30% Sand (0.25–2mm): 10% Silt (<0.25mm): 25%			
Substratum Condition	Heavily compacted cobble, loose silt			

Lamprey *spp.* spawning and salmonid spawning and nursery potential were assessed as *Poor* given the given the predominance of larger, compacted substrata, the headwater location and heavy degree of siltation. Sparse marginal sheltering features (undercut earthen banks and overhanging vegetation), submerged Fool's watercress and coarser channel substrate provided occasional instream refuge for juvenile salmonids (namely Brown trout). Limited salmonid nursery habitat was therefore assessed as *Poor*.

European eel and salmonid holding potential were assessed as *Negligible* and *Poor*, respectively given the shallow water depth. Despite the presence of some marginal silt beds, culverts both upstream and downstream of the surveyed stretch of watercourse features may preclude migration of lamprey *spp.* throughout the watercourse, making lamprey ammocoete access to these fine sediment beds unlikely during periods of low flow as observed at the time of survey.

Overall, this site provided *Low* fisheries value to all life cycle stages. However, watercourse connectivity to higher quality spawning, nursery and holding habitat for all fish species may be improved in periods of higher flow, when culverts and other instream barriers are adequately wetted and passable.

No otter signs were observed at site WF 1. Otter foraging and commuting potential for this localised stretch of the Archerstown watercourse was assessed as *Low* due to small watercourse size, limited pray availability (low fisheries habitat value), surrounding active agricultural land use, absence of riparian cover, a shallowly wetted channel and poor overall connectivity as a result of historic channel modifications and culverting.

No kingfisher signs were identified in the vicinity of WF 1, which provided *Negligible* foraging or burrowing habitat for the species.

Results of the 5-minute qualitative electrofishing survey conducted at this site (using methodologies described in Section 2.3) are presented in Table 4-2

Table 4-2. Electrofishing results at survey location WF 1.

Species	Length (cm)
Brown Trout (*Salmo trutta*)	7.5
Brown Trout (*Salmo trutta*)	5.5

Biological water quality based on Q-sampling was calculated as **Q3 – Poor** for survey site WF 1, on the basis of low macroinvertebrate diversity and density. Pollution sensitive Group A and Group B taxa, as well as Group D and E Pollution Tolerant were absent from the sample, with Group C 'Pollution tolerant' taxa dominated by *Gammarus*. Results of Q-Value assessment are summarised in Table 4-3.

Table 4-3. Results of macroinvertebrates sample at survey location WF 1.

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	-	-
Group B – Moderately Pollution Sensitive	-	-
Group C – Pollution Tolerant	*Baetis rhodani*	2
	Chironomidae sp.	2
	Corixidae sp.	5
	Elmidae sp.	3
	Hydracarina sp.	1
	Gammarus sp.	28
Group D – Very Pollution Tolerant	-	-
Group E – Most Pollution Tolerant	-	-



Plate 4-1. A representative image of Survey Site WF 1

4.1.1.2 WF Survey Site 2 (WF 2)

Survey site WF 2 was located along the upper reaches of the Archerstown River (EPA code: 15A16, IG Ref.: S 40620 71840), approx. 0.15km downstream of the confluence between the Archerstown and Aharney watercourses. Properties of the watercourse at this sample location are provided in Table 4-4 and a representative photograph of the survey location is shown in Plate 4-2.

This **Eroding/Upland River (FW1)** displayed evidence of historical channelisation and embankment extending from the left-hand bank into surrounding **Improved agricultural grassland (GA1)**. With the exception of a localised area of deeper pool approx. 0.4m in depth located under the single-span stone arch bridge at the downstream survey extent, average water depth was 0.15m. The watercourse profile comprised low energy, slow flowing glide, with interspersed sections of semi-compacted boulder/cobble-dominant shallow riffle along the survey stretch.

Sloping clay and earthen banks which are likely submerged in periods of higher flow extended into the channel margins from sections of previously poached banks. Wetted channel width ranged from 0.7–2.5m along the survey stretch. Exposed boulder/cobble outcrops and interstitial f finer gravels were heavily overlain with silt, with a high degree of enrichment evident through luxuriant growths of filamentous green algae atop the in-channel substrate. Water displayed no evident colouration. Water was clear when undisturbed, with plumes of silt evident underfoot upon disturbance of the channel bed during sampling.

Marginal vegetation covering much of the left-hand bankside included Cleaver *(Galium aparine),* Cock's Foot *(Dactylis glomerata),* Common Couch *(Elymus repens)*, Cow Parsley *(Anthriscus sylvestris),* Creeping Buttercup *(Ranunculus repens),* False Brome *(Brachypodium sylvaticum),* Nettle *(Urtica dioica),* and Yorkshire Fog *(Holcus lanatus),* with emergent stands of Great Willowherb *(Epilobium hirsutum).* Isolated Hawthorn *(Crataegus monogyna)* along the left-hand bank and a continuous treeline of Blackthorn *(Prunus spinosa)*, Hawthorn, Hazel *(Corylus avellana)* and Sycamore *(Acer pseudoplatanus)* along the right-hand bank provided high shading to the river margins, limiting macrophyte growth to marginal Fool's Watercress, Watercress *(Nasturtium officinale)* and Water mint *(Mentha aquatica).*

Excessive siltation and high filamentous algae coverage, combined with a barrier to migration in the form of an artificial step-pool directly upstream of the bridge, provided *Low* fisheries value at site WF 2. A lack of any appropriately sized, clean, mobile gravels saw a lack of any suitable salmonid or lamprey *spp.* spawning habitat. While siltation was excessive across coarser channel substrate, the lack of well aerated, stable yet permeable and sheltered silt and sand beds provided little-to-no lamprey *spp.* ammocoete habitat.

Well shaded river margins which provided otherwise *Moderate* localised salmonid nursery were also limited by siltation and nutrient enrichment. Shallow water depth and a lack of in-channel refugia or marginal sheltering features (e.g., undercut banks) upstream of the step-pool provided *Poor* salmonid holding habitat. Downstream of the instream step feature, deeper water provided localised *Moderate* salmonid holding and adult European eel habitat.

Otter signs in the form of spraint and prints were observed along the survey stretch for site WF 2, indicating that Otter utilise this particular stretch of the Archerstown river.

Heavily vegetated banks provided *Negligible* burrowing habitat for Kingfisher, while the river provided potentially opportunistic, albeit *Poor* quality foraging habitat for the species. No Kingfisher burrows were recorded in the vicinity of WF 2.

Table 4-4. Properties of the watercourse at survey location WF 2.

Properties	Record
Average Depth (m)	0.15
Average Bank Width (m)	1.5

Wet Width (m)	0.7–2.5			
Flow	Slow			
Colour	No apparent colouration			
Clarity	Clear when undisturbed			
Bank height (m)	LHB	1.4	RHB	1.6
Dominant Substrates	Bedrock: 15% Cobble (>32–128mm): 40% Gravel (8-32mm): 20% Silt (<0.25mm): 25%			
Substratum Condition	Semi-compacted boulder and gravel outcrops with localised interstitial gravels and a high degree of siltation.			

Results of the 10-minute qualitative electrofishing survey conducted at this site (using methodologies described in Section 2.3) are presented in Table 4-5.

Table 4-5. Electrofishing results at survey location WF 2.

Species	Length (cm)
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	7.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.25
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.8
Brown Trout (*Salmo trutta*)	7.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.4
Brown Trout (*Salmo trutta*)	6.2
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.9
Brown Trout (*Salmo trutta*)	5.8
Brown Trout (*Salmo trutta*)	5.9
Brown Trout (*Salmo trutta*)	10.5
European eel *(Anguilla anguilla)*	16

Kick-sampling was carried out in areas of riffle and glide. Biological water quality based on Q-sampling was calculated as **Q3-4 –Moderate** for survey site WF 2, on the basis of moderate macroinvertebrate diversity and density. Pollution Sensitive Group A and B taxa (six individuals across three taxa) represented ~10 % of the sample. The sample was composed predominantly of Group C 'Pollution Tolerant' taxa, dominated by *Gammarus sp.* 'Very' and 'Most' Pollution tolerant' taxa Groups D and E were absent from the sample. Results of kick-sampling summarised in Table 4-6.

Table 4-6. Results of macroinvertebrates sample at survey location WF 2

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	*Chloroperlidae sp.*	*1*
	Ecdyonurus sp.	*2*

Group B – Moderately Pollution Sensitive	*Goeridae sp.*	3
Group C – Pollution Tolerant	*Baetis rhodani*	17
	Chironomidae sp.	1
	Gammarus sp.	27
	Hydropsychidae sp.	2
	Philopotamidae sp.	4
	Serratella ignita	7
Group D – Very Pollution Tolerant	-	-
Group E – Most Pollution Tolerant	-	-



Plate 4-2. A representative image of Survey Site WF 2.

4.1.1.3 WF Survey Site 3 (WF 3)

Survey site WF 3 was located along the upper reaches of the Lisdowney Stream (EPA code: 15L02, IG Ref.: S 41496 70951), approx. 1.1km downstream of the confluence of the Archerstown and Seskin North watercourses with the Lisdowney Stream. Properties of the watercourse at this sample location are provided in Table 4-7 and representative photographs of the survey location are shown in Plate 4-3 and Plate 4-4.

Table 4-7. Properties of the watercourse at survey location WF 3.

Properties	Record
Depth (m)	0.3–0.6
Bank Width (m)	2–4
Wet Width (m)	1–3
Flow	Low
Colour	Slightly yellow
Clarity	Clear when undisturbed, with plumes of silt readily remaining in suspension when disturbed underfoot

Bank height (m)	LHB	1.5	RHB	2
Dominant Substrates	Boulder (>128mm): 20% Cobble (>32–128mm): 40% Gravel (8-32mm): 15% Fine gravel (2-8mm): 15% Silt (<0.25mm): 10%, forming a continuous layer over much of the channel substrata			
Substratum Condition	Semi-compacted			

This modified stretch of **Eroding/Upland River (FW1)** displayed evidence of artificial channel-bed reinforcement, with the presence of an instream abutment, concrete bridge apron and consequent step-pool formation. Vegetated earthen riverbanks were largely natural at the upstream survey extent, with evidence of historically reinforced and/or resectioned banks along sections of steep, high bank faces toward the downstream survey extent. These sections of earthen bank displayed areas of exposed rock, as well as densely vegetated Ivy *(Hedera helix)* and Bramble **Scrub (WS1)**. More naturalised areas of bankside were vegetated with Cleaver (*Galium aparine*), Common Hogweed (*Heracleum sphondylium*), False Brome (*Brachypodium sylvaticum*), Herb Robert *(Geranium robertianum*), Nettle (*Urtica dioica*), Rose Species (*Rosa* sp.), Willowherb Species (*Epilobium* sp.), and Wood Dock (*Rumex sanguineus*). Land use extending beyond Riparian treelines and bramble scrub and from both the right- and left-hand banks was composed of **Improved agricultural grassland (GA1).**

The watercourse profile comprised low energy, slow flowing glide, with infrequent sections of shallow riffle. Exposed cobble and boulder banks lined much of the channel margins, with the channel narrowly wetted at several points of the downstream survey extent. Localised moderate energy flow occurred in the immediate vicinity of the 2-span stone arch bridge and associated bridge apron, which created an artificial step-pool sequence and a small free-fall. Average water depth was 0.3m, with areas of deeper pool downstream of the bridge apron.

While water was clear when undisturbed, the watercourse displayed a high degree of siltation and nutrient enrichment. Plumes of silt readily entered and remained in suspension when the channel bed was disturbed, and Filamentous Green Algae and Sewage Fungus were abundant, particularly across and directly downstream of the concrete bridge apron. Water displayed a slight yellow colouration. Channel substrata, including cobble and boulder banks and interstitial gravels were heavily overlain with silt, Water displayed no evident colouration.

Treelines of Ash *(Fraxinus excelsior),* Elm *(Ulmus sp.),* Hazel, Sycamore and Hawthorn provide a high degree of shading to the river margins at the upstream survey extent adjacent to the bridge structure, with continuous canopy creating a tunnelled section of channel toward the downstream survey extent. Fallen tree limbs extended into and across the channel at this point of the watercourse. Upstream of the bridge, much of the channel was tunnelled by continuous treelines and choked with Bramble. Instream macrophytes were absent from the channel as a result of heavy shading.

Dense filamentous algae coverage, a high degree of siltation and excessive channel shading, coupled with large, coarse channel substrate and channel bed modifications, provided *Poor* salmonid and lamprey *spp.* spawning. Overhanging marginal vegetation provided localised *Moderate* salmonid nursery, while the standalone scour pool directly downstream of the bridge apron provided an isolated area of *Moderate* salmonid holding habitat and adult European eel habitat. Boulder/cobble banks exposed at the time of survey may provide *Moderate* refuge to fish when submerged in periods of higher flow. The highly enriched nature of this section of watercourse, in combination with a lack of stable sand/silt beds and a barrier to migration in the form of a bridge apron, meant suitable lamprey *spp.* ammocoete habitat was negligible.

No otter signs were observed at site WF 3. Given the localised moderate fisheries potential of this survey site, in combination with marginal refugia and bankside features which may be utilised by feeding otters, otter foraging and commuting potential for this section of the Lisdowney Stream was assessed as *Moderate.*

Bank faces were densely vegetated and compacted with exposed root structures and boulder, providing *Poor* quality habitat for Kingfisher burrows. Similar to WF 2, this site provided opportunistic *Poor* quality foraging habitat, give the highly enriched nature of the watercourse. No Kingfisher burrows were recorded in the vicinity of WF 3.

Results of the 10-minute qualitative electrofishing survey conducted at this site (using methodologies described in Section 2.3) are presented in Table 4-8.

Table 4-8. Electrofishing results at survey location WF 3.

Species	Length (cm)
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	7.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	4.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	15.5
Brown Trout (*Salmo trutta*)	11.5
Brown Trout (*Salmo trutta*)	11.5
Brown Trout (*Salmo trutta*)	9.5
Brown Trout (*Salmo trutta*)	11
Atlantic Salmon (*Salmo salar*)	6
Atlantic Salmon (*Salmo salar*)	6
Atlantic Salmon (*Salmo salar*)	4
Atlantic Salmon (*Salmo salar*)	4.5
Atlantic Salmon (*Salmo salar*)	5
Atlantic Salmon (*Salmo salar*)	4
Atlantic Salmon (*Salmo salar*)	4.5
Atlantic Salmon (*Salmo salar*)	4
Atlantic Salmon (*Salmo salar*)	4.5
Atlantic Salmon (*Salmo salar*)	10.5

Atlantic Salmon (*Salmo salar*)	11.5
Atlantic Salmon (*Salmo salar*)	9.5
Atlantic Salmon (*Salmo salar*)	11
Atlantic Salmon (*Salmo salar*)	10
Atlantic Salmon (*Salmo salar*)	10

Kick-sampling was carried out in areas of riffle and glide. Biological water quality based on Q-sampling was calculated as **Q3-4 –Moderate** for survey site WF 3. Pollution Sensitive Group A and B taxa (five individuals across three taxa) represented ~8% of the sample. The sample was composed predominantly of Group C 'Pollution Tolerant' taxa, of which *Gammarus sp.* was the dominant taxa. 'Very' and 'Most' Pollution tolerant' taxa Groups D and E were absent from the sample. Results of kick-sampling summarised in Table 4-9.

Table 4-9. Results of macroinvertebrates sample at survey location WF 3.

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	*Chloroperlidae sp.*	1
Group B – Moderately Pollution Sensitive	*Polycentropodidae sp.*	3
	Sericostomatidae sp.	1
Group C – Pollution Tolerant	*Baetis rhodani*	11
	Chironomidae sp.	5
	Gammarus sp.	40
	Gyrinidae sp.	1
Group D – Very Pollution Tolerant	-	-
Group E – Most Pollution Tolerant	-	-



Plate 4-3. A representative image of the downstream extent of Survey Site WF 3.



Plate 4-4. A representative image of the upstream extent of Survey Site WF 3.

4.1.1.4 WF Survey Site 4 (WF 4)

Survey site WF 4 was located along the Ballyconra (EPA code: 15B86, IG Ref.: S 42675 70622). Properties of the watercourse at this survey location are provided in Table 4-10 and representative photographs of the survey location are shown in Plate 4-5 and Plate 4-6.

Table 4-10. Properties of the watercourse at survey location WF 4.

Properties	Record
Average Depth (m)	< 0.05 in wetted sections of channel, with several areas completely unwetted
Average Bank Width (m)	1.5
Wet Width (m)	0.3–0.5
Flow	Low–Dry
Colour	Brown
Clarity	Slightly turbid even when undisturbed
Bank height (m)	LHB 1.4 RHB 0.3
Dominant Substrates	Boulder (>128mm): 5% Cobble (>32–128mm): 5% Fine gravel (2-8mm): 20% Clay and silt(<0.25mm): 70%
Substratum Condition	Loose and unconsolidated clay and silt

This stretch of negligibly wetted–almost dry, historically modified **Eroding/Upland River (FW1)** watercourse displayed almost no perceptible flow. Any water present in the channel was brown in colour and displayed a moderate degree of turbidity, even when undisturbed. Plumes of silt and clay readily entered and remained in suspension when disturbed in wetted sections. Access to the

watercourse downstream of the bridge was precluded by the presence of an under-road culvert and densely vegetated, steep sided banks. Stands of impassable vegetation at this downstream extent included dense stands of Meadowsweet, Hedge Bindweed *(Calystegia sepium)*, Common Reed *(Phragmites australis)* classified as **Reed and large sedge swamps (FS1)** and marginal Bramble dominant **Scrub (WS1).**

The watercourse profile upstream of the bridge comprised interspersed areas of exposed boulder, cobble and gravel substrata, with soft, silt and clay channel substrate underfoot in the centre of the channel. Unstable riparian mudflats extended from wetted sections at the channel margins and were littered with woody material, fallen tree limbs and detritus. Similar to downstream of the culvert, the channel margins were heavily vegetated (tunnelled at points) with stands of Great Willowherb, Nettle and Common Hogweed. Instream macrophytes were absent, while small patches of emergent Fool's watercress were present in wetted sections of the channel margins.

Given the steep nature of the left-hand bank upstream of the culvert, the left-side of the channel may have been subject to historic modification (e.g. channel deepening and embankment). Grass species such as Yorkshire fog and Cock's Foot vegetating the left-hand embankment and extended back into **Improved agricultural grassland (GA1)** and **Dry calcareous and neutral grassland (GS1)**, upstream and downstream of the culverted section of watercourse, respectively. Contrastingly, the low, sloping right-hand bank composed of unconsolidated, soft earth and clay was largely unvegetated, with the exception of featured Blackthorn and invasive Snowberry *(Symphoricarpos albus)* **Scrub (WS1).**

Areas of insufficient water depth, no perceptible flow and excessive shading provided *Negligible* spawning, nursery or holding habitat for European eel, salmonid or lamprey species at survey site WF 4. Given the poor-quality channel substrate and barriers to migration in the form of culverting and dense, in-channel vegetation, fisheries habitat downstream of the bridge was also *Poor* and likely only utilised by fish species such as three-spined stickleback *(Gasterosteus aculeatus*). Due to a lack of sufficiently wetted channel, kick-sampling and electrofishing could not take place at survey site WF 4.

No Otter signs were observed at site WF 4. Given low fisheries value and barriers to migration arising from the highly modified nature of this stretch of watercourse, Otter foraging and commuting habitat were assessed as locally *Poor,* with this stretch of watercourse likely only used opportunistically for commuting in periods of higher flow.

No kingfisher signs were identified in the vicinity of WF 4, which, given the highly tunnelled and unwetted nature of the watercourse, provided *Negligible* foraging or burrowing habitat for the species.



Plate 4-5. A representative image of an inaccessible stretch of Survey site WF 4, downstream of the culvert.



Plate 4-6. A Representative image of Survey Site WF 4, upstream of the culvert.

4.1.1.5 WF Survey Site 5 (WF 5)

Survey site WF 5 was located on the Lisdowney Stream (EPA code: 15L02, IG Ref.: S 43623 68635), approx. 0.7km upstream of the confluence of Lisdowney Stream with the mainstem River Nore. Properties of the watercourse at this sample location are provided in Table 4-11 below and a representative photographs of the survey location are shown in Plate 4-7 and Plate 4-8.

Table 4-11. Properties of the watercourse at survey location WF 5.

Properties	Record
Depth (m)	0.4–0.6
Bank Width (m)	2–3
Wet Width (m)	1.7–2.0
Flow	Low – moderate
Colour	No distinct coloration
Clarity	Clear when undisturbed. Plumes of silt evident underfoot
Bank height (m)	LHB 0.8 RHB 0.8
Dominant Substrates	Boulder (>128mm): 25% Cobble (>32–128mm): 20% Gravel (8-32mm): 20% Fine gravel (2-8mm): 10% Silt (<0.25mm): 25%, forming a continuous layer over much of the channel substrata
Substratum Condition	Semi-compacted

This boulder dominant stretch of **Eroding/Upland River (FW1)** was comprised of a series of slow flowing glide interspersed with occasional riffle, terminating in a pool of water impounded by an artificial rock ramp placed diagonally across the channel width. Water velocity downstream of the rock ramp was comparatively faster than upstream, with a slightly steeper channel bed gradient and more natural river profile. Other modifications along this stretch of watercourse included an earthen embankment and rock armour reinforcement along the right and left-hand banks, respectively, which created a laterally confined channel upstream of the rock-ramp. Exposed cobble banks and an additional artificially placed boulder ramp extended along the banks from under a clear-span concrete bridge structure, with outfall pipes along both banks.

Channel substrate was heavily silted, with abundant filamentous green algae and sewage fungus growth throughout. Water was clear with no distinct colouration but exhibited a high degree of siltation when channel substrate was disturbed underfoot. Instream macrophytes were largely absent from the watercourse and given the reinforced nature of the immediate bank faces, emergent macrophytes were absent. Boulders lining the banks were covered with abundant *Rhynchostegium riparioides.* Beyond the bank reinforcement, bankside vegetation included stands of Common Reed, Rough meadowgrass *(Poa trivialis),* Cock's foot, Herb Robert, Great Willowherb, Hedge Bindweed, Nettle and Dock *(Rumex sp.).* Land use extending from the left- and right-hand banks was composed of **(Dry meadows and) Grassy verges (GS2)** and a field of Oat *(Avena sativa)* **Arable crop (BC1)** and **Amenity grassland (improved) (GA2)** and **Buildings and artificial surfaces (BL3)** in the form of standalone residential developments and road, respectively.

Slower flow across coarse, compacted cobble-boulder dominant substrate, in combination with heavy siltation and excessive algal and sewage fungus growth provided negligible salmonid and lamprey *spp.* spawning habitat upstream of the rock ramp, with a high degree of siltation and filamentous green algae persisting even in the more naturalised sections of the downstream survey extent. Localised areas of *Moderate* cobble salmonid nursery were also subject to heavy siltation, but areas of cobble riffle in particular provided instream refugia. Stable, well aerated sand and silt beds were absent from this section of watercourse. Therefore, lamprey ammocoete habitat was assessed as *Negligible*

The upstream survey extent was highly shaded by sections of undercut earth bank and in combination with submerged crevices between rock armour, created locally excellent European eel habitat. Similar marginal features and overhanging vegetation atop deeper water provided good marginal salmonid holding habitat. The shallow drop created by the artificial rock ramp did not appear to preclude upward migration of salmonid fish, given the flow pathways between each boulder in the ramp.

Otter spraint was identified at several points along the survey stretch for WF 5, atop boulders along the right-hand bank. Survey site WF 5 provided good commuting and foraging habitat for otter, given the high fisheries value, with several bankside areas suitable for feeding.

Bank tops were vegetated and bank faces reinforced with rock armour, limiting the potential habitat for Kingfisher burrows. However, the section of watercourse at WF 5 provided *Moderate* potential foraging habitat for Kingfisher. No Kingfisher burrows were recorded in the vicinity of WF 5.

Results of the 10-minute qualitative electrofishing survey conducted at this site (using methodologies described in Section 2.3) are presented in Table 4-12. Species recorded include Atlantic salmon, Brown trout and European eel. In addition to the two eels which were caught and released, a further eight were missed (i.e., not captured for measurement) during electrofishing.

Table 4-12. Electrofishing results at survey location WF 5.

Species	Length (cm)
Atlantic Salmon (*Salmo salar*)	5.5
Atlantic Salmon (*Salmo salar*)	10.5
Atlantic Salmon (*Salmo salar*)	9.5
Atlantic Salmon (*Salmo salar*)	11.5
Atlantic Salmon (*Salmo salar*)	12.5
Atlantic Salmon (*Salmo salar*)	11.5
Atlantic Salmon (*Salmo salar*)	10
Atlantic Salmon (*Salmo salar*)	11
Atlantic Salmon (*Salmo salar*)	10.5
Atlantic Salmon (*Salmo salar*)	14
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	10.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	4.5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	25.5
Brown Trout (*Salmo trutta*)	24.5
Brown Trout (*Salmo trutta*)	14.5
Brown Trout (*Salmo trutta*)	12
Brown Trout (*Salmo trutta*)	12.5
Brown Trout (*Salmo trutta*)	12

Brown Trout (*Salmo trutta*)	14.5
Brown Trout (*Salmo trutta*)	13.5
Brown Trout (*Salmo trutta*)	13
Brown Trout (*Salmo trutta*)	20.5
Brown Trout (*Salmo trutta*)	10.75
Brown Trout (*Salmo trutta*)	13.5
Brown Trout (*Salmo trutta*)	10.5
Brown Trout (*Salmo trutta*)	13.5
Brown Trout (*Salmo trutta*)	14.5
Brown Trout (*Salmo trutta*)	14.5
Brown Trout (*Salmo trutta*)	14
Brown Trout (*Salmo trutta*)	12
European eel *(Anguilla anguilla)*	20
European eel *(Anguilla anguilla)*	22

Kick-sampling was carried out in areas of riffle and glide. Macroinvertebrate diversity and density were *Moderate*. The Q rating assigned to survey location WF 5 was assigned **Q4 –Good**, on the basis that at least one Group A 'Very Pollution Sensitive' taxon was present in reasonable numbers, Group B 'Moderately Pollution Sensitive' taxa were present in reasonable numbers (27 individuals across three taxa, ~30% of the sample). Group C 'Pollution Tolerant' taxa were the dominant group in the sample, with 55 individuals across 12 taxa (making up ~60% of the sample). Results of the kick-sample are summarised in Table 4-13.

Table 4-13. Results of macroinvertebrates sample at survey location WF 5

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	*Chloroperlidae sp.*	4
	Ecdyonurus sp.	5
Group B – Moderately Pollution Sensitive	*Glossomatidae sp.*	17
	Goeridae sp.	7
	Sericostomatidae sp.	3
Group C – Pollution Tolerant	*Baetis rhodani*	11
	Chironomidae sp.	3
	Corixidae sp.	4
	Elmidae sp.	2
	Gammarus sp.	6
	Hydracarina sp.	2
	Hydropsychidae sp.	1
	Philopotamidae sp.	2
	Poolycentropodidae sp.	2
	Rhyacophila sp.	3
	Seratella ignita	14
	Simuliidae sp.	5
Group D – Very Pollution Tolerant	-	-
Group E – Most Pollution Tolerant	-	-



Plate 4-7. A representative image of the upstream extent of Survey Site WF 5.



Plate 4-8. A representative image of the downstream extent of Survey Site WF 5.



Plate 4-9. Otter spraint found along boulders at Survey site WF 5.

4.1.1.6 WF Survey Site 6 (WF 6)

Survey site WF-6 was located on the Durrow_Townparks watercourse (EPA code: 15D34, IG Ref.: S 42185 76437) within Knocknatrina Woods, Co. Laois. Properties of the watercourse at this sample location are provided in Table 4-14 below and a representative photograph of the survey location is shown in Plate 4-10.

Table 4-14. Properties of the watercourse at survey location WF 6.

Properties	Record			
Depth (m)	< 0.05 in wetted sections of channel, with several areas completely unwetted			
Bank Width (m)	0.5 but largely no defined bank widths			
Wet Width (m)	0.3			
Flow	Dry			
Colour	Brown (where wetted)			
Clarity	Turbid (where wetted)			
Bank height (m)	LHB	Poorly defined, sloping banks, <0.05m in height	RHB	Poorly defined, sloping banks, <0.05m in height
Dominant Substrates	Boulder (>128mm): 5% Cobble (>32–128mm): 10% Gravel (8-32mm): 10% Fine gravel (2-8mm): 20% Silt (<0.25mm): 55%			
Substratum Condition	Loose			

This section of **Eroding/Upland River (FW1)** (Durrow_Townparks) was largely unwetted at the time of survey, with isolated sections of shallowly wetted, undefined channel. Channel substrate was largely clay, earth and silt, with infrequent, largely unwetted stone-based substrata at the upstream extent. Any wetted sections of channel were 0.01–0.05m in depth and heavily silted and turbid even when undisturbed, with a brown water colouration.

The channel profile for this stretch of watercourse was not clearly demarcated, with no clear channel margins or flow path (in wetted areas) and exposed, gradually sloping earthen banks amid the wider **(Mixed) broadleaved woodland (WD1)**. Areas of wetted channel were littered with woody material, detritus and fallen tree limbs. Woodland canopy composed of Beech *(Fagus sylvatica),* Elder *(Sambucus nigra),* Elm *(Ulmus sp.)* and Sycamore *(Acer pseudoplatanus)* provided heavy shading to the entire area. Woodland ground flora included areas of Bramble and Hawthorn **Scrub (WS1)**, as well as Cleaver *(Galium aparine),* Creeping Buttercup *(Ranunculus repens),* Elder *(Sambucus nigra),* Dog's Mercury *(Mercurialis perennis),* Hart's-Tongue Fern *(Asplenium scolopendrium),* Herb Robert, Ivy, Meadowsweet, Nettle, and Wood Dock.

The accessible length of the Durrow_Townparks watercourse within Knocknatrina woods was walked to assess areas suitable for kick-sampling and electrofishing surveys, with much of the unculverted length of watercourse unsurveyable due to either dry or insufficiently wetted channel. Consequently, kick-sampling and electrofishing could not be carried out at survey site WF 6. At the time of survey, WF 6 provided *Negligible* fisheries habitat. No otter signs were found in the vicinity of survey site WF 6. No kingfisher signs were identified in the vicinity of the unwetted channel at WF 6.



Plate 4-10. A representative picture of Survey Location WF 6.



Plate 4-11. A short, insufficiently wetted section of cobble-dominant watercourse at Survey site WF 6.



Plate 4-12. A completely unwetted section of channel along the walked stretch for Survey site WF 6.

4.1.1.7 WF Survey Site 7 (WF 7)

Survey site WF 7 was located on the Erkina River (EPA code: 15E01, IG Ref.: S 40847 77491), directly upstream of the 5-span stone arch bridge at Durrow Firestation, Co. Laois. Properties of the watercourse at this sample location are provided in Table 4-15. Plate 4-13 and Plate 4-14 show representative photographs of the survey location.

Table 4-15. Properties of the watercourse at survey location WF 7.

Properties	Record
Depth (m)	0.6–1.2
Bank Width (m)	15–18
Wet Width (m)	15–18
Flow	Slow–Moderate
Colour	No distinct coloration
Clarity	Very clear when undisturbed. Slight plumes of silt evident underfoot but cleared quickly by moderate velocity flow
Bank height (m)	LHB 0.8 RHB 0.6
Dominant Substrates	Boulder (>128mm): 20% Cobble (>32–128mm): 30% Gravel (8-32mm): 40% Silt (<0.25mm): 10%
Substratum Condition	Semi-compacted

Along the Erkina River, the upstream survey extent of this stretch of watercourse was most consistent with the profile of a **Depositing/Lowland River (FW2),** with continuous smooth glide, moderate flow, deep water (up to 1.2m) and extensive mats of Water-crowfoot *(Ranunculus sp.)*, associated with the following Annex I Habitat: *'3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation'* across the channel. Cobble and boulder outcrops directly upstream of the first bridge structure created flow patterns more aligned with a section of **Eroding/Upland River (FW1)**. Interstitial gravel substrate was found most widespread across the channel. Patches of sewage fungus were also locally abundant along the river margins at this site. Other macrophytes included marginal stands of Branched bur-reed *(Sparganium erectum)* and Fine-leaved water dropwort *(Osenanthe aquatica)*, as well as emergent patches of Watercress. Given the **Amenity grassland (improved) (GA2)** land use in the vicinity of the survey site, bankside vegetation was limited to Reed Canary-grass *(Phalaris arundinacea)*, Nettle and Willowherb *(Epilobium sp.)*. Lithophytic vegetation growing from the bridge (classed **as BL1, Stone walls and other stonework**) included Red Valerian *(Centranthus ruber)*.

An artificial rock ramp directly upstream of the first of two bridge structures created an area of swift, chute flow over larger, coarse boulder and cobble substrate. Water depth below both bridges was comparatively shallower, with riffle pattern flow across a higher proportion of stone-based channel substrate than the upstream survey extent.

Other channel modifications included a historically resectioned, bare earth right-hand bank face, which displayed evidence of embankment. Additionally, the left-hand bank was reinforced with a concrete wall **(BL3, Buildings and artificial surfaces)** running along the underside of a wooden jetty. Land use in the vicinity of the survey stretch was largely related to urban use, with **Amenity grassland (improved) (GA2)** and further **Buildings and artificial surfaces (BL3)** in the form of gardens, residential areas and infrastructure related to recreational water resources.

Water was very clear when undisturbed with no colouration. A slight degree of siltation was evident upon disturbance of the river margins, particularly in areas of dense sewage fungus. However, turbid water was quickly cleared by moderate velocity flow. Shading was largely absent from the watercourse, particularly at the downstream survey extent toward Durrow town. Overhanging Willow trees *(Salix sp.)*, particularly along area of undercut right-hand bank, provided adequate shading and refugia,

creating excellent marginal holding habitat for salmonids and adult European eel. The presence of excessive sewage fungus, very deep water and a lack of appropriately sized, mobile, clean gravel beds provided negligible salmonid or lamprey *sp.* spawning habitat, particularly in the slow flow, impounded flow upstream of the rock ramp. Abundant instream Water Crowfoot and diverse flow patterns created by a variety of channel substrate created excellent refugia suitable for salmonid nursery habitat across the whole channel. The shallow step created by the rock ramp did not appear to preclude upward migration of salmonid and eel species, given the flow pathways available between boulders in the ramp structure. A lack of any stable, well sheltered silt and sand beds saw negligible habitat for lamprey *sp.* ammocoete.

No otter signs were observed in the vicinity of survey site WF 7. Despite the semi-urban location and high level of human activity in the vicinity of the stretch of watercourse, the Erkina River at this survey location provides *Good* commuting and foraging for otter, being a high fisheries value habitat with good connectivity to the wider catchment.

Resectioned and reinforced bank faces in the vicinity of WF 7 provided *Negligible* burrowing habitat for Kingfisher. However, given the presence of available perches at the river margins, this section of watercourse at WF 7 provided *Good* potential foraging habitat for Kingfisher. No Kingfisher burrows were recorded in the vicinity of WF 7.

Results of the 10-minute qualitative electrofishing survey conducted at this site (using methodologies described in Section 2.3) are presented Species recorded include Atlantic salmon, Brown trout, European eel and Minnow. In addition to the three eels which were caught and released, a further three were missed (i.e., not captured for measurement) during electrofishing.

Table 4-16. Electrofishing results at survey location WF 5.

Species	Length (cm)
Atlantic Salmon (*Salmo salar*)	6
Atlantic Salmon (*Salmo salar*)	11.5
Atlantic Salmon (*Salmo salar*)	13.5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	7.3
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.6
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	7.3
Brown Trout (*Salmo trutta*)	6.2
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	5.5

Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5.7
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	7
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	5
Brown Trout (*Salmo trutta*)	5.4
Brown Trout (*Salmo trutta*)	5.5
Brown Trout (*Salmo trutta*)	6
Brown Trout (*Salmo trutta*)	22.5
Brown Trout (*Salmo trutta*)	18.5
Brown Trout (*Salmo trutta*)	14.8
Brown Trout (*Salmo trutta*)	12.5
Brown Trout (*Salmo trutta*)	13
Brown Trout (*Salmo trutta*)	13
Brown Trout (*Salmo trutta*)	12.3
Brown Trout (*Salmo trutta*)	17.5
Brown Trout (*Salmo trutta*)	11
Brown Trout (*Salmo trutta*)	16
Brown Trout (*Salmo trutta*)	27
Brown Trout (*Salmo trutta*)	13
Brown Trout (*Salmo trutta*)	11
Brown Trout (*Salmo trutta*)	12.5
Brown Trout (*Salmo trutta*)	12
Minnow *(Phoxinus phoxinus)*	6.5
Minnow *(Phoxinus phoxinus)*	7.5
Minnow *(Phoxinus phoxinus)*	6.5
European eel *(Anguilla anguilla)*	37
European eel *(Anguilla anguilla)*	36
European eel *(Anguilla anguilla)*	23

Kick-sampling was carried out in areas of riffle and glide. Macroinvertebrate diversity and density were moderate. The Q rating assigned to survey location WF 7 was assigned **Q3 –Poor**, on the basis that Group A 'Very Pollution Tolerant' taxa were absent from the sample, with Group C taxa making up ~92% of the sample (162 individuals across 11 taxa). Numbers for the Group C taxa *Simuliidae sp.* were excessive in the sample. Group B 'Moderately Pollution Sensitive' taxa were represented by 14 individuals across 2 taxa of cased caddisfly. Results of the kick-sample are summarised in Table 4-17.

Table 4-17 Results of macroinvertebrates sample at survey location WF 7

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	-	-
Group B – Moderately Pollution Sensitive	*Goeridae sp.*	1
	Limnephilidae sp.	13
Group C – Pollution Tolerant	*Baetis rhodani*	38
	Gammarus sp.	5
	Hydropsychidae sp.	12
	Philopotamidae sp.	10

	Planorbidae sp.	1
	Potamopyrgus sp.	11
	Rhyacophila sp.	2
	Seratella ignita	7
	Simuliidae sp.	70
	Tipulidae sp.	1
	Valvatidae sp.	*4*
Group D – Very Pollution Tolerant	*Glossiphonidae sp.*	*1*
Group E – Most Pollution Tolerant	-	-



Plate 4-13. A representative image of the upstream extent of Survey site WF 7.



Plate 4-14. A representative image of the downstream extent of Survey site WF 7.

4.1.2 Proposed Grid Connection Survey Locations

4.1.2.1 GC Survey Site 1 (GC1)

Survey site GC1 was located along the River Nore (Nore_120, EPA code: 15N01, IG Ref.: S 43983 71845). Properties of the watercourse at this sample location are provided in Table 4-18. Plate 4-15 shows a representative photograph of the survey location.

Table 4-18. Properties of the river at Survey site GC1.

Properties	Record			
Average Depth (m)	0.8–1.2			
Bank Width (m)	20			
Wet Width (m)	20			
Bank height (m)	LHB	1.6	RHB	1.2
Flow	Moderate flow and fast velocity			
Colour	No distinct colouration			
Clarity	Clear when undisturbed			
Dominant Substrates	Boulder (>128mm): 5% Cobble (>32–128mm): 60% Gravel (8-32mm): 20% Silt (<0.25mm): 15%			
Substratum Condition	Compacted			

This surveyed stretch of **Depositing/Lowland River (FW2)** was characterised by slow flowing, deep glide across the channel width (approx. 20m). Although this section of the River Nore displayed a straight channel profile, the wider River Nore displayed a meandering profile. Channel substrate was predominantly compacted cobble, with a patchy distribution of filamentous green algae growth and moderate siltation atop channel bed substrata. Cock's foot, Yorkshire Fog and *Poa spp.*, as well as Nettle, Creeping buttercup *(Ranunculus repens),* Meadow buttercup *(Ranunculus acris)* and Cuckoo flower *(Cardamine pratensis).* Vegetated earthen banks extended into Perennial Rye Grass *(Lolium*

perenne) dominant ***Improved Agricultural Grassland (GA1)*** from the left- and right-hand banks. Earthen banks were eroded and undercut, and in combination with overhanging vegetation, provided marginal refugia. Water was very clear when undisturbed, with plumes of silt evident when channel substrate was disturbed underfoot, particularly along marginal silt beds.

The channel was largely unshaded, with the exception of marginal and emergent stands of Reed Canary grass, Great willowherb and Branched bur-reed which provided instream refugia. Overhanging Willow *(Salix spp.)* branches provided further shading to the channel margins, as well as areas of slower, sheltered flow suitable for adult European Eel holding habitat.

Biological water quality based on Q-sampling was calculated as **Q3-4 –Moderate** for survey site GC1, on the basis that at least one 'very pollution sensitive' Group A taxon was present in low numbers (one *Heptagenidae sp.* and one *Chloroperlidae sp.).* two individuals from one Group B 'Moderately Pollution Sensitive' taxa were present in the sample, while Group C 'Pollution Tolerant' taxa were dominant (~94% of the sample), with *Ephermellidae sp.* mayfly and *Philopotamidae* caddis fly being the most numerous taxa. Results of the kick-sample are summarised in Table 4-19.

Table 4-19. Results of macroinvertebrates sample at GC1.

Indicator Group	Taxon	Abundance
Group A – Very Pollution Sensitive	*Chloroperlidae sp.*	3
	Heptagenidae sp.	1
Group B – Moderately Pollution Sensitive	*Limnephilidae sp.*	2
Group C – Pollution Tolerant	*Baetis rhodani*	11
	Chironomidae sp.	8
	Gammarus sp.	6
	Hydropsychidae sp.	14
	Lumbricidae sp.	1
	Philopotamidae sp.	23
	Planorbidae sp.	1
	Rhyacophilidae sp.	4
	Seratella ignita	22
	Simuliidae sp.	1
Group D – Very Pollution Tolerant	-	-
Group E – Most Pollution Tolerant	-	-

Semi-compacted cobble-dominant channel substrate overlain with silt and patchy filamentous green algae coverage, combined with a lack of instream refugia provided *Poor-Moderate* salmonid and lamprey *spp.* spawning habitat, while localised *Good* salmonid nursery was present, particularly along the more sheltered and vegetated river margins. Patches of water crowfoot (*Ranunculus spp.*) are present downstream of survey site GC1 offering moderate – good nursery habitat for salmonids where it occurs. Lamprey ammocete habitat was present, although *Moderate* in quality, along areas of marginal silt bed. Deep, slow flowing glide provided adequate depth and flow type for *Good* salmonid holding, while marginal refugia provided by stands of emergent ***Reed and large Sedge swamps (FS1)*** and overhanging tree limbs created localised areas of *Good* European eel habitat.

Signs of otter were recorded along the Proposed Grid Connection route at the point where it crosses the River Nore. Multiple signs of otter were recorded in the form of prints, slides, spraints, and feeding remains. Representative images of otter signs can be seen in Plate 4-16, Plate 4-17, Plate 4-18 and Plate 4-19.

Due to the quantity of Otter signs within the vicinity of GC1, an additional dedicated otter survey was undertaken in the winter season when vegetation had died back and features were most visible. A non-breeding otter holt was recorded along the right bank of the River Nore in the proximity of GC1. Following the deployment of a trail camera, the holt was confirmed to be active. The holt was in

regular use by a single individual during the time the camera was deployed (from 19.12.2024 to 14.01.2025). Based on the footage captured it is not considered to be a natal holt.

No kingfisher signs were identified in the vicinity of GC1. However, the stretch of the River Nore at this site provided *Good* potential foraging habitat for Kingfisher.



Plate 4-15. A representative image of the downstream extent of Survey site GC1.



Plate 4-16. Otter prints observed downstream of survey site GC1



Plate 4-17: Otter print recorded within the vicinity of GC1 during the multidisciplinary walkover survey.



Plate 4-18. Salmon head remains from feeding otter in the vicinity of survey site GC1



Plate 4-19. Otter spraint observed in the vicinity of Survey site GC1.



Plate 4-20: Otter recorded by trail camera approximately 165m upstream of GC1.

4.2 eDNA Results.

Environmental DNA (eDNA) surveys were undertaken on watercourses at five survey locations (WF 1, WF 2, WF 3, WF 5 and WF 7). Survey locations were chosen to maximise the chance of detecting eDNA from target species and to estimate the approximate extent of their presence where detected.

Freshwater Pearl Mussel (*Margaritifera margaritifera*) (FPM), White-clawed crayfish (*Austropotamobius pallipes*) (WcC) and Crayfish plague (*Aphanomyces astaci*) were tested for at each location. Both FPM and Crayfish plague were not detected at any of the survey locations, considered as evidence of the species' absence at and/or upstream of the sampling locations. Positive eDNA results for WcC were found at survey site WF 3, considered as evidence of the presence of WcC at and/or upstream of the sampling location WF3. eDNA results can be found in Appendix III.

4.3 Otter Survey Results

All watercourse within the Proposed Wind Farm site and along the Proposed Grid Connection route were surveyed for signs of otter. No signs of were recorded within the boundaries of the Proposed Wind Farm site. Otter spraint and prints were recorded at survey site WF2. Otter sprain was recorded at survey site WF 5 (Plate 4-9).

Signs of otter were recorded along the Proposed Grid Connection route where it runs adjacent and crosses the River Nore. Multiple signs of otter were recorded in the form of prints, spraints and feeding remains (Plate 4-16, Plate 4-17, Plate 4-18, Plate 4-19), as well as an otter holt along the right bank of the River Nore. Following the deployment of a trail camera the holt was confirmed to be active (Plate 4-20). The holt was in regular use by a single individual during the time of camera deployment. Based on the footage captured it is not considered to be a breeding holt.

5. DISCUSSION

5.1 Proposed Wind Farm Aquatic Baseline Assessment

Watercourses surveyed within the vicinity of the Proposed Wind Farm consisted primarily of modified **Eroding/Upland Rivers (FW1)**, surrounded predominantly by agricultural and pastural land use. Many watercourses within the vicinity of the wind farm (WF 1–WF 5, sites inclusive) exhibited visible enrichment, with sewage fungus and excessive filamentous green algae growth across channel bed substrate. Cobble was the dominant channel bed substrate across many of the sites, although the compacted and highly silted nature of substrata often limited potential spawning habitat. The highly modified nature of WF 1 as a result of livestock poaching, lack of riparian buffer and intensive agricultural land use limited this site to almost negligible overall fisheries potential, while sites such as WF 4 and WF 6 offered no fisheries potential as a result of negligibly wetted–completely dry channels as a result of historic modification, culverting and diversion. Sites WF 2 and WF 3 provided overall moderate fisheries potential, which was again often limited by excessive watercourse enrichment from surrounding land use, barriers to migration in the form of impassable bridge aprons and excessive tunnelling. Despite barriers to migration and excessive enrichment at WF 5, fisheries potential at this site was assessed as overall high, given the abundant instream and marginal refugia provided by boulder channel and bank substrate and a variety of instream microhabitats.

Despite the presence of abundant patches of sewage fungus, site WF 7 provided the highest value fisheries habitat, which displayed a river profile more closely associated with a **Depositing/Lowland River (FW2).** Historic rock ramp integration created a variety of flow types across the channel and in combination with abundant instream macrophyte coverage, overhanging tree limbs and undercut banks created high fisheries potential. Fish species caught across the survey sites included Brown Trout, Atlantic Salmon, European eel and Minnow (listed in order of most to least common).

Q-value scores calculated for the survey sites in the vicinity of the wind farm ranged from **Q3 –Poor** to **Q3-4 –Moderate** and **Q4 –Good,** with the lowest scoring sites being WF 1and WF 7, and highest scoring site being WF 5.

Both eDNA surveys and available NPWS records showed no positive records for Freshwater Pearl Mussel (FPM) upstream of the Proposed Wind Farm Survey sites. Proposed Wind Farm aquatic survey locations WF 6 and WF 7 are located within the Nore Upper *Margaritifera* sensitive area, which is listed as catchment of SAC populations of FPM, while remaining survey sites are located within the Nore Middle catchment, listed as a catchment of other extant populations of FPM outside of SAC populations.

FPM data from NPWS showed point locations along the River Nore, approx. 500m downstream of the Durrow_Townparks watercourse (on which survey site WF 6 is located), and approx. 2.2km upstream of the confluence of the Erkina River with the mainstem River Nore.

eDNA surveys for White-clawed Crayfish (WcC) were negative for all but survey site WF 3. NPWS data showed point locations for WcC approx. 4.3km upstream of the Erkina River confluence with the mainstem River Nore, and approx. 5km upstream of survey site WF 7, located along the Erkina River. eDNA surveys provided no positive results for crayfish plague in the vicinity of the Proposed Wind Farm.

No otter holts or couches were identified at the survey sites in the vicinity of the Proposed Wind Farm. Otter signs in the form of spraints and prints were found at survey sites WF 2 and WF 5, indicating that otter actively utilise these watercourses (namely Lisdowney Stream). Given the high fisheries potential and good connectivity of other sites within the vicinity of the Proposed Wind Farm it is likely that otter also actively utilise the stretch of watercourse at WF7 (Erkina River) for commuting and foraging.

5.2 Proposed Grid Connection Route Aquatic Baseline Assessment

The watercourse surveyed as part of the Proposed Grid Connection was located along a **Depositing/Lowland River (FW2)** section of the River Nore, characterised by wide, meandering river profiles, deep glide and predominantly compacted cobble. Deep pool and glide, combined with marginal refugia in the form of undercut banks, overhanging tree bows and marginal and emergent vegetation provided high fisheries value habitat for salmonid fish and European eel in the vicinity of sites GC1. Coarse, compacted channel bed substrate was not conducive to lamprey *spp.* spawning and ammocete habitat.

Land use surrounding the Proposed Grid Connection crossing point was composed of both managed and unmanaged agricultural and pastural land, as well as artificial surfaces associated with urban development and road networks. The Proposed Grid Connection sites displayed a moderate degree of siltation.

Instream macrophytes were largely absent from the surveyed sections of the River Nore, with patches of *Ranunculus spp.* identified at downstream of survey site GC1. Marginal vegetation species, e.g., Branched Bur-reed and Common Club-rush, associated with reed and large sedge swamp habitat were abundant along the river margins at the Proposed Grid Connection crossing point. Willow species were frequent along the bank tops and channel margins.

The Q-value score calculated for survey site GC1 was **Q3-4 (Moderate)**.

The Proposed Grid Connection crossing point passes through the River Barrow and River Nore SAC, which is designated for the QI species Otter. Otter signs were identified along the banks within the vicinity of GC1 (spraint, prints, feeding remains). In addition, an active, non-breeding otter holt was recorded along the right bank of the River Nore in the proximity of survey site GC 1. The holt was found to be in regular use by a single individual. Based on camera trap footage, it is not considered to be a natal holt. Otter have been shown to be in frequent use of the River Nore upstream, downstream and in the vicinity of the Proposed Grid Connection crossing point.

6. CONCLUSION

This report provides a comprehensive baseline of aquatic habitats in the vicinity of the Proposed Wind Farm Development and Proposed Grid Connection Route.

Watercourses near the Proposed Wind Farm were largely modified **Eroding/Upland Rivers (FW1)**, within agricultural landscapes, with a river profile more consistent with a **Depositing/Lowland River (FW2)** at survey sites WF 7 and GC 1. Siltation and enrichment pressures were evident throughout the surveyed sites, with evidence of historical modification at several sections of surveyed watercourses.

Survey sites WF 1, WF 4 and WF 6 provided *Negligible–Poor* potential fisheries habitat, limited by modified watercourse profiles and negligibly wetted channels, respectively. WF 2 and WF 3 had moderate fisheries potential, hindered by enrichment and migration barriers. Survey sites WF 7 and GC 1 offered the highest quality fisheries habitat, with varied substrate composition and flow pattern diversity, with good instream cover provided by dominant *Ranunculus spp.* at WF 7.

Fish species recorded in electrofishing surveys included Minnow, Brown Trout, European eel and Atlantic Salmon. Salmon were present at three survey sites (WF 3, WF 5 and WF 7), with survey site WF 7 providing the best quality salmonid habitat for juvenile and adult fish, while salmonid spawning was limited across the survey sites. European eel were recorded in low densities at survey sites WF 2, WF 5 and WF 7, with WF 5 and WF 7 providing the best quality eel habitat across the surveyed sites. No lamprey ammocoetes were recorded during targeted electro-fishing and this was considered to reflect the lack of suitable nursery habitat within the vicinity of the Proposed Wind Farm development, in addition to the presence of sub-optimal or absent suitable spawning habitat and poorly connected, unwetted sections of watercourse, particularly at sites WF 4 and WF 6.

Biological water quality as indicated by Q-value scores also ranged between survey sites, from **Q3 – Poor** (WF 1, WF 7) to **Q3-4 –Moderate** (WF 2, WF 3, GC 1) and **Q4 –Good** (WF 5). No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples.

Despite survey sites WF 6 and WF 7 being located within the Nore Upper *Margaritifera* sensitive area, no Freshwater Pearl Mussel was detected via eDNA sampling. White-clawed Crayfish was detected at WF 3, with no evidence of crayfish plague via eDNA sampling. Otter signs (prints, spraints and/or feeding remains) were observed at WF 2, WF 5 and GC 1, suggesting active use of those watercourses. Additionally, a non-natal otter holt was identified in the proximity of GC1. No kingfisher burrows were identified in the vicinity of any of the survey sites.

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APPENDIX I

ELECTROFISHING SPECIES RECORDS AT ALL PROPOSED WIND FARM SURVEY LOCATIONS



APPENDIX II

Q-VALUES AT ALL SURVEY LOCATIONS

Appendix II: Q-Values at all Survey Locations (Proposed Wind Farm and Proposed Grid Connection Underground Cable Route)	
Survey Location	Q-Value and WFD Status
Proposed Wind Farm	
WF 1	Q3 – Poor
WF 2	Q3-4 – Moderate
WF 3	Q3-4 – Moderate
WF 4	N/A (negligibly wetted channel)
WF 5	Q4 – Good
WF 6	N/A (negligibly wetted channel)
WF 7	Q3 – Poor
Proposed Grid Route	
GC 1	Q3-4 – Moderate

APPENDIX III

PROPOSED WIND FARM eDNA RESULTS

Folio No: 3140-2024
Purchase Order: 231103
Contact: MKO
Issue Date: 26.07.2024
Received Date: 12.07.2024

eDNA Report

Technical Report

SureScreen Scientifics

Folio No: 3140-2024
Purchase Order: 231103
Contact: MKO
Issue Date: 26.07.2024
Received Date: 12.07.2024

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK2120	2 Seskin		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed crayfish	Pass	Negative	0
FK2197	1 Seskin		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed crayfish	Pass	Negative	0
FK2201	7 Seskin		Crayfish plague	Pass	Negative	0
			Freshwater pearl mussel	Pass	Negative	0
			White-clawed	Pass	Negative	0

Folio No: 3140-2024
Purchase Order: 231103
Contact: MKO
Issue Date: 26.07.2024
Received Date: 12.07.2024

SureScreen Scientifics

		crayfish			
FK2199	5 Seskin	Crayfish plague	Pass	Negative	0
		Freshwater pearl mussel	Pass	Negative	0
		White-clawed crayfish	Pass	Negative	0
FK2198	3 Seskin	Crayfish plague	Pass	Negative	0
		Freshwater pearl mussel	Pass	Negative	0
		White-clawed crayfish	Pass	Positive	7

Matters affecting result: none

Reported by:Chelsea Warner

Approved by: Chelsea Warner

Folio No:	3140-2024
Purchase Order:	231103
Contact:	MKO
Issue Date:	26.07.2024
Received Date:	12.07.2024

Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check:

Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

APPENDIX 2

Environmental Impact Assessment Report (EIAR)

Seskin Renewables Wind Farm

Chapter 4 – Description of the Proposed Development



DOCUMENT DETAILS

Client:	**Seskin Renewable Energy Ltd**
Project Title:	**Seskin Renewables Wind Farm**
Project Number:	**231103**
Document Title:	**Environmental Impact Assessment Report (EIAR)**
Document File Name:	**Ch.4 Description F – 2025.06.27 - 231103**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	27/06/2025	ER	EM

Table of Contents

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT 4-1

4.1 Introduction 4-1
4.2 Proposed Development Layout 4-2
4.3 Proposed Development Components 4-4
4.3.1 Proposed Wind Farm 4-4
4.3.2 Proposed Grid Connection 4-20
4.3.3 Quantities of Spoil and Crushed Stone 4-29
4.3.4 Site Activities 4-31
4.4 Access and Transportation 4-34
4.4.1 Site Entrance 4-34
4.4.2 Deliveries of Stone and Ready-Mix Concrete from Quarries 4-34
4.4.3 Turbine Component Delivery Route 4-34
4.4.4 Traffic Management 4-44
4.5 Community Gain Proposal 4-45
4.5.1 Background 4-45
4.5.2 Renewable Energy Support Scheme 4-45
4.5.3 Community Benefit Fund 4-46
4.5.4 Community Investment Opportunity 4-46
4.6 Site Drainage 4-46
4.6.1 Introduction 4-46
4.6.2 Existing Drainage Features 4-47
4.6.3 Drainage Design Principles 4-47
4.6.4 Drainage Design 4-49
4.6.5 Drainage Management and Maintenance 4-57
4.7 Construction Management 4-58
4.7.1 Construction Sequencing 4-58
4.7.2 Construction Phase Monitoring and Oversight 4-59
4.8 Construction Methodologies 4-60
4.8.1 Proposed Wind Farm 4-60
4.8.2 Proposed Grid Connection 4-66
4.9 Operation 4-76
4.10 Decommissioning 4-76

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the Proposed Development and all its component parts. Two separate planning applications, relating to the Proposed Development, will be made to Kilkenny County Council and to Laois County Council. This chapter also describes elements of the overall project which are not subject to this planning application but are assessed in this EIAR. Construction methodologies for the main infrastructural components of the development are also included in this chapter (or its associated appendices) of the EIAR.

The Overall Proposed Development will consist of the provision of the following:

i. *The construction of 8 no. wind turbines with an overall turbine tip height of 175 metres; a rotor blade diameter of 150 metres; and hub height of 100 metres, and associated foundations and hard standing areas;*

ii. *A permanent 38kV substation compound (control building with welfare facilities, all associated electrical plant and apparatus, security fencing including vegetative screening, underground cabling, wastewater holding tank, site drainage and all ancillary works);*

iii. *Permanent underground electrical (38kV) and communications cabling to the existing Ballyragget 110kV substation in the townland of Moatpark (including joint bays, communication and earth sheath link chambers and all ancillary works along the route);*

iv. *Underground electrical and communications cabling connecting the wind turbines and meteorological mast to the on-site substation;*

v. *A meteorological mast with a height of 100m above ground and associated foundation and hard-standing area;*

vi. *Upgrade of existing tracks and roads and the provision of new site access roads;*

vii. *All works associated with the upgrade of the existing agricultural access off the L58333 local road (including the installation of fencing and steel gates);*

viii. *2 no. temporary construction compounds (including temporary site offices and staff facilities);*

ix. *Accommodation works along the N77 National secondary road, in the townlands of Durrow Townparks, Co. Laois and Ballynaslee, Co. Kilkenny, to facilitate the delivery of turbine components and other abnormal sized loads;*

x. *A borrow pit;*

xi. *Spoil Management;*

xii. *Hedgerow removal;*

xiii. *Biodiversity Management and Enhancement Plan measures (including establishment of new hedgerow, translocation of existing hedgerow and enhancement of existing hedgerow);*

xiv. *Site Drainage;*

xv. *Operational stage site signage; and,*

xvi. *All associated site development works, ancillary works and apparatus.*

The development descriptions for the current planning applications as they appear in the public notices for Kilkenny County Council and Laois County Council are included in Chapter 1, Section 1.4, of this EIAR.

Both applications are seeking a ten-year planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

Section 1.1.1 of Chapter 1 of this EIAR provides a definition of the various project references used throughout the document. The 'Proposed Development', which encompasses the 'Proposed Wind Farm' and 'Proposed Grid Connection' has been assessed within this EIAR. The Proposed Development is located within the EIAR Site Boundary or the 'Site' which measures approximately 302 hectares (ha). The 'Proposed Wind Farm site' refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the site surrounding the Proposed Grid Connection underground cabling route. The Proposed Development layout is illustrated on Figure 4-1.

All elements of the Proposed Development in the list above, and described in this chapter, have been assessed as part of this EIAR.

4.2 Proposed Development Layout

The layout of the Proposed Development has been designed to minimise the potential environmental effects of the wind farm, while at the same time maximising the energy yield of the wind resource passing over the site. A constraints study, as described in Section 3.2.5.2.1 of Chapter 3 of this EIAR, has been carried out to ensure that turbines and all ancillary infrastructure are located in the most appropriate areas of the site. The Proposed Development layout makes maximum use of the existing access roads and tracks within the site, thereby minimising the extent of proposed new roads required.

The overall layout of the Proposed Development is shown on Figure 4-1. This drawing shows the proposed locations of the wind turbines, electricity substation, grid connection route, spoil repositories, construction compounds, internal roads layout, and the main site entrance. The EIAR Site Boundary does not encompass the turbine delivery accommodation works along the N77 national secondary road in the townland of Durrow Townparks, Co. Laois and at the L58333 local road junction with the N77 national secondary road in the townland of Ballynaslee, Co. Kilkenny. However, these temporary works are included as part of this planning application and are fully assessed as part of the EIAR.

Detailed site layout drawings of the Proposed Development are included in Appendix 4-1 to this EIAR.

Durrow

County Laois

County Kilkenny

T1

T2

T3

T4

T5

T6

T7

T8

Map Legend

- EIAR Site Boundary
- Proposed Turbine Locations
- Proposed Met Mast
- Proposed Hardstands
- Existing Roads to be Upgraded
- Proposed New Roads
- Proposed Borrow Pit
- Proposed Temporary Construction Compounds
- Proposed Hedgerow Planting and Enhancement Measures
- Proposed 38kV Substation
- Proposed 38kV Underground Gird Connection Cabling
- Proposed Horizontal Directional Drilling
- Existing Ballyragget 110kV Substation
- Kilkenny/Laois County Border

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Drawing Title: Proposed Development

Project Title: Seskin Renewables Wind Farm

Drawn By	Checked By
ER	EM
Project No.	Drawing No.
231103	Figure 4-1
Scale	Date
1:20,000	2025-06-26

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4.3 Proposed Development Components

This section of the EIAR describes the components of the Proposed Development. Further details regarding Access and Transportation (Section 4.4), Community Gain (Section 4.5), Site Drainage (Section 4.6), Construction Management (Section 4.7) and Construction Methodologies (Section 4.8) are provided subsequently in this chapter.

4.3.1 Proposed Wind Farm

4.3.1.1 Wind Turbines

4.3.1.1.1 *Turbine Locations*

The Proposed Wind Farm turbine layout has been verified using industry standard wind farm design software ensuring that it maximises the energy yield from the Proposed Development, while maintaining sufficient distances between the proposed turbines so as to ensure turbulence and wake effects do not compromise turbine performance. The Grid Reference coordinates of the proposed turbine locations are listed in Table 4-1 below.

The final finished top of foundation level of the turbine foundations will be determined by the actual ground conditions at each proposed turbine location and may differ slightly from those levels listed in Table 4-1. Also, in accordance with the '*Wind Energy Development Guidelines for Planning Authorities'* (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) micro-siting of the turbine positions may be required within the criteria set out in the guidelines.

Table 4-1 Proposed Wind Turbine Locations and Elevations

Turbine	ITM Coordinates		Existing Elevation (m OD)
	Easting	Northing	
T1	641792	675091	152
T2	641224	674883	172
T3	641939	674425	140
T4	641393	674394	174
T5	641969	673942	161
T6	641797	673301	144
T7	642441	673026	101
T8	641873	672889	123

4.3.1.1.2 *Turbine Type*

Wind turbines use the energy from the wind to generate electricity. A wind turbine, as shown in Plate 4-1 below, consists of four main components:

- Foundation unit
- Tower
- Nacelle (turbine housing)
- Rotor



Plate 4-1 Wind turbine components

The proposed wind turbines to be installed on the site will have the following dimensions:

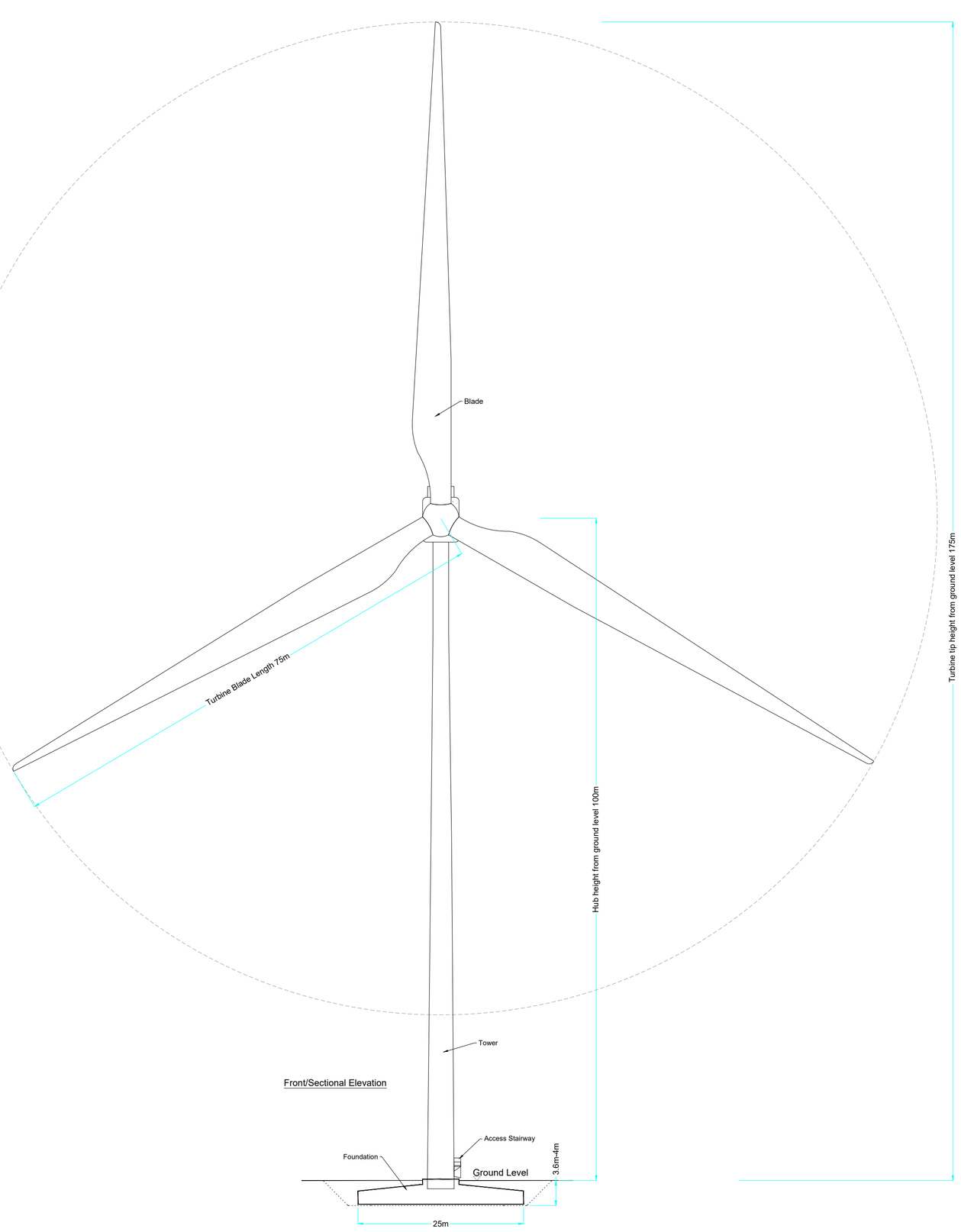
- Turbine Tip Height –175 metres
- Hub Height –100 metres
- Rotor Diameter - 150 metres.
- Blade Length –75 metres

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the Proposed Development site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times.

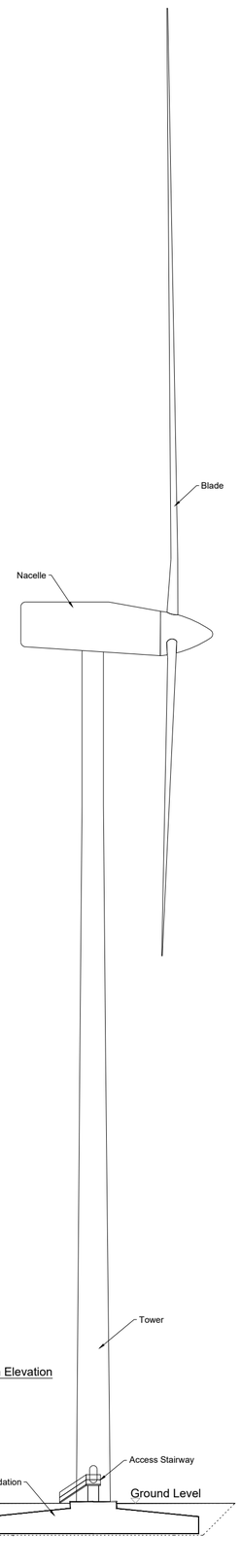
It should be noted that the assessment of the development footprint of the Proposed Development site, within this EIAR, is based on the maximum potential footprint for all of the infrastructural elements. This precautionary approach is taken as the assessment of the maximum development footprint will, in the absence of mitigation measures, give rise to the greatest potential for significant effects. Should the development footprint be less than the maximum, the potential for significant effects will also be reduced.

A drawing of the proposed wind turbine is shown in Figure 4-2.

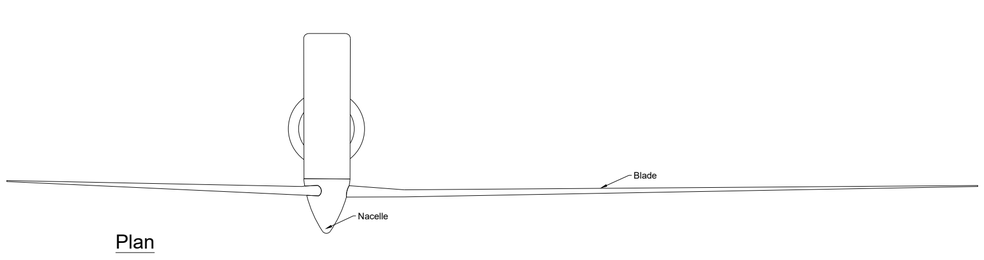
Figure 4-2 also shows the turbine base layout, including turbine foundation, hard standing area, assembly area, access road and surrounding works area. The individual components of a geared wind turbine nacelle and hub are shown in Figure 4-3 below.



Front/Sectional Elevation



Side/Section Elevation



Plan

Drawing Notes

1. Proposed wind turbines to have a maximum ground to blade tip height of 175m, blade length of 75m and hub height of 100m
2. Ground level represents the top of turbine foundation.

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Wind Turbine Elevation & Plan**

PROJECT No.:	DRAWING No.:	SCALE:
231103	**Fig 4-2**	**1:500 @ A1**

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JOB	**AC**	**30.06.2025**	P01

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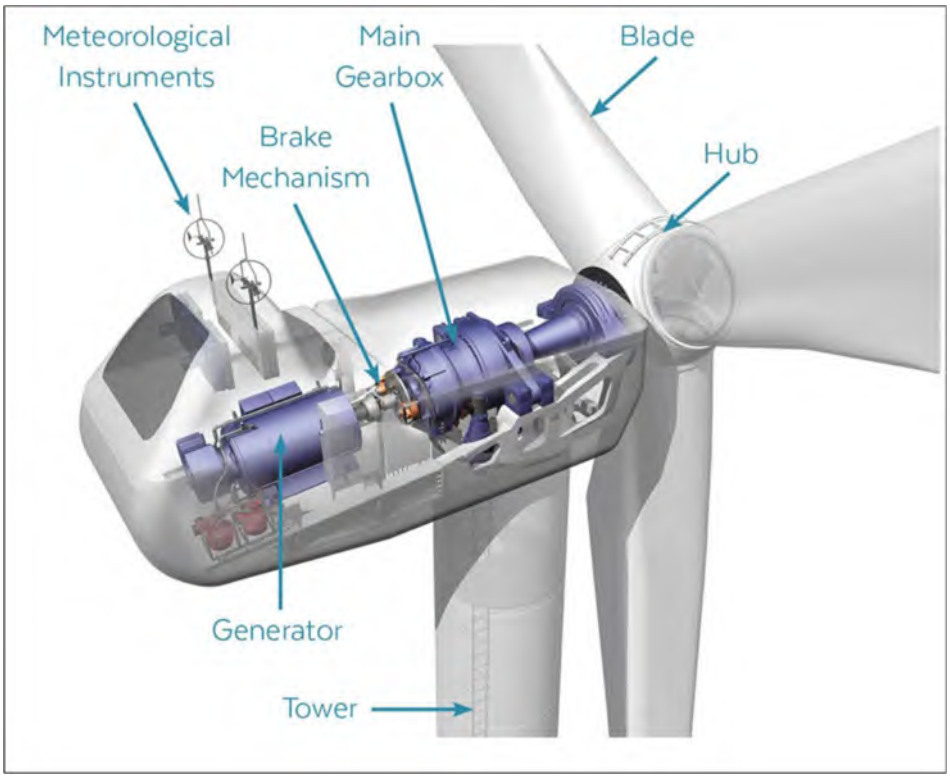


Figure 4-3 Turbine nacelle and hub components

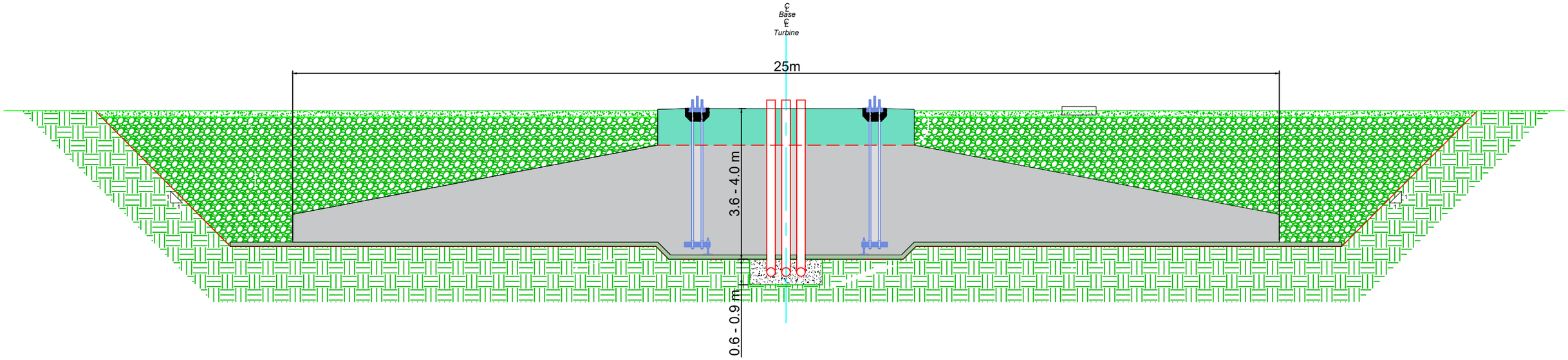
4.3.1.1.3 *Turbine Foundations*

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier and a foundation area large enough to accommodate modern turbine models has been assessed in this EIAR. The turbine foundation transmits any load on the wind turbine into the ground. Where ground conditions are unfavourable to use the excavate and replace (gravity), piles (bored or driven) will be installed to formation level. All foundation options have been assessed in this EIAR and are shown in Figure 4-4 ,Figure 4-5 and Figure 4-6.

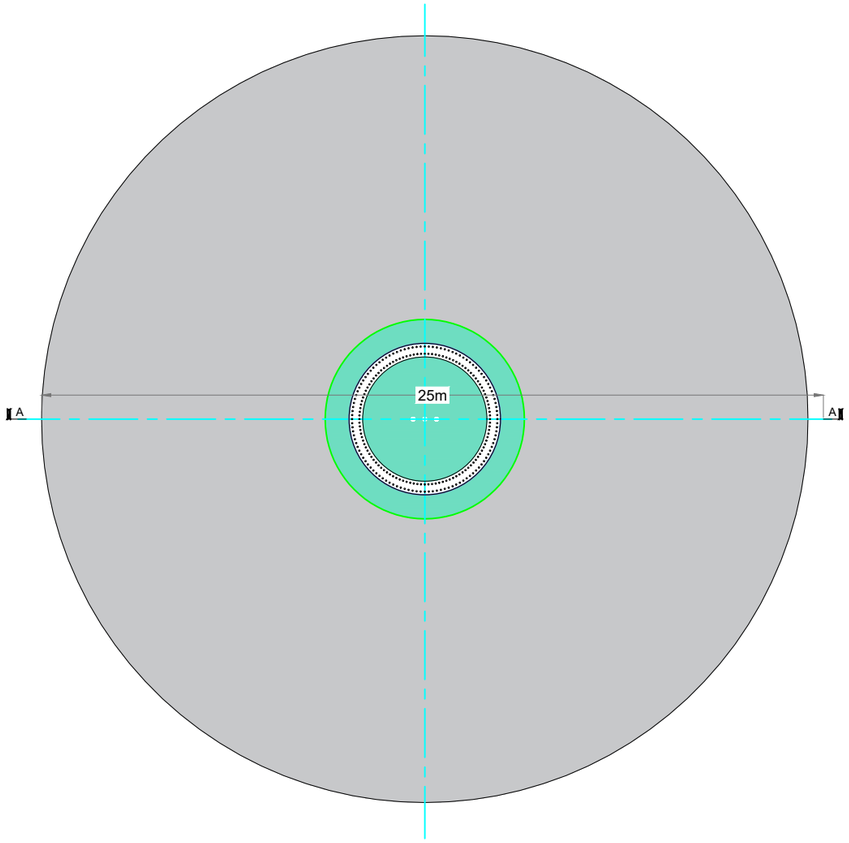
The maximum horizontal and vertical extent of the turbine foundation will be 25m and 4m respectively, which has been assessed in the EIAR.

After the foundation level of each turbine has been formed on competent strata (i.e. bedrock or subsoil of sufficient load bearing capacity) or using piling methods, the “Anchor Cage” (anchors the first section of the turbine tower to the foundation) is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level (Plate 4-2 below).

Section A-A
Scale 1:100



Plan
Scale: 1:200



PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Gravity Foundations Details**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-4	As Shown @ A3

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JOB	AC	30.06.2025	P01

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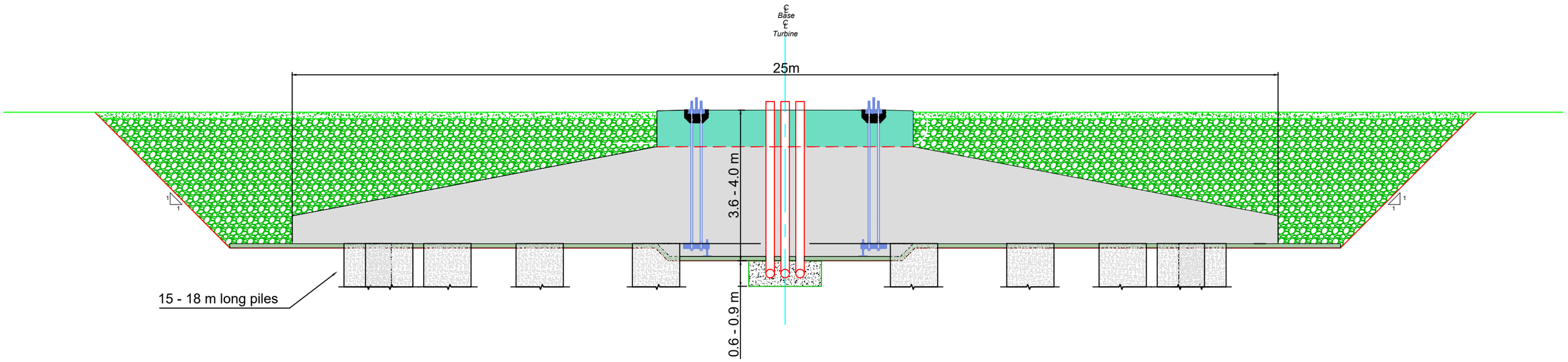
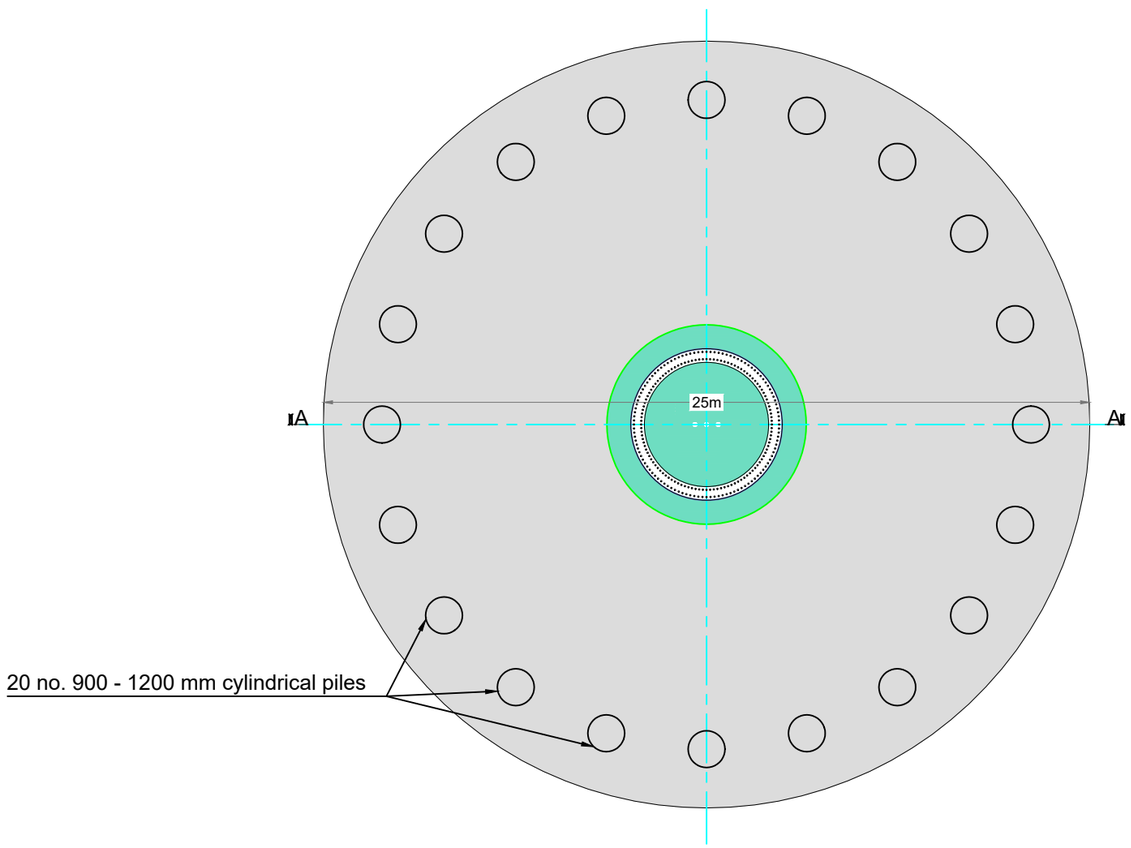
Section A-A
Scale 1:100



Plan
Scale: 1:200



PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Bored Pile Foundations Details**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-5	As Shown @ A3

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Section A-A
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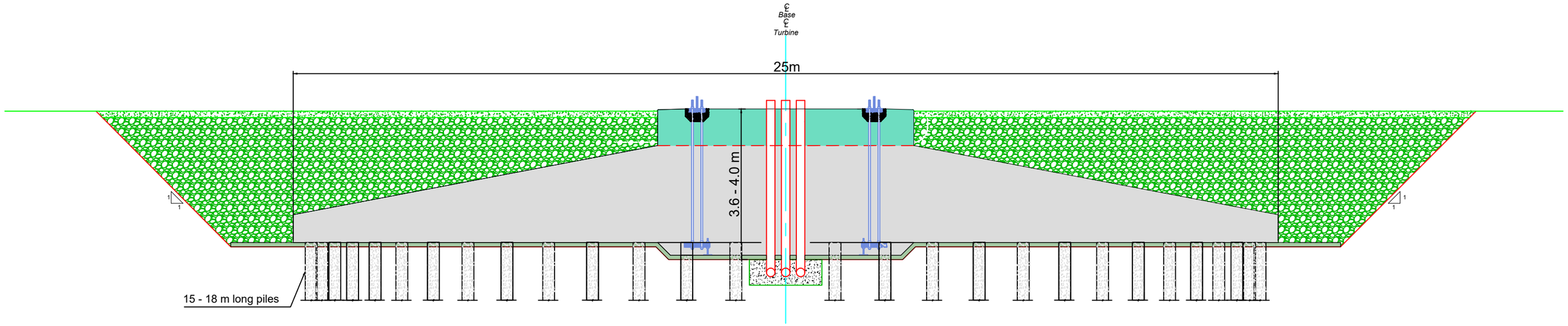
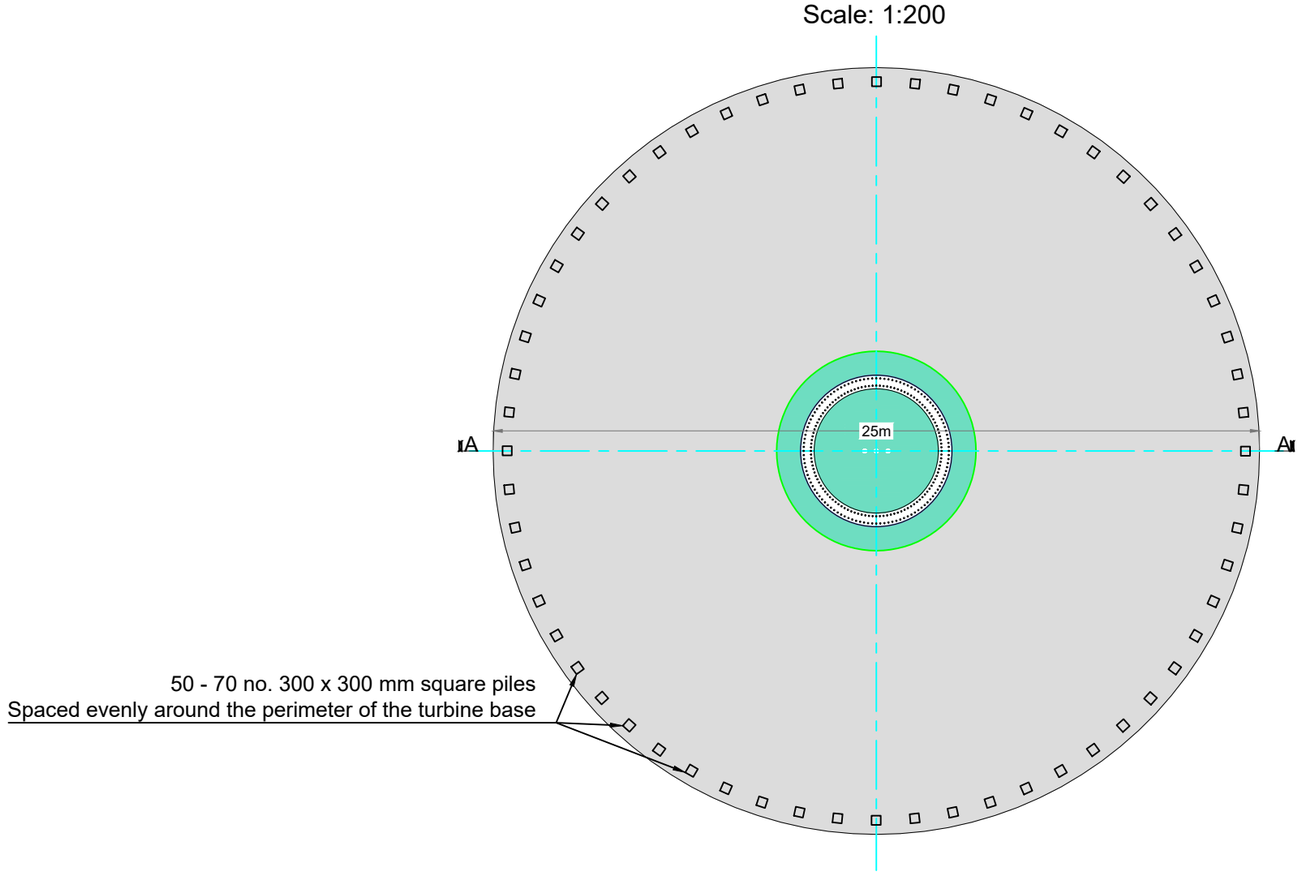


Plan
Scale: 1:200



50 - 70 no. 300 x 300 mm square piles
Spaced evenly around the perimeter of the turbine base

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Driven Pile Foundations Details**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-6	As Shown @ A3

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Plate 4-2 Turbine Foundation Anchor Cage surrounded by reinforcing steel and finished turbine base

4.3.1.1.4 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base. These will facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine. The hardstands also allow for the offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations, once completed, by placing crushed stone over the foundation. The arrangement and positioning of hard standing areas are dictated by turbine suppliers. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads. The proposed hard standing areas for each individual turbine are shown as part of the detailed layout drawings included in Appendix 4-1 and represent the maximum sizes required. However, the extent of the required areas at each turbine location may be optimised on-site within the parameters set out and assessed in this EIAR. This will depend on the turbine supplier's exact requirements.

4.3.1.1.5 Assembly Area

Levelled assembly areas will be located on either side of the hard-standing area. These assembly areas are required for offloading turbine blades, tower sections and hub from trucks until such time as they are ready to be lifted into position by cranes and to assist the main crane during turbine assembly. The extent of the area required for the assembly areas is shown on the detailed drawing in Appendix 4-1.

4.3.1.1.6 Power Output

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Development, will have an operational lifespan greater than the 35-year operational life that is being sought as part of the planning application. Each of proposed wind turbines will have a generating capacity of 6MW. 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. The exact power rating of the installed turbine will be designed to match the wind regime on the Proposed Development site and will be determined by the selected manufacturer.

For the purposes of this EIAR, a rated output of 6 MW has been chosen to calculate the power output of the proposed 8-turbine renewable energy development, which would result in an estimated installed capacity of 48 MW.

Assuming an installed capacity of 48 MW, the Proposed Development therefore has the potential to produce up to 134,554 MWh (megawatt hours) of electricity per year, based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year

where: A = ... The number of hours in a year: 8,760 hours

B = ... The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 32%[1] is used here.

C = ... Rated output of the wind turbines: 48 MW

The 134,554 MWh of electricity produced by the Proposed Development would be sufficient to supply approximately 32,037 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity[2] (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision Paper).

4.3.1.2 Site Roads

4.3.1.3 Road Construction Types

To provide access within the Proposed Development site and to connect the wind turbines and associated, infrastructure, existing roads and tracks will need to be upgraded and new access roads will need to be constructed. The road construction design, as per the Spoil Management Plan in Appendix 4-2, has taken into account the following key factors:

1. *Buildability considerations;*
2. *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles*
3. *Horizontal longitudinal and cross-fall gradient of the roads;*
4. *Minimisation of excavation arisings;*
5. *Making use of existing infrastructure where possible;*

Whilst the above key factors are used to determine the road design the actual construction technique employed for a particular length of road will be determined on the prevailing ground conditions encountered along that length of road.

The Proposed Development site makes use of the existing road network insofar as possible. It is proposed to upgrade approximately 1.5 km of existing site roads and tracks, and to construct approximately 4.9 km of new access road on the Proposed Development site. It is proposed to construct passing bays along the proposed access road network to allow construction traffic to safely pass each other. Areas such as wide junctions and proposed hardstands will also be used as passing bays throughout the construction phase of the Proposed Wind Farm site.

Upgrade of Existing Access Roads or Tracks

As noted above, approximately 1.5km of existing roads and access tracks will be upgraded as part of the Proposed Wind Farm construction phase. The existing tracks onsite were constructed using the excavate and replace construction technique, therefore proposed road widening will be founded on competent stratum. Cross section details of the upgrade of existing roads are shown as Figure 4-7. Details on the construction methodology for the upgrading of existing tracks and roads is outlined below in Section 4.8.1.2.2.

[1] *https://www.eirgridgroup.com/site-files/library/EirGrid/ECP-2-2-Solar-and-Wind-Constraints-Report-Area-I-v1.0.pdf*
[2] *March 2017 CER (CRU) Review of Typical Consumption Figures Decision Paper https://www.cru.ie/document_group/review-of-typical-consumption-figures-decision-paper/*

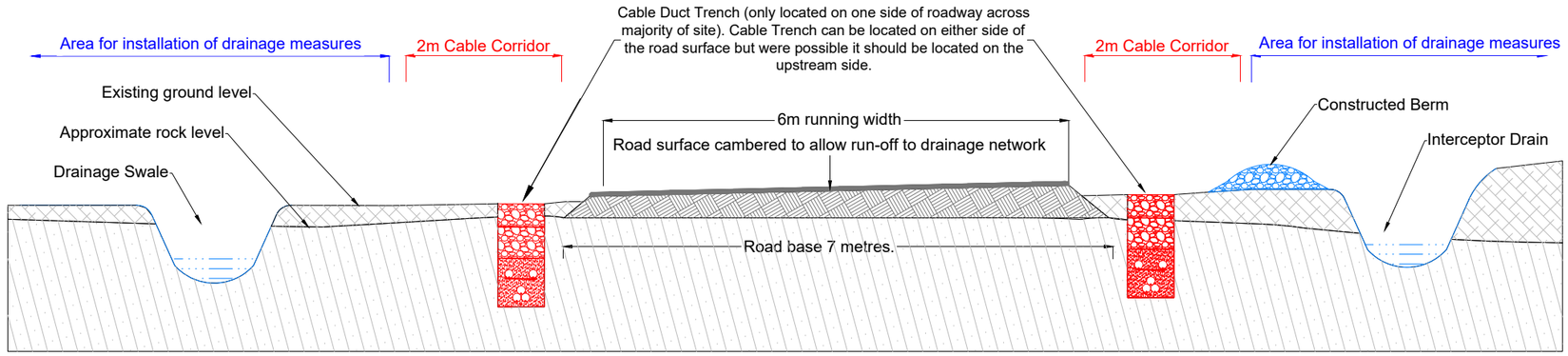
Construction of New Roads

As noted above, approximately 4.9km of new roads will be constructed in order to facilitate the Proposed Wind Farm. Due to the ground conditions, new access tracks proposed on site are proposed to be founded and located on competent stratum. The make-up of the founded access tracks is a stone thickness of c. 400mm. A cross section detail of a new excavated road is also shown in Figure 4-7.

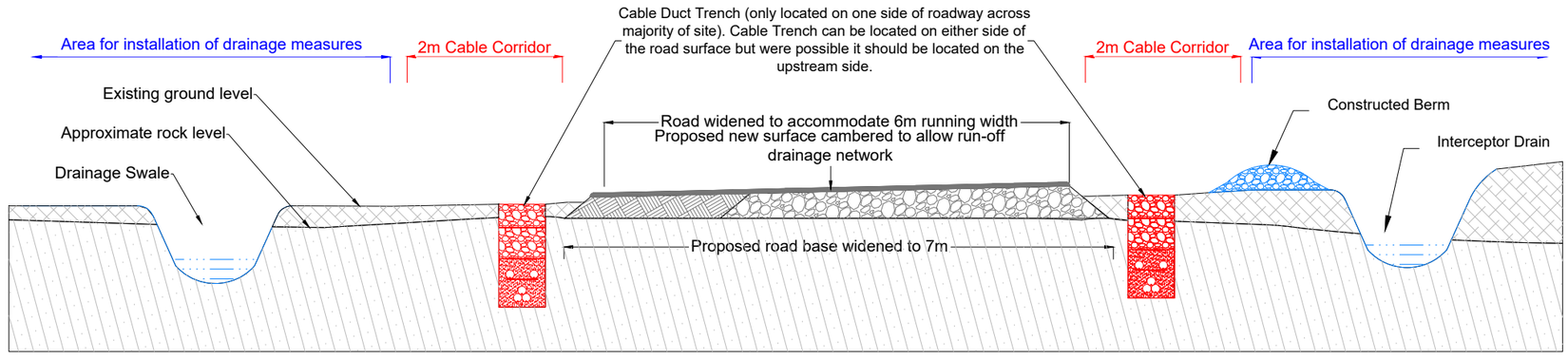
The details on the construction methodology for new excavated roads is outlined below in Section 4.8.1.2.1.

Drawing Notes

1. Widening can occur to either side of existing roads dependent on site conditions.
2. Depths of road fill to vary dependent on site conditions.



Typical excavated road section.



Typical existing excavated road widening section.

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Excavated Road Sections**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-7**	SCALE: **1:75 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **AC**	DATE: **30.06.2025**	REVISION.: P01

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4.3.1.4 Site Underground Electrical (33kV) and Communications Cabling

Each turbine and the meteorological mast (refer to Section 4.3.1.5 below) will be connected to the on-site electricity substation via underground 33 kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the onsite substation. The electricity and fibre-optic cabling connecting to the onsite substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways and/or under the roadways. The route of the cable ducts will follow the access track to each turbine location and are illustrated on the site layout drawings included as Appendix 4-1, the exact number and configuration of cable ducting may vary within the cabling trench. Figure 4-8 below shows two variations of a typical cable trench, one for off-road trenches and one for on-road trenches. The cabling may be placed on either side of the roads, on both sides of the road or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

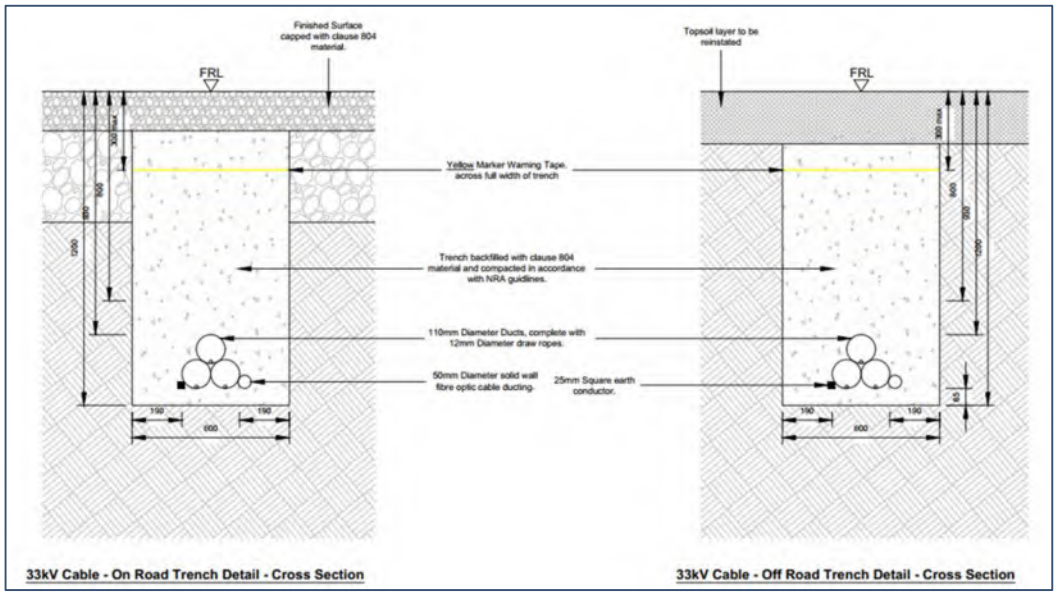
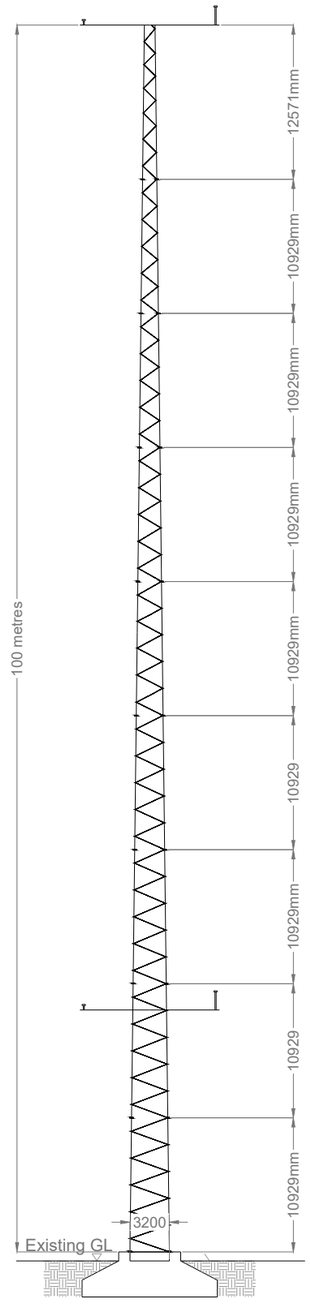


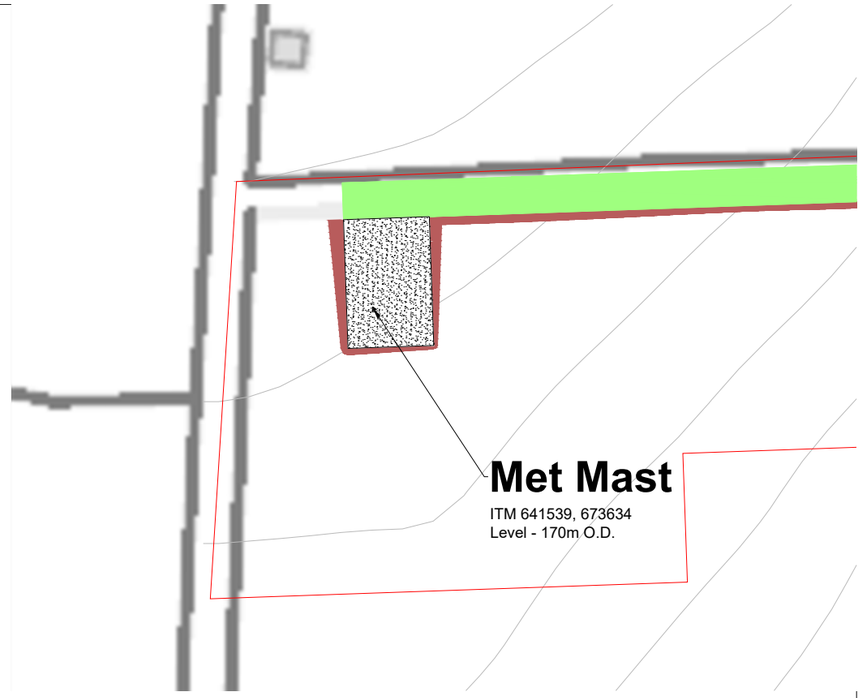
Figure 4-8 Cable trench cross section detail

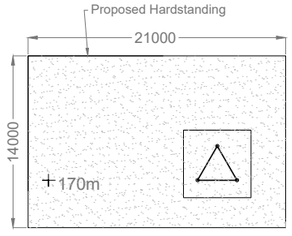
Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the Proposed Wind Farm site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

4.3.1.5 Meteorological Mast

One meteorological (met) mast is proposed as part of the Proposed Development site. The met mast will be equipped with wind monitoring equipment at various heights. The proposed met mast will be located at E641539, N673634 (ITM) as shown on the Proposed Development site layout drawing in Figure 4-1. The mast will be a free-standing slender lattice structure 100 metres in height. The mast will be constructed on a hard-standing area sufficiently large enough to accommodate the equipment that will be used to erect the mast. The elevation and plan view of the proposed met mast is shown in Figure 4-9.







Met Mast Compound Plan

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Met Mast Layout Plan and Elevations**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-9	1:500 @ A3

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4.3.1.6 Temporary Construction Compounds

Two temporary construction compounds will be located within the Proposed Development site. The primary construction compound will be located at the 240m southeast of T03, measuring approximately 2,925 square metres (m^2) in area. The secondary construction compound will be located adjacent to the proposed substation, measuring approximately 1,554m^2 in area.

The locations of the proposed construction compounds are shown on the Proposed Development site layout drawing in Figure 4-1. The layouts of the construction compounds are shown on Figure 4-10 and Figure 4-11.

The construction compounds will consist of temporary site offices, staff facilities, construction materials storage and car-parking areas for staff and visitors. Turbine components will be brought directly to the proposed turbine locations following their delivery to the site.

Temporary toilets, located within staff portacabins, will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by a permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.

The construction compound will also include a bunded refuelling and containment area for the storage of oil, lubricants and site generators etc, and full retention oil interceptor.

Once the proposed wind farm has been commissioned both the compounds will be removed. These areas will be reinstated with previously excavated spoil and either be reseeded or left to revegetate naturally.

4.3.1.7 Biodiversity Management and Enhancement Plan

4.3.1.7.1 *Hedgerow Removal*

The vast majority of field boundaries within the Proposed Wind Farm site are delineated by (managed and unmanaged) hedgerow and treeline habitats. It is anticipated approximately 1,794m of hedgerow habitat will be removed to accommodate the Proposed Development, including turbines and associated bat buffers, wind farm roads and other key infrastructure. The majority of the existing hedgerows in the Proposed Wind Farm site are heavily managed and support high levels of biodiversity or provide adequate commuting and foraging corridors for local wildlife. The locations of hedgerow loss are shown in Figure 2-1 and Figure 2-2, of Appendix 6-4 of the EIAR, the Biodiversity Management and Enhancement Plan (BMEP).

4.3.1.7.2 *Hedgerow Enhancement*

Approximately 2,375m of heavily managed hedgerow will be enhanced through best practice management measures (discussed further below) and additional planting with native hedgerow species. It is proposed to plant some native tree species within the hedgerow habitat to further increase the biodiversity value of linear features within the Proposed Development site. The following species should be planted:

- Hawthorn (Crataegus monogyna)
  - Proportion of hedgerow mix: 75%
  - Age class to be planted: combination of whips and advanced nursery stock (10cm – 12 cm girth trees) to increase structure diversity.
- Hazel (Corylus avellana)
- Blackthorn (Prunus spinosa)
- Guelder rose (Viburnum opulus)

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.

Drawing Legend

- Planning Application Boundary
- Proposed New Road
- Internal Underground Electrical Cabling Trench
- Borrow Pit
- Cut
- Fill
- Proposed New Hedgerow/Hedgerow Translocation

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Temporary Construction Compound 1**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-10	1:500 @ A3

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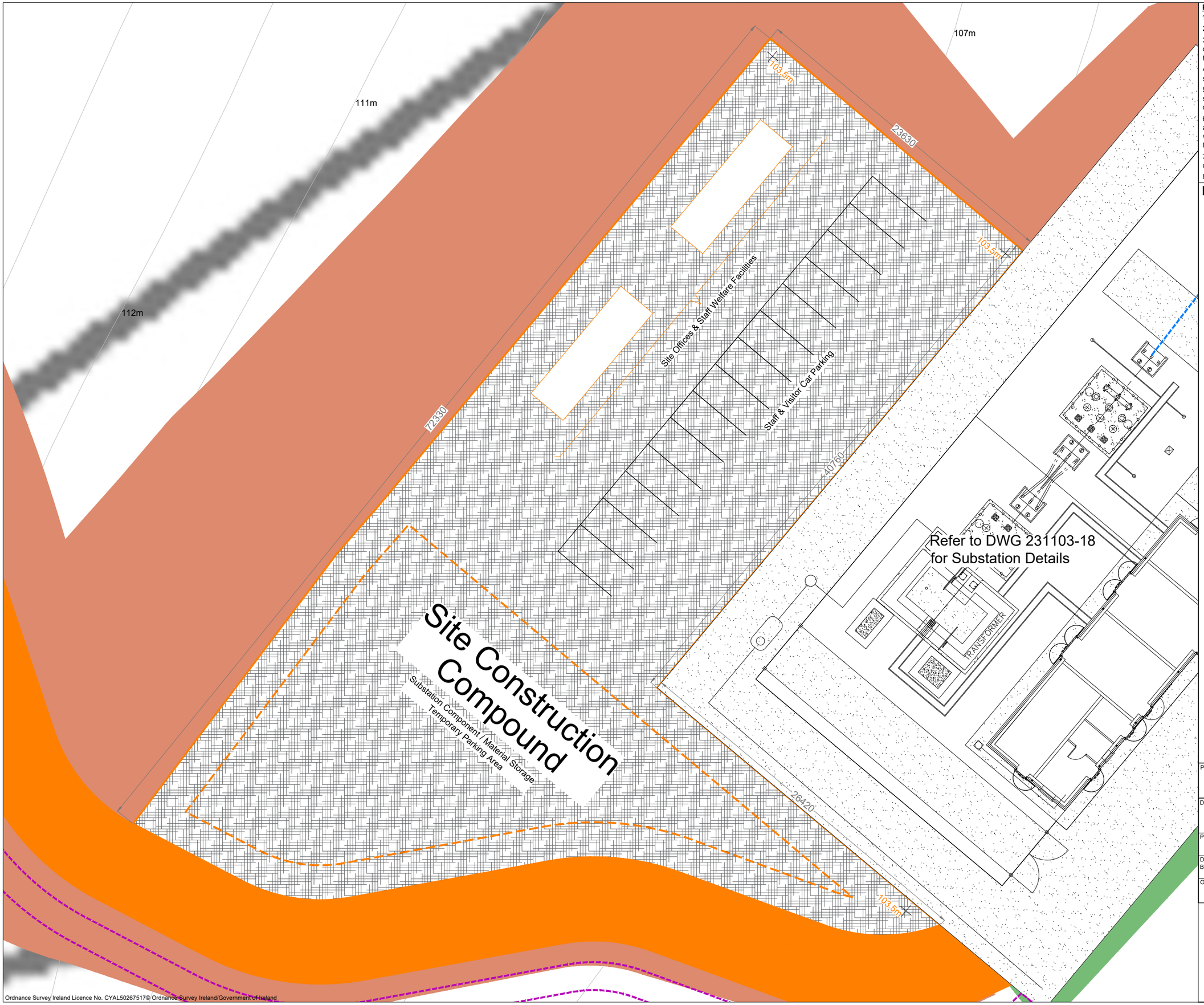

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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.

Drawing Legend

- Proposed New Road
- Internal Underground Electrical Cabling Trench
- Cut
- Fill
- Proposed Underground Grid Connection Cabling Route

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Temporary Construction Compound 2**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-11	1:250 @ A3

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- Holly (Ilex aquifolium)
- Elder (Sambucus nigra)
- Spindle (Euonymus europaeus)
- Wild cherry (Prunus avium)
- Downey birch (Betula pubescens)
- Oak (Quercus robur)
- Goat Willow (Salix caprea)
    - Proportion of hedgerow mix: 25%
    - Age class to be planted: Whips predominantly

Hedgerows should be managed as follows (DAERA, 2022):

- Hedgerows should not be cut every year, as flower buds often form on second-year growth. Hedges should be trimmed on a two- three-year rotation, targeting different sections each year, which will make sure there are always flowers for pollinators in spring and berries for birds in autumn.
- Hedgerows should be trimmed to an 'A' Shape, which is thicker at the base and gets narrower at the top
- A two-meter buffer should be provided next to the hedgerow.
- Where possible, allow trees to develop at roughly 20 metre intervals.

The enhancement of existing hedgerows, translocation of existing (species rich) hedgerow and hedgerow creation will off-set the loss of hedgerows within the Proposed Development site and in the long term will provide a net gain in linear features across the Proposed Development site, increasing the ecological value of the site for local biodiversity. Existing hedgerows identified for enhancement are shown in yellow on Figure 2-3 and Figure 2-4, of Appendix 6-4 of this EIAR, while areas identified as suitable for new hedgerow planting and/or translocation are shown in blue on Figure 2-3 and Figure 2-4. The location of hedgerow planting and enhancement was identified to ensure connectivity with the wider landscape in particular for commuting bats.

4.3.1.7.3 *Hedgerow Creation*

Approximately 2,097m of additional hedgerow will be established within the Proposed Development site, this will be achieved through new hedgerow planting and translocation of existing hedgerows within the site.

Species selected will be indigenous to the local area and will maximise flowering times throughout the year as well as berry availability later in the year as detailed below. For example, species such as guelder rose would be beneficial as this species flowers later in summer. The ideal native hedge is made up of approx. 75% hawthorn and 25% of at least four other species.

A combination of whips and advanced nursery stock (10cm – 12 cm girth trees) will be used for both tree and hedgerow planting across the Proposed Wind Farm site to increase structure diversity and to ensure connectivity gains are immediate.

New hedgerows should be planted between November – March when the woody hedge plants are dormant. When planting new hedgerow, plants will be closely spaced (a maximum of 50cm apart) and planted in a staggered row. The new hedgerow will need to be protected from poaching by livestock, through the erection of new stockproof fencing where required, which will be at least 1m away from the hedge, and installed on each side if required.

- Willow
- Blackthorn
- Whitethorn/Hawthorn
- Spindle
- Elder

- Guelder Rose

4.3.1.7.4 *Hedgerow Translocation*

A number of hedgerows within the site had a rich and diverse floristic composition. They consisted of a high number of woody species including hawthorn (Crataegus monogyna), blackthorn (Prunus spinosa), elder (Sambuccus nigra) hazel (Corylus avellana), holly (Hedera helix), and spindle (Euonymus europaeus). Mature and semi-mature trees, such as beech (Fagus sylvatica), ash (Fraxinus excelsior), pedunculate oak (Quercus robur), goat willow (Salix caprea), alder (Alnus glutinosa), and aspen (Populus tremuloides) were growing as individual trees within these hedgerows. Some of these hedgerows had well developed understories and a diverse ground flora associated with them with species such as lords and ladies (Arum maculatum), cow parsley (Anthriscus sylvestris), bluebells (Hyacinthoides non-scripta), greater stitchwort (Stellaria holostea), primrose (Primula vulgaris), golden saxifrage (Chrysosplenium oppositifolium), common dog violet (Viola riviniana), wood avens (Geum urbanum), and lesser celandine (Ficaria verna) recorded (See Plate 2-3 and 2-4, of Appendix 6-4, for examples of hedgerows with high biodiversity value that will be lost to the footprint of the Proposed Development).

The identification of hedgerows suitable for translocation should be agreed with an Ecologist. Those species rich hedgerows and those that follow old townland boundaries (see data on specific hedgerows in Appendix 6-1) should be prioritised for translocation including those with a range of ground flora. Hedgerow translocation is practiced widely in the UK (Rooney and Hill 2004, cited in Foulkes, N. 2007) and has been attempted in Ireland on multiple occasions (Foulkes, N. 2007). The benefits of translocation include the following (Devon Hedges Group, 2015):

- Where works are carried out well, the integrity and visual character of the original hedge can be maintained, together with much of its cultural, environmental and landscape value.
- A translocated hedge will establish and grow in its new position more quickly than a new hedge.
- Translocation retains the genetic stock and seed bank of the original woody and herbaceous plants.
- The retention of the original and nutrient poor soils can help to reduce weed infestation problems.
- It can be cheaper than establishing a new hedge.
- The hedge is likely to be more in keeping with the surrounding landscape than a new boundary feature such as a fence or unbanked hedge.

The methodology used to carry out hedgerow translocation is included in Section 2.3.1 of Appendix 6-4 of the EIAR.

4.3.1.8 Borrow Pit

It is estimated that approximately 81,075 cubic metres (m^3) of stone material will be required to construct the Proposed Development. It is intended to obtain the majority of materials for the construction of the Proposed Development from the proposed onsite borrow pit (engineer's specified material may be imported onto the Site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure, to come from local licenced quarries). Please see Figure 4-12 for details of the proposed borrow pit. The proposed onsite borrow pit is located approximately 102m southeast of T3 and measures approximately 15,226m^2 in area.

Access to the borrow pit will be via a proposed new access road running along the southern edge of the borrow pit. Please see Figure 4-1 for details. Post-construction, the borrow pit will be reinstated with excavated spoil and profiled to match the existing ground levels, insofar as possible. The borrow pit area will then be reseeded. A stock-proof fence will be erected around the borrow pit area, to prevent unauthorised access, during the construction phase and until the borrow pit has been fully reinstated.

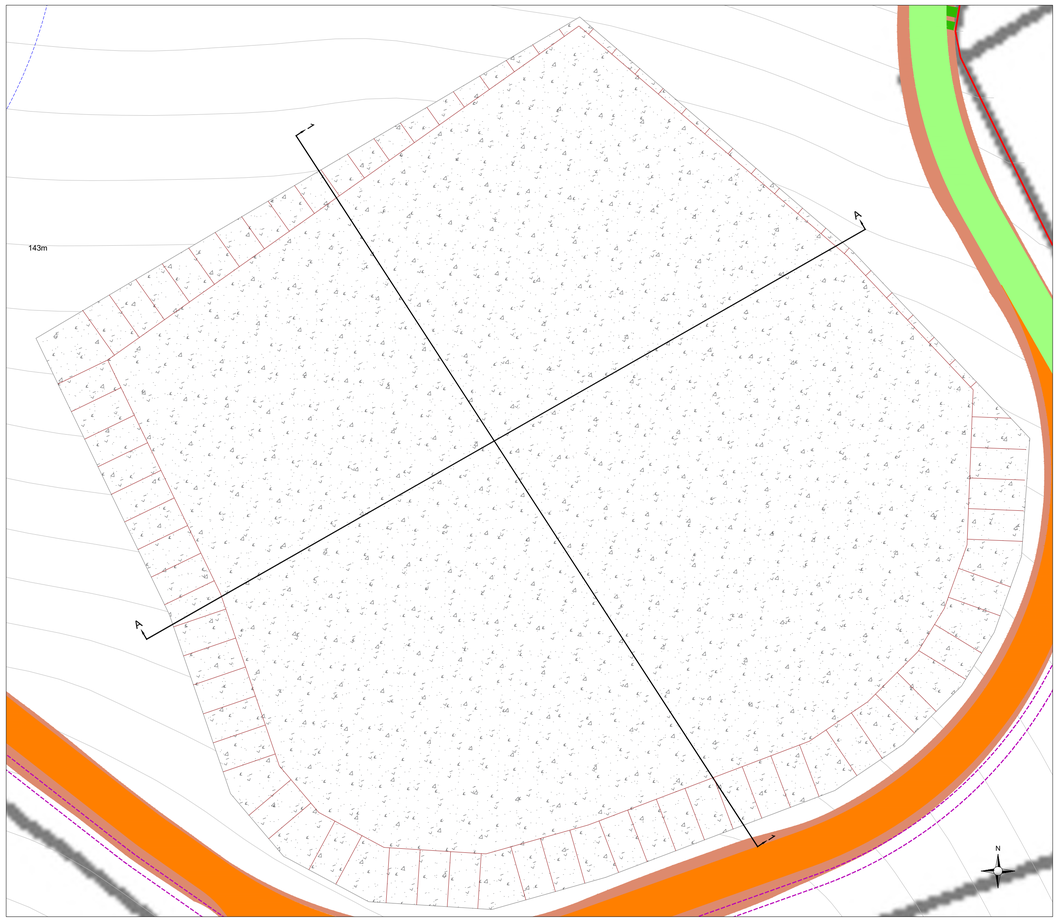
The extraction of material from the borrow pit is a construction phase activity only of the Proposed Development which will be a temporary operation run over a short period of time during the construction phase. The topsoil and subsoil will be stripped back and temporarily stockpiled using standard tracked excavators. Hardcore materials will be extracted from the borrow pit (and some turbine locations, if necessary), principally by means of rock breaking. Depending on the hardcore volume, blasting may also be used as a more effective rock extraction method, capable of producing significant volumes of rock in a matter of milliseconds. Blasting will only be carried out after notifying any potentially sensitive receptors. These two rock extraction methods are discussed below. The processing and crushing of boulders may be required to achieve the grading requirements for use in construction. The potential noise and vibration impact on sensitive receptors associated with the rock extraction measures, detailed below, are assessed in Chapter 12 of this EIAR. Post-construction, any unsafe areas around the borrow pit area will be permanently secured and a stock-proof fence will be erected around the borrow pit area to prevent access to this area. Appropriate health and safety signage will also be erected on this fencing and at locations around the fenced area.

Please see Section 4.8.1.6 below for the methodologies for the breaking and extraction of rock from the borrow pit.

4.3.1.8.1 *Spoil Management Plan*

It is proposed to manage overburden generated through construction activities for the Proposed Development locally within the Site, through backfilling of the proposed borrow pit void in the first instance, and following that within linear berms will be placed along access roads and turbine hardstand areas, where appropriate.

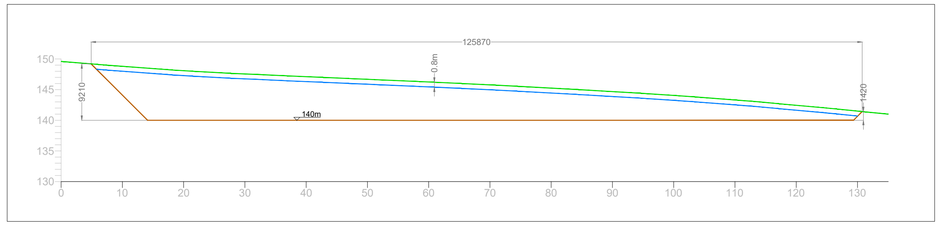
The total estimated volume of spoil to be managed following excavations during the construction phase of the Proposed Development is approximately 100,350m^3. Some material arising from the construction of the Proposed Grid Connection underground cabling route will be sent to an appropriate licenced facility. The majority of soil and subsoil excavated during the works will be used to backfill the proposed borrow pit. Any additional soil and subsoil will be used for site landscaping or will be placed alongside site access roads and turbine hardstands (avoiding environmentally constrained areas).There is more than enough capacity to manage the total volume of spoil requiring management for both the Proposed Wind Farm and the Proposed Grid Connection as detailed in Table 4-2 below.



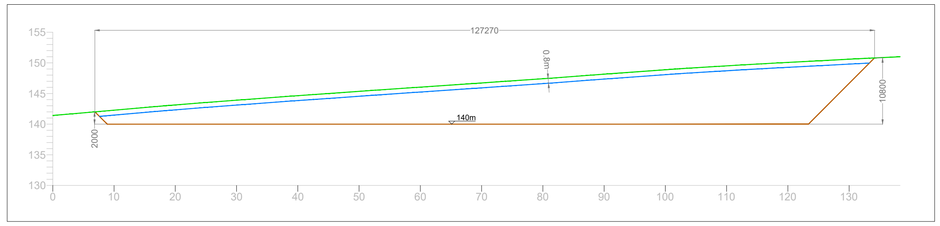
Plan View

Drawing Legend

- Existing Ground
- Assumed Bedrock Level Assumed Bedrock Level (based on trial pit data)
- Proposed Excavation Level



Section A-A



Section 1-1

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Borrow Pit Layout & Sections**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-12**	SCALE: **1:500 @ A1**
DRAWN BY: **JOB**	CHECKED BY: **AC**	DATE: **30.06.2025**	REVISION.: P01

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4.3.2 Proposed Grid Connection

4.3.2.1 Onsite 38 kV Substation

It is proposed to construct a 38kV electricity substation within the Proposed Development site, as shown in Figure 4-1. The proposed onsite 38kVsubstation is located within agricultural pastural land and will be accessed via the Proposed Wind Farm access roads.

The footprint of the proposed onsite 38kV substation compound measures approximately 2,160 square metres in area and will include 1 no. control building and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine and export that electricity from the onsite 38kV substation to the national grid. The layout elevations and sections of the proposed onsite 38kVsubstation are shown on Figures 4-13, 4-14 and 4-15. The construction and exact layout of electrical equipment within the onsite 38kV substation will be to EirGrid / ESB Networks specifications.

Further details regarding the connection between the onsite 38kVsubstation compound and the national electricity grid are provided in Section 4.8.2 below.

The onsite 38kV substation compound will include steel palisade fencing (approximately 2.5 metre high or as otherwise required by ESB), and internal fences will also segregate different areas within the main substation.

4.3.2.2 Wind Farm Control Building

The wind farm control building will be located within the substation compound and will measure 21.5 metres by 7.3 metres and 6 metres in height. Layout and elevation drawings of the control building are included in Figure 4–16. The wind farm control building will include staff welfare facilities for the staff that will work on the Proposed Development during the operational phase of the project. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the Proposed Development there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the Proposed Development does not necessitate a potable source. It is proposed to either harvest rainwater from the roofs of the buildings or, alternatively, install a groundwater well adjacent to the substation in accordance with the Institute of Geologists Ireland, *Guide for Drilling Wells for Private Water Supplies* (IGI, 2007). The well will be flush to the ground and covered with a standard manhole. A pump house is not required as an in-well pump will direct water to a water tank within the roof space of the control building. Bottled water will be supplied for drinking, if required.

It is not proposed to treat wastewater on site. Wastewater from the staff welfare facilities in the control building will be managed by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants.

Such a proposal for managing the wastewater arising on site has become almost standard practice on Proposed Development sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Bord Pleanála as an acceptable proposal.

The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system can be submitted to the Planning Authority in advance of any works commencing on-site. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed Development site's turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007(as amended), will be employed to transport wastewater away from the Proposed Development site.



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7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.

Drawing Legend

- Proposed New Road
- Internal Underground Electrical Cabling Trench
- Cut
- Fill
- Proposed Underground Grid Connection Cabling Route

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Site Substation Compound Layout**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-13	1:250 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
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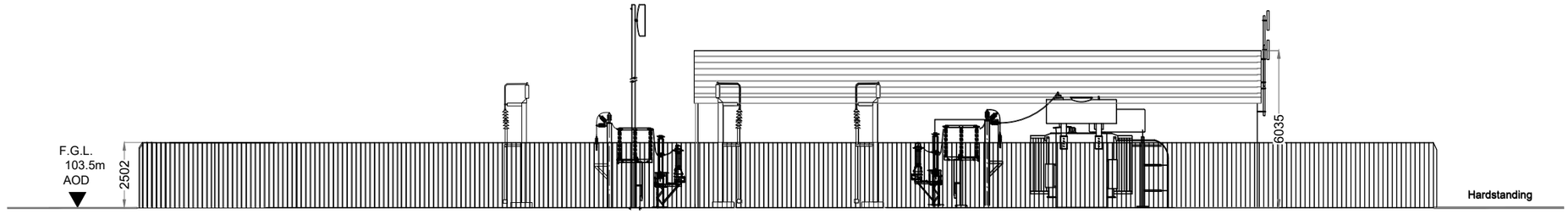
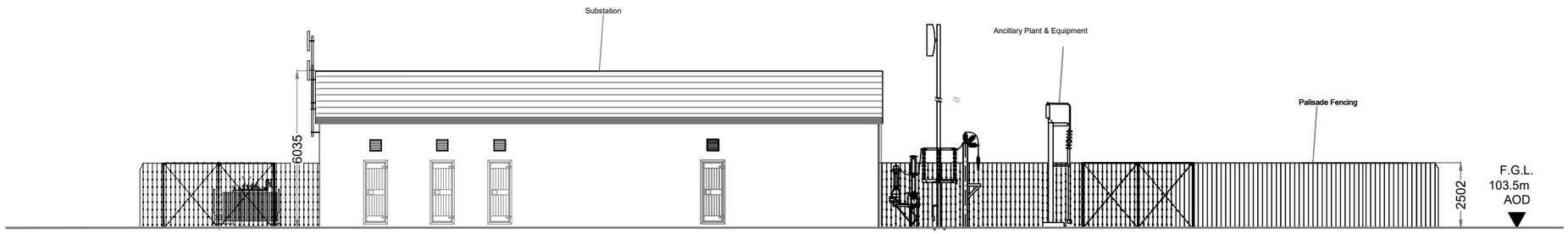
Drawing Notes

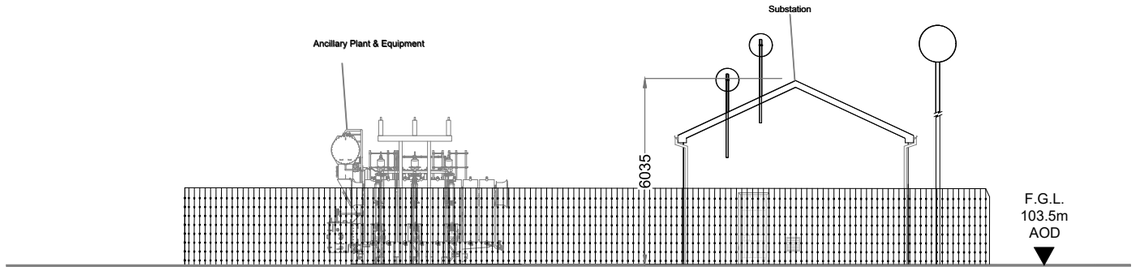
1. Layout and arrangements of substation buildings and electrical equipment is shown indicatively and for illustration purposes only as final specifications of buildings and electrical equipment is to be dictated by Eirgrid/ESB networks requirements.



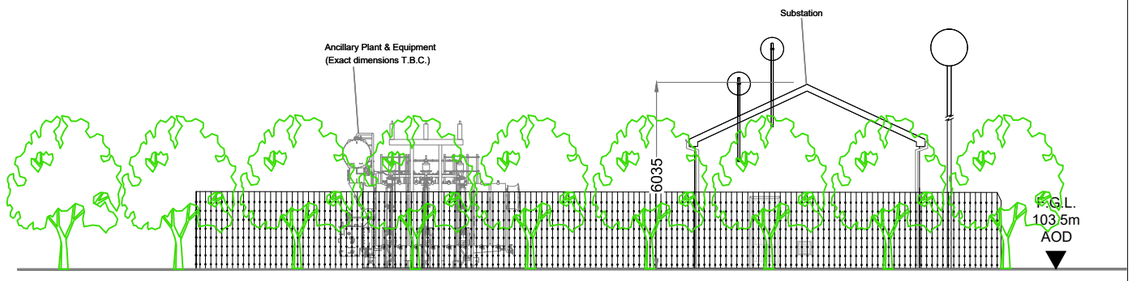
Northern Elevation



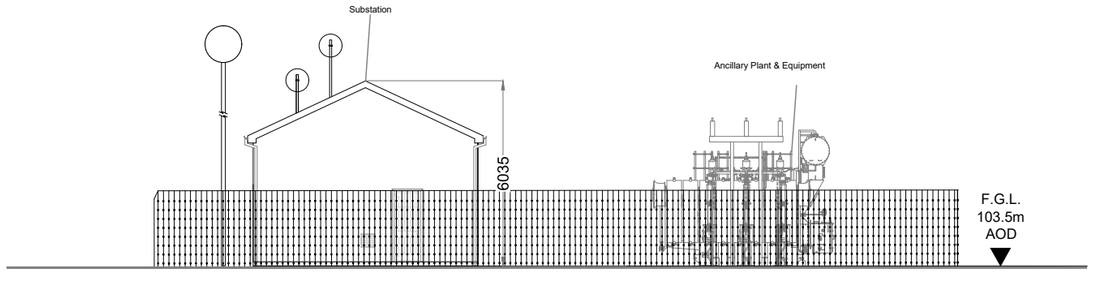
Southern Elevation



Eastern Elevation



Eastern Elevation with Screening



Western Elevation

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Substation Elevations**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-14	1:200 @ A3

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Drawing Notes

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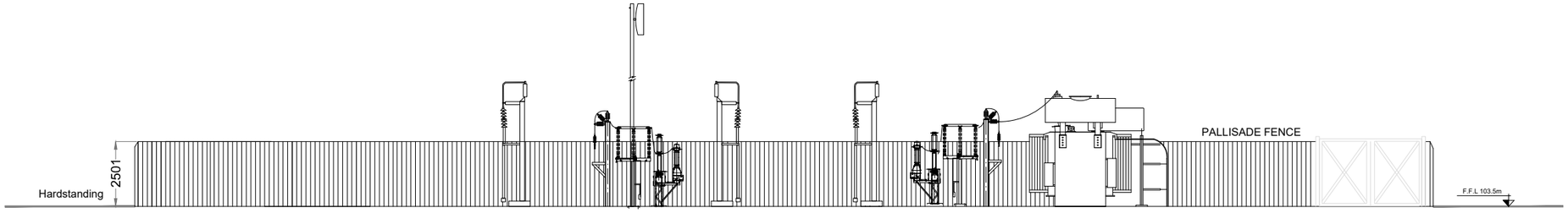
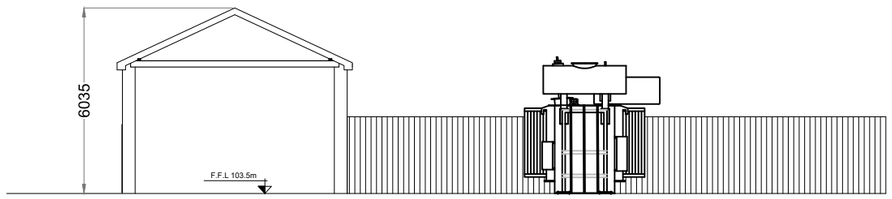


Site Cross Section A-A



Site Cross Section 1-1

Proposed
Hardcore

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Substation Sections**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-15**	SCALE: **1:200 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **RD**	DATE: **30.06.2025**	REVISION.: P01

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Drawing Notes

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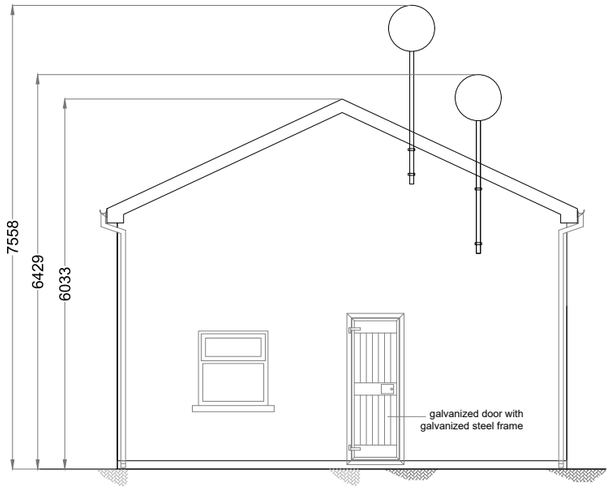
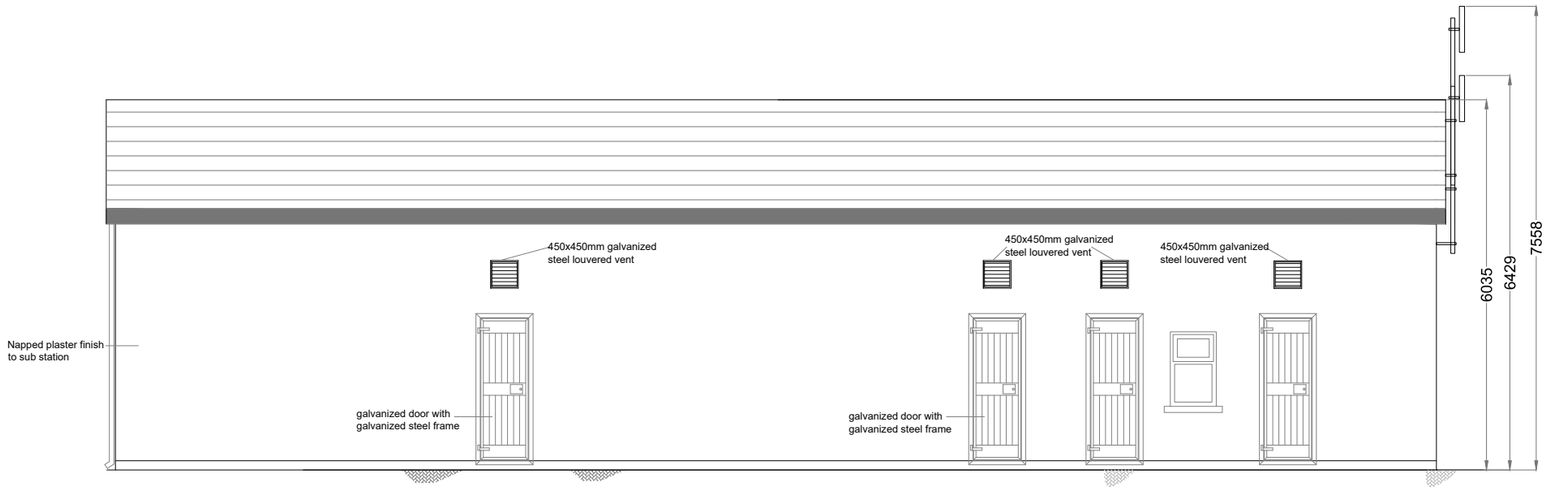
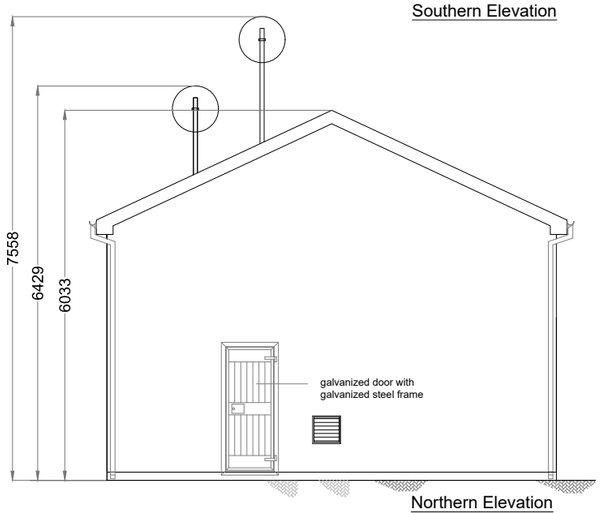


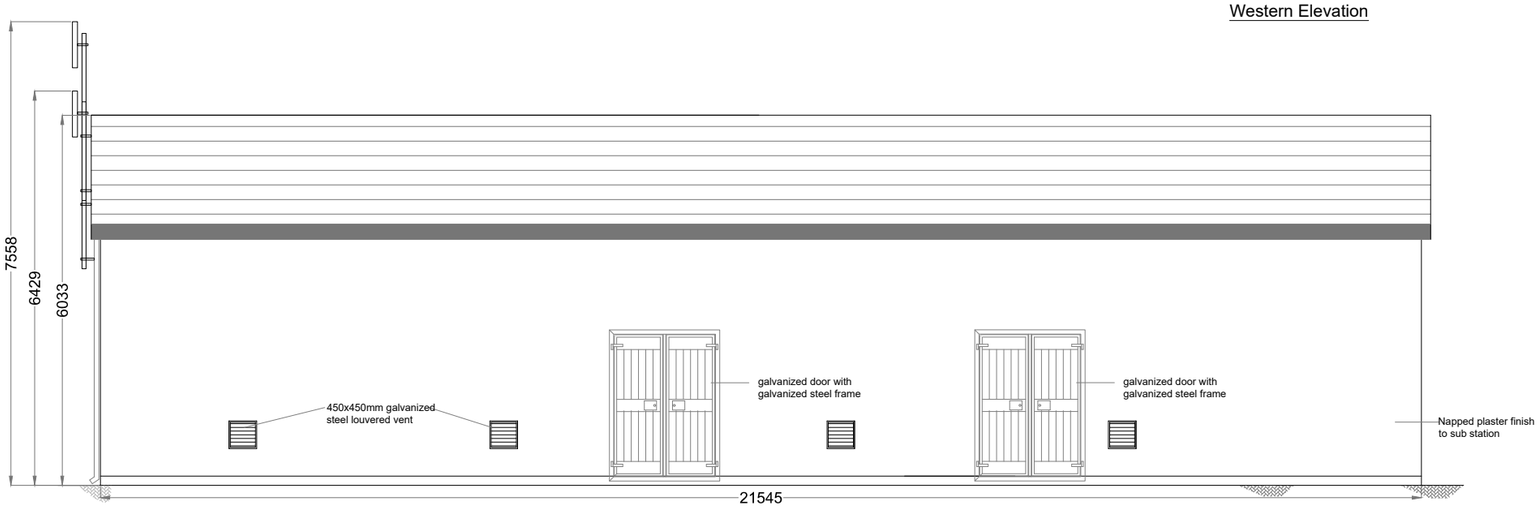
Southern Elevation



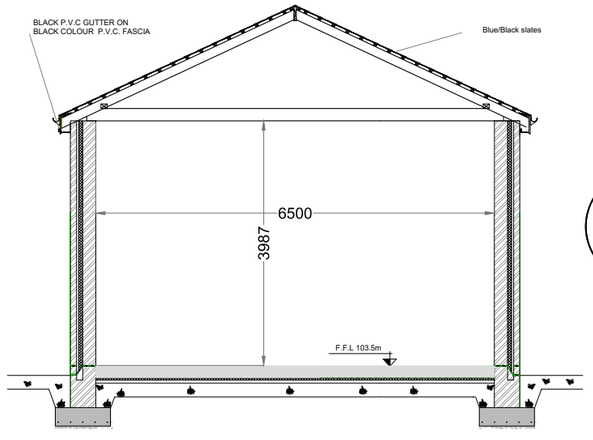
Western Elevation



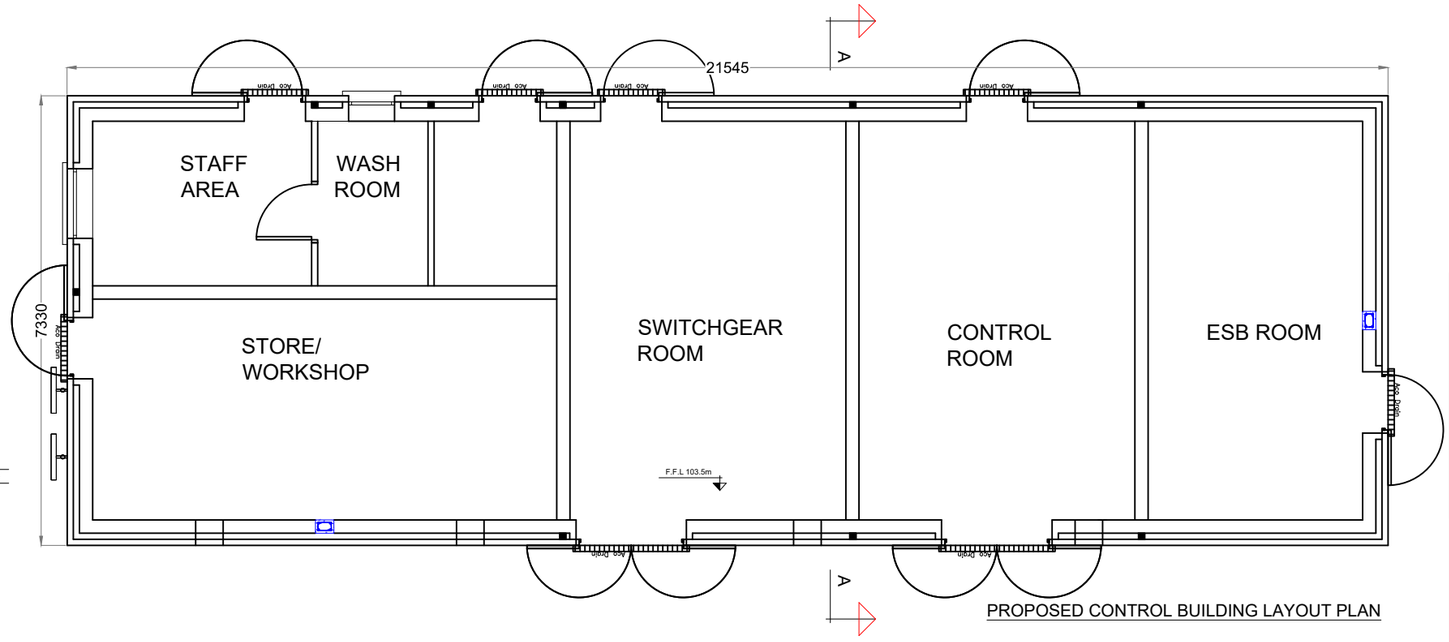
Northern Elevation



Eastern Elevation



SECTION A-A



PROPOSED CONTROL BUILDING LAYOUT PLAN

N

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Control Building**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-16	1:100 @ A3

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4.3.2.3 Underground Grid Connection Cabling Route

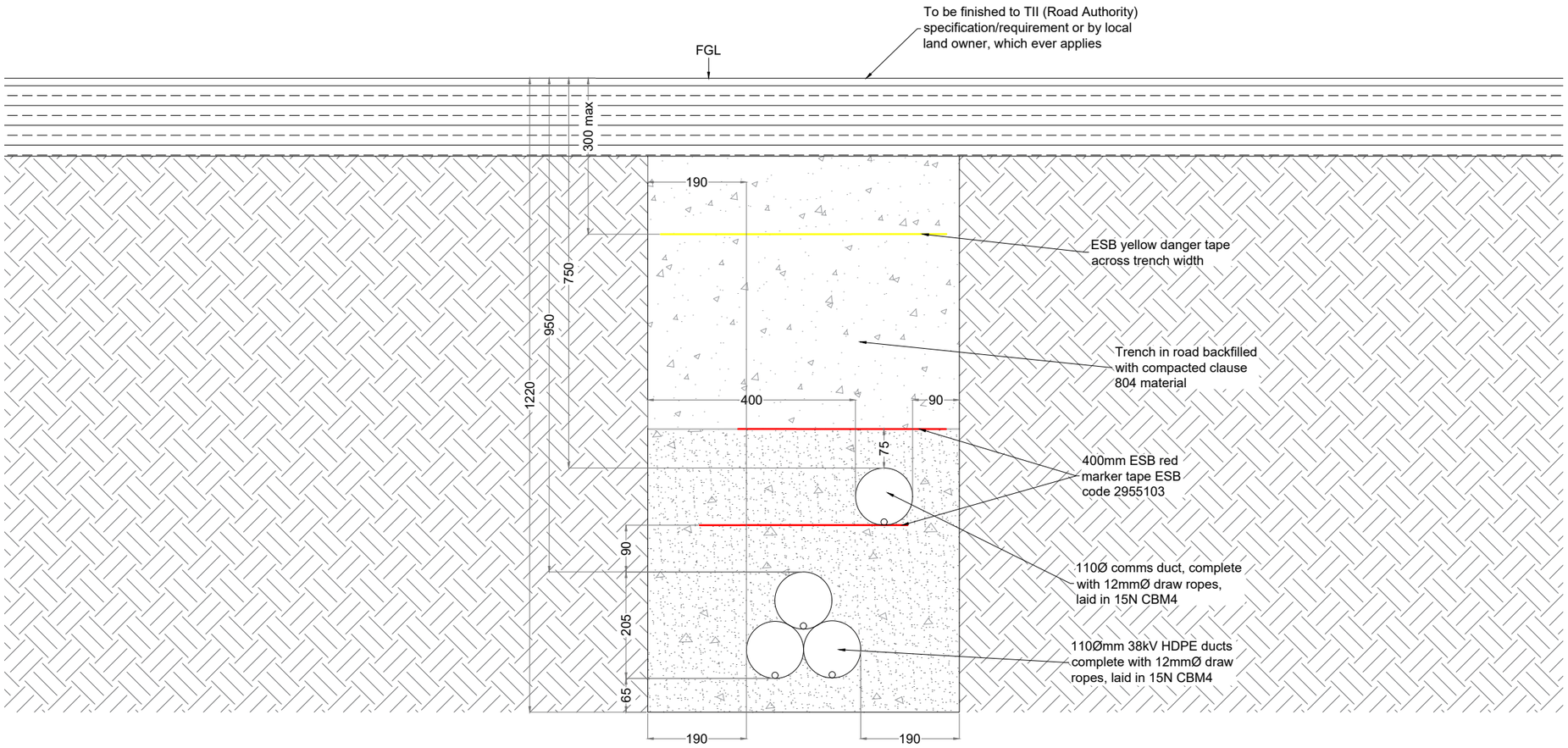
A 38kV connection between the Proposed Development and the national electricity grid will be necessary to export electricity from the Proposed Wind Farm. It is proposed to connect the Proposed Development to the national electricity grid via a 38kV underground electrical cable connection to the existing 110 kV Ballyragget substation, in the townland of Moatpark near the town of Ballyragget, Co. Kilkenny. The underground electrical cabling route is approximately 3.4km in length to Ballyragget substation of which approximately 2.2km is located primarily within the curtilage of the public road network (N77 National Secondary Road).

As part of the detailed design process, every effort has been made to locate the Proposed Grid Connection cabling trench off the existing road carriageway and within the hard shoulder or soft margin/grass verges, avoiding, insofar as possible, other existing underground services/utilities (Refer to Section 4.8.2.4). The existing carriageway of the N77 has been avoided apart from a short section measuring approximately 35m where the cabling trench crosses from west to east across the public road corridor.

The exact location of the grid connection cabling within the curtilage of the public road network may be subject to minor modification following confirmatory site investigations, to be undertaken prior to construction of the proposed wind farm development. A Road Opening Licence will be sought from the Roads Authority i.e. Kilkenny County Council requiring all details to be confirmed before the licence is granted and work can commence.

The Proposed Grid Connection underground cabling route will originate at the proposed onsite substation, in the townland of Ballynaslee, Co. Kilkenny, and run east for 335 metres through agricultural pastoral land. The underground cabling route will then emerge on to the N77 National Secondary Road and run south for 2.2km before turning east into agricultural pastoral land, continuing for 395m in the townland of Ballyconra, Co. Kilkenny. Within the agricultural land, the underground cabling will cross beneath the River Nore via horizontal direction drilling (refer to Section 4.8.2.6.1 below) and continue east for 560m through agricultural land before reaching the Ballyragget 110kV substation in the townland of Moatpark, Co. Kilkenny. The total length of the Proposed Grid Connection underground cabling route measures approximately 3.4km. The underground electrical cabling route is illustrated in Figure 4-1. Standard 38kV underground cabling trench cross sections are shown in Figure 4-17.

Access and maintenance tracks may be required by ESB along short sectons of the Proposed Grid Connection underground cabling route currently proposed within agricultural land to provide access for periodic maintenance during the operational phase of the Proposed Development.



Trench Layout Single Circuit (4-way) Trefoil

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Roadside Cable Trench Cross Section**			
PROJECT No.: **231103**		DRAWING No.: **fig 4-17**	SCALE: **1:10 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **RD**	DATE: **30.06.2025**	REVISION.: P01

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4.3.3 Quantities of Spoil and Crushed Stone

The quantity of spoil generated and requiring management on the site of the Proposed Development has been calculated, as presented in Table 4-2 below. In addition, the volume of stone required to build the Proposed Development infrastructure is noted below.

Table 4-2 Spoil and Stone Volumes requiring management

Development Component	Spoil Volume(m3) (approx.)	Crushed Stone Requirement (m3) (approx.)
Proposed Wind Farm		
8 no. Turbines and Hardstanding Areas (including foundations)	38,285	27,400
Access Roads (including met mast hardstand and security cabin)	38,010	40,670
Temporary Construction Compound	2,430	1,755
Met Mast	225	175
Total	78,950	70,000
Proposed Grid Connection		
Onsite Substation (including temporary construction compound)	10,230	2,785
Cabling Trench	2,045	920
Total	12,275	3,705
Total	91,225	73,705
Total (including 10% contingency)	100,350	81,075

Note: A contingency factor of 10% has been applied and is included to the excavated spoil volumes above to allow for expected increase in volume upon excavation and to allow for a variation in ground conditions across the Proposed Wind Farm site.

It is considered that any spoil generated by the proposed cabling trench will be removed and either accommodated within the borrow pit within the Proposed Wind Farm site or transported to a Materials Recovery Facility (MRF) where necessary. Any road material containing tar will be managed separately. Further detail on this can be found in Chapter 15: Traffic and Transport.

There will be a requirement to remove some sections of linear vegetation i.e. hedgerows to facilitate the Proposed Development infrastructure, however, this will not involve the excavation of tree stumps outside of the infrastructure footprint and as such does not affect the excavation volumes.

4.3.4 Site Activities

4.3.4.1 Environmental Management

All proposed activities on the site of the Proposed Development will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Development and is included in Appendix 4-2 of this EIAR.

The CEMP includes details of drainage, spoil management and waste management, and outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event planning permission is granted for the Proposed Development, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for approval.

4.3.4.2 Refuelling

Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. All refuelling will be carried out outside designated watercourse buffer zones. 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 used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.

4.3.4.3 Concrete Deliveries

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from a local batching plant in sealed concrete delivery trucks. The quarry that could potentially provide stone and ready mix concrete for the Proposed Development are detailed below in Section 4.4.2.

The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. When concrete is delivered to Site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the Site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place.

The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. Two examples are shown in Plate 4-3 below.

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 will be tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste.



Plate 4-3 Concrete washout area

Alternatively, a Siltbuster-type concrete wash unit or equivalent (https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/) may be used. This type of Siltbuster unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids can be disposed of off-site at an appropriate waste facility.

The risks of pollution arising from concrete deliveries will be further reduced by the following:

- Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout.
- Proposed Development site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the Proposed Development site roads will not be provided until all bases have been poured. No concrete will be transported around the Site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed.
- The arrangements for concrete deliveries to the Site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the Site.

4.3.4.4 Concrete Pouring

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours, which are normally complete in a single day per turbine. The main pours will be planned days or weeks in advance.

Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These may include:

- Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast.
- Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete.

- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain.
- The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit (https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/) or equivalent.
- Disposing of surplus concrete after completion of a pour in agreed suitable locations away from any watercourse or sensitive habitats.

4.3.4.5 Dust Suppression

In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling/settlement ponds in the Proposed Development site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and temporary construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.

4.3.4.6 Vehicle Washing

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. A wheel wash facility will be provided and a layout of the same is shown in Figure 4-18. The site roads will be well finished with non-friable, compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

A road sweeper will be available if any section of the public roads were to be dirtied by trucks associated with the Proposed Development.

4.3.4.7 Waste Management

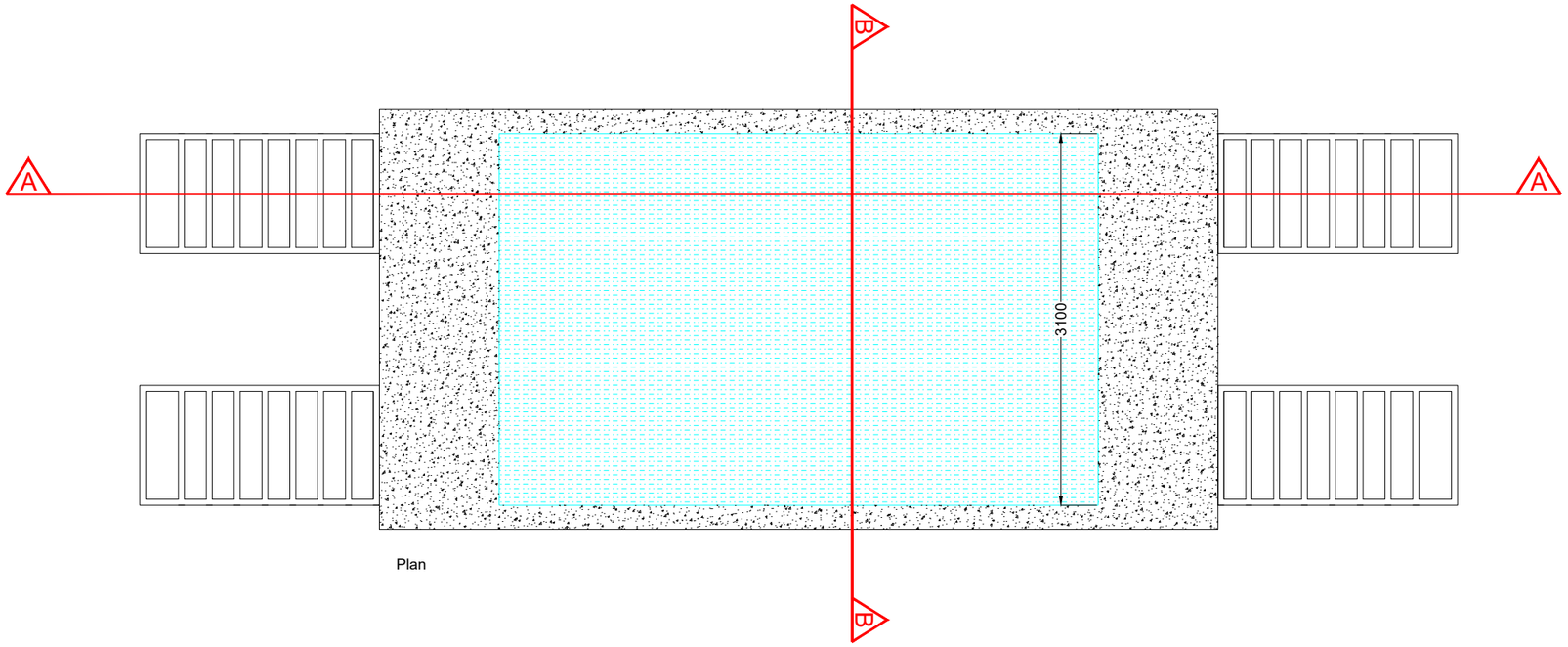
The CEMP, Appendix 4-2 of this EIAR, provides a waste management plan (WMP) which outlines the best practice procedures during the construction phase of the project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be a last resort.

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

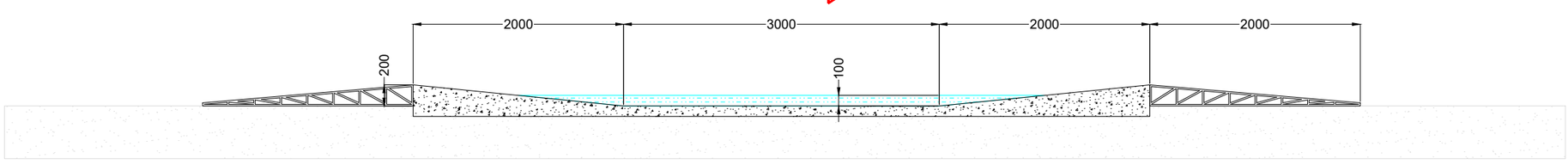
The Act requires that any waste related activity must have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the Proposed Development to ensure that all contractors hired to remove waste from the Site have valid Waste Collection Permits to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations.

Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient

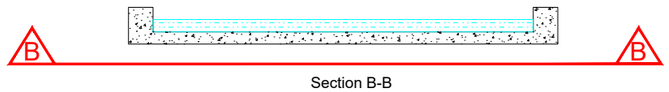
Note
Wheel washes will be appropriately located at all entrances used during construction of the wind farm



Plan



Section A-A



Section B-B

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Wheel Wash Detail**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-18**	SCALE: **1:50 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **RD**	DATE: **30.06.2025**	REVISION.: P01

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authority so that they can ensure everyone working on the development adheres to the management plan.

The WMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

4.4 Access and Transportation

4.4.1 Site Entrance

During the construction phase, the Proposed Development site will be accessed via a proposed new siter road originating from an existing agricultural access off the L58333 local road. The L58333 runs along the eastern boundary of the Proposed Wind Farm site in the townland of Ballynalsee. The local road is, in turn, accessed via the N77 national secondary road. This entrance will be used as the site entrance for HGVs, turbine component deliveries and other abnormal loads during the construction phase of the Proposed Development. Once the Proposed Development is operational, this entrance will remain in place, and it will be used for the operation and maintenance of the Proposed Development during the operational phase and in the unlikely event of the delivery of a replacement turbine component or other abnormal load required for the operational maintenance of the wind farm.

It is proposed to access the proposed onsite 38kV substation, during both the construction and operational phases of the Proposed Development, via this proposed site entrance off the L58333 local road in the townland of Ballynalsee.

For the purposes of delivering large turbine components to the Proposed Wind Farm site, the site entrance will be temporarily widened on the northern side. The existing boundary along the L58333 will be reinstated following the completion of the turbine component delivery phase.

The location of Proposed Development access and temporary widening is shown in Figure 4-19 and Appendix 4-1 of this EIAR.

4.4.2 Deliveries of Stone and Ready-Mix Concrete from Quarries

While it is proposed to source the majority of crushed stone for the construction of the Proposed Development from the onsite borrow pit, a certain volume of crushed stone and hardcore materials and all ready-mix concrete that will be required during the construction phase will be sourced from local, appropriately authorised quarries. For the purposes of assessment within the EIAR, construction materials will be delivered to the Site via selected haul routes that will be determined based on the source of the construction material. All construction materials will ultimately access the site, from the north or south, via the N77 national secondary route. Quarries within a 20km range of the Site, that could potentially provide stone and concrete, are illustrated on Figure 4-20. Traffic movements generated by the Proposed Development are discussed in Section 15.1 of Chapter 15, Material Assets.

4.4.3 Turbine Component Delivery Route

It is envisaged that large wind turbine components will be delivered to the Proposed Development site, from the Port of Cork (Ringaskiddy) (other ports such as Galway Port, Shannon Foynes od Dublin Port could also be used), via the N28, and N40 national roads, the M8 and M7 Motorways N77 National

Drawing Legend

- Existing Road Edge
- Proposed Road
- Sight Line

Location 5 - Site access on L58333

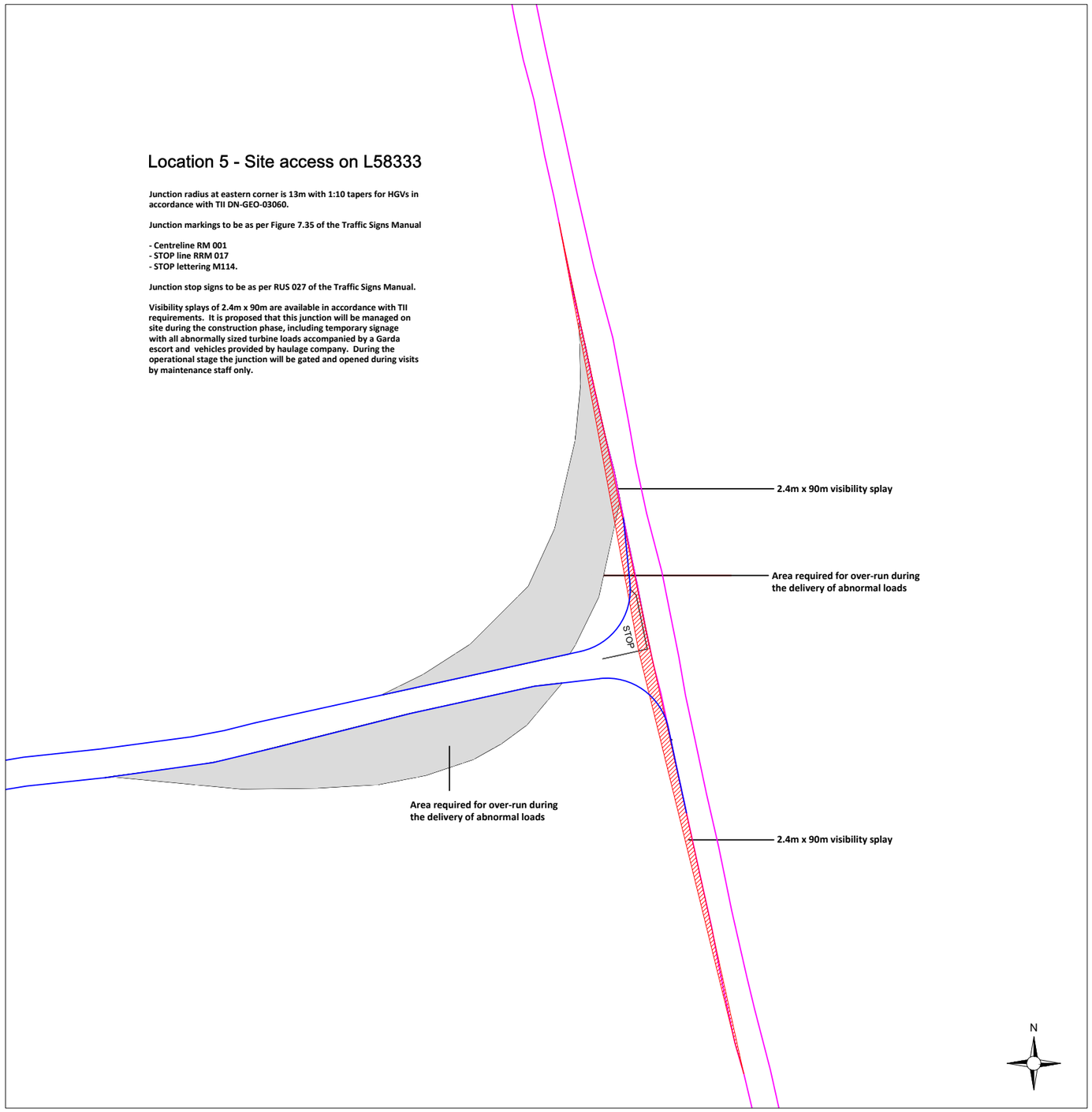
Junction radius at eastern corner is 13m with 1:10 tapers for HGVs in accordance with TII DN-GEO-03060.

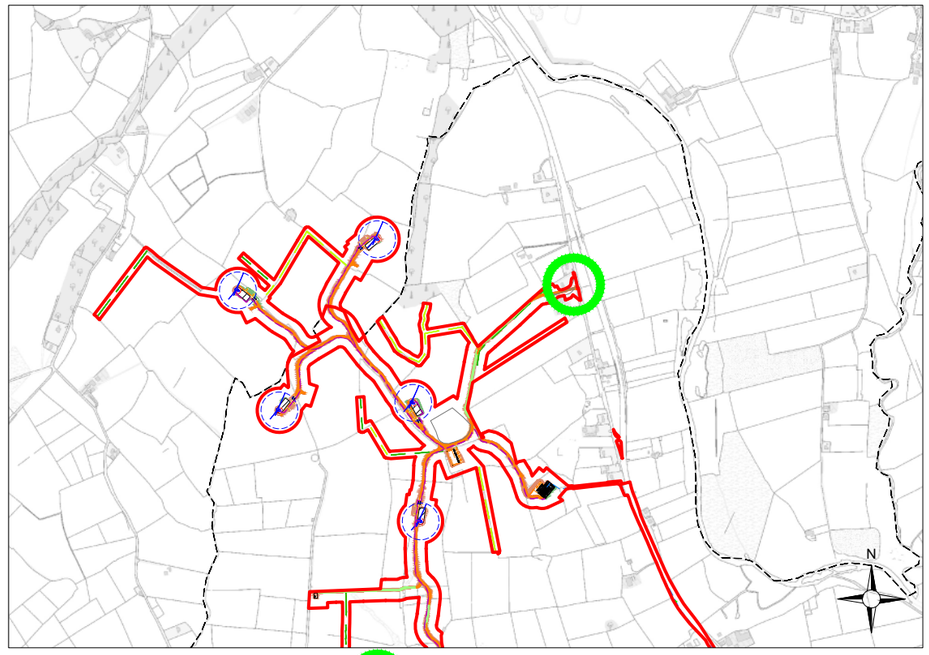
Junction markings to be as per Figure 7.35 of the Traffic Signs Manual

- Centreline RM 001
- STOP line RRM 017
- STOP lettering M114.

Junction stop signs to be as per RUS 027 of the Traffic Signs Manual.

Visibility splays of 2.4m x 90m are available in accordance with TII requirements. It is proposed that this junction will be managed on site during the construction phase, including temporary signage with all abnormally sized turbine loads accompanied by a Garda escort and vehicles provided by haulage company. During the operational stage the junction will be gated and opened during visits by maintenance staff only.





1:25,000 Location on Context Map

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Proposed Access Junction**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-19**	SCALE: **1:1,000 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **AC**	DATE: **30.06.2025**	REVISION.: P01

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County Offaly

County Kildare

County Laois

County Kilkenny

County Tipperary

County Carlow

Map Legend

- EIAR Site Boundary
- Quarries
- 20km Proposed Turbine Buffer
- Counties Border

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N

Drawing Title
Licensed Quarries within 20km

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
ER	EM
Project No.	Drawing No.
231103	Figure 4-20
Scale	Date
1:150,000	2025-06-30

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Secondary Road, and the L58333 local road. The proposed turbine delivery route (TDR) from the M7 to the Proposed Development is shown on Figure 15-1a.

From the Port of Cork (Ringaskiddy), the turbine component delivery vehicles will travel north via the N28 and N40 National Primary Roads before merging onto the M8 Motorway and subsequently the M7 Motorway. At Junction 17 (Portlaoise), the vehicles will exit the M7, travelling south on the N77 National Secondary Road for approximately 25km. The vehicles will travel through the town of Abbeyleix and the village of Durrow in Co. Laois. In the townland of Ballynaslee, Co. Kilkenny the turbine component delivery vehicles will reverse on to the L58333 local road from the existing junction on the N77 and continue north on this local road for approximately 700m to the Proposed Wind Farm entrance. The proposed turbine delivery route (TDR) from the M7 to the Proposed Development is shown on Figure 4-21.

It is also envisaged that general construction traffic (including materials and staff) will travel to the site via the public road network to the east of the site. Traffic movements generated by the Proposed Development are discussed in Section 15.1.6 of Chapter 15, Material Assets.

4.4.3.1 Turbine Delivery Route Accommodation Areas

Road and junction widening are sometimes required along proposed turbine delivery routes to accommodate the large vehicles used to transport turbine components and other abnormally sized loads to wind farm sites. The proposed transport route for the Proposed Development has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment set out in Section 15.1.9 of this EIAR and summarised below. There are sections on the route where the vertical alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process.

Temporary accommodation works will be required at two locations to facilitate the delivery of turbine components and other abnormal loads to the Proposed Wind Farm during the construction phase. The accommodation works will be located within the town of Durrow, Co. Laois, at the Chapel Street/Mary Street (N77) junction and at the junction between the N77/L58333 in the townland of Ballynaslee, Co. Kilkenny. The locations of the accommodation works are shown on Figure 1-2 and these works are fully assessed as part of this EIAR.

The locations of the accommodation areas are shown in Figures 4-22 to 4-23.

Location 1 – Durrow Townparks, Co. Laois

It is proposed to carry out temporary accommodation works within and adjacent to the green space, located at the Chapel Street/Mary Street (N77) junction, in the townland of Durrow Townparks, Co. Laois.

The existing trees, ornamental street furniture, signage and electricity/telecommunication poles, within and around the green space will be temporarily removed for the duration of the turbine component delivery phase. Crushed stone will be used to raise the level of the laneway, which bounds the northwestern side of the green space, up to the level of the grassed area within the green space. Heavy duty, ground protection mats, such as Tufftrak mats (https://www.buyjustrite.eu/en/checkers-tufftrak/content/tufftrak/), will be installed on the grassed area.

Upon completion of the turbine component delivery phase, the crushed stone and ground protection mats will be removed and the trees, ornamental street furniture, signage and electricity/telecommunication poles will be reinstated.

The proposed accommodation area is shown in Figure 4-22 and it forms part of the planning application to Laois County Council.

Location 2– Ballynaslee, Co. Kilkenny

In the townland of Ballynaslee, Co. Kilkenny, it is proposed to construct an accommodation area, using crushed stone, measuring approximately 822m^2, within the grass verge on the southern and northern side of the junction between the L58333 local road and N77. This area is currently under the control of and being maintained by Kilkenny County Council.

Upon the completion of the construction phase, the accommodation area will be covered with a layer of topsoil and reseeded. It will only be used again in the unlikely event that an oversized delivery was required for wind turbine maintenance purposes.

This accommodation area is shown in Figure 4-23 and it forms part of the planning application submitted to Kilkenny County Council.

The works described at Locations 1 and 2 above will facilitate the movement of the turbine component and other abnormal load delivery vehicles through these junctions. Once the accommodation areas have been reinstated, they will only be used again in the very unlikely event that an oversized delivery is required for wind turbine maintenance purposes.

Via M7

Abbeyleix

County Laois

Durrow

Cullahill

Ballyragget

County Kilkenny

Map Legend

- Proposed Site Entrance
- Turbine Delivery Route
- EIAR Site Boundary
- Kilkenny/Laois County Border

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Drawing Title: Turbine Delivery Route

Project Title: Seskin Renewables Wind Farm

Drawn By	Checked By
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Project No.	Drawing No.
231103	Figure 4-21
Scale	Date
1:70,000	2025-06-27

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Map Legend

Temporary Accommodation Area (385m2)

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Drawing Title
Accommodation Works: Durrow Townparks, Co. Laois

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
ER	EM
Project No.	Drawing No.
231103	Figure 4-22
Scale	Date
1:300	2025-06-27

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Map Legend

Temporary Accommodation Area (822m2)

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Drawing Title
Accommodation Works: Ballynaslee, Co. Kilkenny

Project Title
Seskin Renewables Wind Farm

Drawn By	Checked By
ER	EM
Project No. 231103	Drawing No. Figure 4-23
Scale 1:500	Date 2025-06-27

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4.4.4 Traffic Management

A turbine with the maximum blade length of 75 metres has been used in assessing the traffic impact of the Proposed Development. The blade transporter for such a turbine blade would have a total vehicle length of 81 metres, including the blade which overhangs the back of the vehicle. The total length of the tower transporter is 47 metres with the axles located at the front and rear of the load with no overhang.

The vehicles used to transport the nacelles will be similar to the tower transporter. All other vehicles requiring access to the site of the Proposed Development will be smaller than the design test vehicles. The turbine delivery vehicles have been modelled accurately in the Autotrack assessments for the Proposed Development site access junctions, as detailed in Section 15.1.9 of this EIAR.

The need to transport turbine components on the public roads is not an everyday occurrence in the vicinity of the site of the Proposed Development. However, the procedures for transporting abnormal size loads on the country's roads are well established. While every operation to transport abnormal loads is different and requires careful consideration and planning, escort vehicles, traffic management plans, drive tests, road marshals and convoy escorts from the Garda Traffic Corps are all measures that are regularly employed to deliver oversized loads from origin to destination. With just under 400 No. wind farms already built and operating in Ireland (Republic and Northern Ireland combined, as per latest available figures on www.windenergyireland.com), transport challenges are something the wind energy industry and specialist transport sector has become particularly adept in finding solutions to.

As an alternative solution for transport of turbine blades, alternative delivery systems are available. For example, delivery vehicles fitted with blade adapters may be used in order to navigate the existing roads along the turbine delivery route. Blade adaptors allow the turbine blade to be transported at a suitable angle in order to navigate tight bends or obstacles along the delivery route. Plate 4-4 below shows an example of a blade adapter.



Plate 4-4 Blade adaptor transport system

A detailed traffic management plan has been prepared as part of the traffic impact assessment set out in Chapter 15 of this EIAR. The deliveries of turbine components to the Proposed Development site may be made in convoys of three to four vehicles at a time, and at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a "stop and go" system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles

passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users.

It is not anticipated that any section of the public road network will be closed during transport of turbines, although there will be some delays to local traffic at pinch points. During these periods it may be necessary to operate local diversions for through traffic. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, usually at night, to avoid disruption to work and school-related traffic.

Prior to the Traffic Management Plan being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the Traffic Management Plan for agreement with the relevant Authorities. All turbine deliveries will be provided for in a Traffic Management Plan which will be finalised in advance of oversized load deliveries, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a traffic management plan is typically submitted to the relevant Authorities for agreement in advance of any abnormal loads using the local roads, and will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

4.4.4.1 Traffic Management of Other Construction Materials

Aside from the delivery of the large turbine components and other abnormal loads, the construction of the Proposed Development will require the delivery of a large volume of other construction materials (including all crushed stone and concrete required) mainly by HGVs. A detailed traffic management plan (TMP) has been prepared as part of the traffic and transport impact assessment and is included as Appendix 15-2 of this EIAR. The purpose of the TMP is to set out the various traffic management measures that will be implemented during the construction stage of the Proposed Development. The successful completion of the Proposed Development will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction phase of the Proposed Development in order to minimise the effects of the additional traffic generated on the surrounding road network.

All traffic management measures that are to be implemented during the construction phase of the Proposed Development will be agreed with Kilkenny County Council, Laois County Council and the Roads and Traffic Section will be consulted throughout the construction phase.

4.5 Community Gain Proposal

4.5.1 Background

Seskin Renewables Wind Farm has the potential to bring significant positive benefit to the local community. The project will create sustainable local employment, it will contribute annual rates to the local authority, and it will provide opportunity for local community investment in the project. A community benefit fund will be put in place for the lifetime of the project to provide direct funding to those areas surrounding the project.

4.5.2 Renewable Energy Support Scheme

The Renewable Energy Support Scheme (RESS) Terms and Conditions, published by the Department of Communications, Climate Action and Environment on the 29th October 2021, make some high level provisions for how this type of benefit fund will work. Any project which wants to export electricity to the national grid must abide by these broad principles. These include the following:

1. *a minimum of €1,000 shall be paid to each household located within a distance of a 1-2kilometre radius from the Project;*
2. *a minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives.*
3. *a maximum of 10% of the funds may be spent on administration. This is to ensure successful outcomes and good governance of the Community Benefit Fund.*
4. *the balance of the funds shall be spent on initiatives successful in the annual application process, as proposed by clubs and societies and similar not-for-profit entities, and in respect of Onshore Wind RESS 1 Projects, on "near neighbour payments" for households located outside a distance of 1 kilometre from the Project but within a distance of 2 kilometres from such Project.*

4.5.3 Community Benefit Fund

Seskin Renewables Wind Farm Ltd. expects that for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community fund for the RESS period or the first 15 years of operation. If this commitment is improved upon in upcoming Government Policy, we will adjust accordingly.

If this project is constructed as currently designed, we estimate that a total of approximately €4 million will be available in the local area for community funding over the lifetime of the project. The above figure is indicative only and will be dependent on the generation capacity of the wind farm which is influenced by a number of factors including:

1. *Number of wind turbines.*
2. *Capacity and availability of energy production of those turbines.*
3. *Quantity of wind.*

4.5.4 Community Investment Opportunity

The Renewable Energy Support Scheme (RESS) sets out that future renewable energy project proposals enable the possibility for local communities to invest in projects in a meaningful way as a means to directly gain from the financial dividends that a project can provide should it be consented, built and operated. In response to this, the applicant has been working hard with external agencies to develop workable models of Community Investment. As with the benefit fund, the applicant aims to take this work into the community during 2025/2026, to continue to explore this exciting possibility and see how best to embed its design within the community.

4.6 Site Drainage

4.6.1 Introduction

The drainage design for the Proposed Development has been prepared by Hydro Environmental Services Ltd (HES). The drainage design has been prepared based on experience of the project team on other wind farm sites and the best practice guidance documents referred to in the References section of the EIAR.

The protection of the watercourses within and surrounding the Site, and downstream catchments that they feed is important to establish the most appropriate drainage proposals for the Proposed Development.

The drainage design for the Proposed Development has been planned with the intention of having no significant negative impact on the water quality of the Site and its associated rivers, and consequently no impact on downstream catchments and ecological ecosystems. The assessment of potential impacts on hydrology and hydrogeology due to the construction, operation and decommissioning of the Proposed Development is included in Chapter 9: Hydrology and Hydrogeology.

No routes of any natural drainage features will be altered as part of the Proposed Development. Turbine locations and associated new roadways were designed to avoid natural watercourses with existing roads to be used wherever possible. There will be no direct discharges to any natural watercourses or land drains, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses and drains. Buffer zones of 50m around the existing natural drainage features have been used to inform the layout of the Proposed Development.

4.6.2 Existing Drainage Features

A detailed description of the local hydrology of the Site is provided in Chapter 9 of this EIAR.

There will be no direct discharges to natural watercourses or drains. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from watercourses. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Development and are indicated on the drainage design drawings.

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place.

Existing artificial drains in the vicinity of existing Site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas post treatment, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

4.6.3 Drainage Design Principles

The key principles of drainage design that will be implemented and adhered to as part of the Proposed Development are as follows:

- Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge as diffuse overland flow or for rewetting of land.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line, treatment and outfall controls prior to controlled diffuse release as overland flow or for rewetting of land.
- No direct hydraulic connectivity from construction areas to watercourses or drains connecting to watercourses.
- Where possible, maintain 50-metre watercourse buffer zones for the wind turbines.
- No alteration of natural watercourses.
- Maintain the existing hydrology of the Site.
- Blocking of existing manmade drainage as appropriate.
- Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works and immediate remedial measures to be carried out

as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site.
- Use of siltbuster or equivalent system if required.

Drainage water from any works areas of the Site will not be directed to any natural watercourses within the Site. Two distinct methods will be employed to manage drainage water within the Site. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release. The drainage design is intended to maximise erosion control, which is more effective than having to control sediment during high rainfall. Such a system also requires less maintenance. The area of exposed ground will be minimised. The drainage measures will prevent runoff from entering the works areas of the Site from adjacent ground, to minimise the volume of sediment-laden water that has to be managed. Discoloured run-off from any construction area will be isolated from natural clean run-off. A schematic of the proposed site drainage management is presented in Figure 4-24 below.

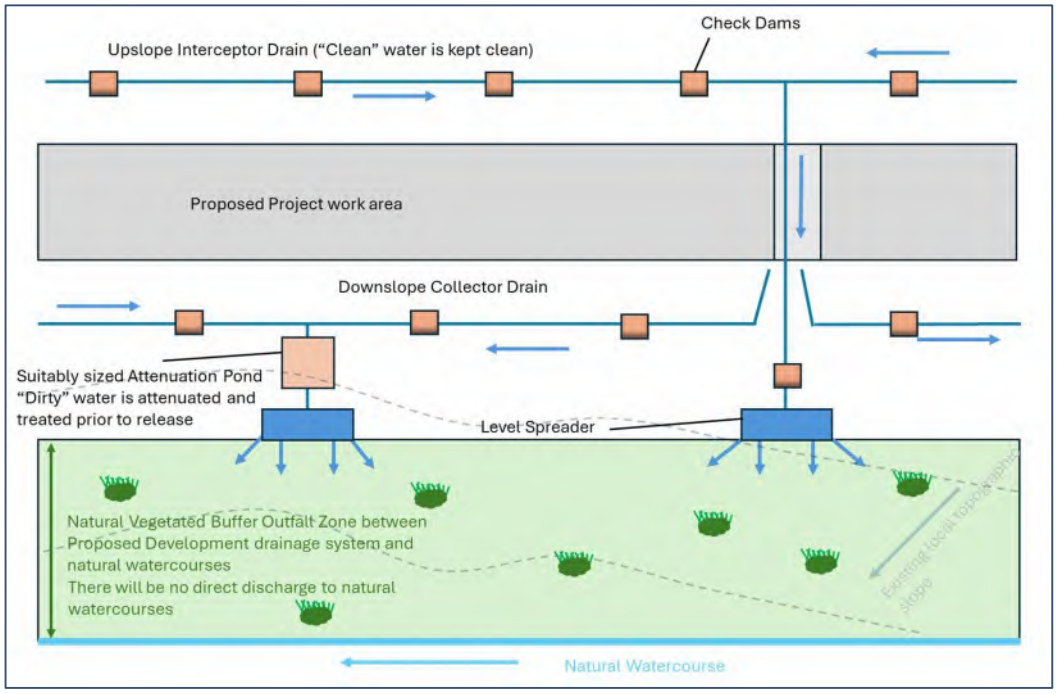


Figure 4-24 Proposed Development Drainage Process Flow

4.6.4 Drainage Design

A drainage design for the Proposed Development, incorporating all principles and measures outlined in this drainage design description, has been prepared, and is included in Appendix 4-3 to this EIAR. The drainage design employs the various measures further described below and is cognisant of the following guidance documents:

- Forestry Commission (2011): Forests and Water UK Forestry Standard Guidelines, Fifth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte Forest (2013): Operations and Water Protection Guidelines;
- Forest Services (Draft) Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Scottish Natural Heritage, 2019 Good Practice During Wind Farm Construction
- UK Guidance Note 2020 GPP1 - General Guide to Prevention of Pollution (UK Guidance Note);
- UK Guidance Note 2018 GPP5 – Works or Maintenance in or Near Watercourses
- Construction Industry Research and Information Association (CIRIA) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- Construction Industry Research and Information Association (CIRIA) 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 200.

4.6.4.1 Interceptor Drains

Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the Site where it might otherwise have come into contact with exposed surfaces and picked up silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area.

The interceptor drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be compacted on the downslope edge of the drain to form a diversion dike. On completion of the construction phase works, it is envisaged that the majority of the interceptor drains could be removed. At that stage, there will be no open excavations or large areas of exposed ground that are likely to give rise to large volumes of potentially silt-laden run off. Any areas in which works were carried out to construct roads, turbine bases or hardstands, will have been built up with large grade hardcore, which even when compacted in place, will retain sufficient void space to allow water infiltrate the subsurface of these constructed areas. It is not anticipated that roadways or other installed Site infrastructure will intercept ground-conveyed surface water runoff to any significant extent that would result in scouring or over-topping or spill over. Where the drains are to be removed, they will be backfilled with the material from the diversion dike. Interceptor drains may have to be retained in certain locations, for example where roadways are to be installed on slopes, to prevent the roadways acting of conduits for water that might infiltrate the roadway sub-base. In these cases, interceptor drains would be maintained in localised areas along the roadway with culverts under the roadway, which would allow the intercepted water to be discharged to vegetation filters downgradient of the roadway. Similarly, in localised hollows where water is likely to be funnelled at greater concentrations than on broader slopes, interceptor drains and culverts may be left in situ following construction. Figure 4-25 below shows an illustrative drawing of an interceptor drain.

The velocity of flow in the interceptor will be controlled by check dams (see Section 4.6.4.3 below), which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive. On steeper sections where erosion risks are greater, a geotextile membrane will be added to the channel.

Interceptor drains will be installed horizontally across slopes to run in parallel with the natural contour line of the slope. Intercepted water will travel along the interceptor drains to areas downgradient of works areas, where the drain will terminate at a level spreader (see Section 4.6.4.4 below). Across the entire length of the interceptor drains, the design elevation of the water surface along the route of the drains will not be lower than the design elevation of the water surface in the outlet at the level spreader.

4.6.4.2 Swales

Drainage swales are shallow drains that will be used to intercept and collect run off from construction areas of the Site during the construction phase. Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Development during the operational phase. A swale is an excavated drainage channel located along the downgradient perimeter of construction areas, used to collect and carry any sediment-laden runoff to a sediment-trapping facility and stabilised outlet. Swales are proven to be most effective when a dike is installed on the downhill side. They are similar in design to interceptor drains and collector drains described above. Figure 4-25 below, shows an illustrative example of a drainage swale.

Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the Site and prevent it reaching natural watercourses.

Drainage swales will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.

4.6.4.3 Check Dams

The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the swale is non-erosive.

Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor drains are being excavated. Check dams may also be installed in some of the existing artificial drainage channels on the Site, downstream of where drainage swales connect in.

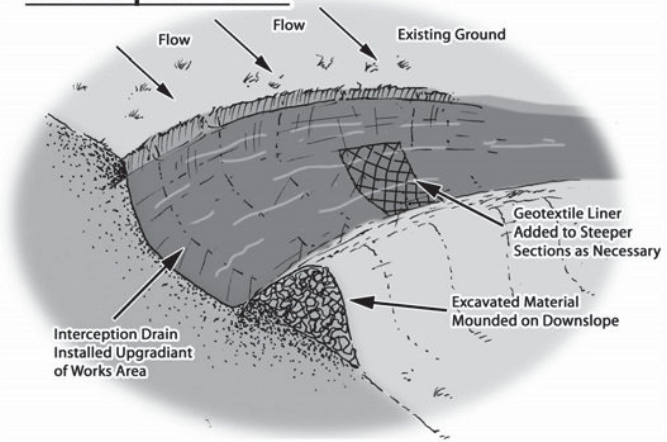
The proposed check dams will be made up of straw bales or stone, or a combination of both depending on the size of the drainage swale it is being installed in. Where straw bales are to be used, they will be secured to the bottom of the drainage swale with stakes. Clean 4-6 inch stone will be built up on either side and over the straw bale to a maximum height of 600mm over the bottom of the interceptor drain. In smaller channels, a stone check dam will be installed and pressed down into place in the bottom of the drainage swale with the bucket of an excavator. Figure 4-25, below, shows illustrative examples of check dams.

The check dams will be installed at regular intervals along the interceptor drains to ensure the bottom elevation of the upper check dam is at the same level as the top elevation of the next down-gradient check dam in the drain. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams.

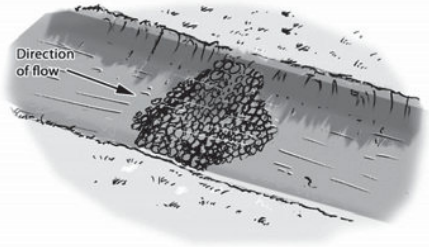
Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events.

Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

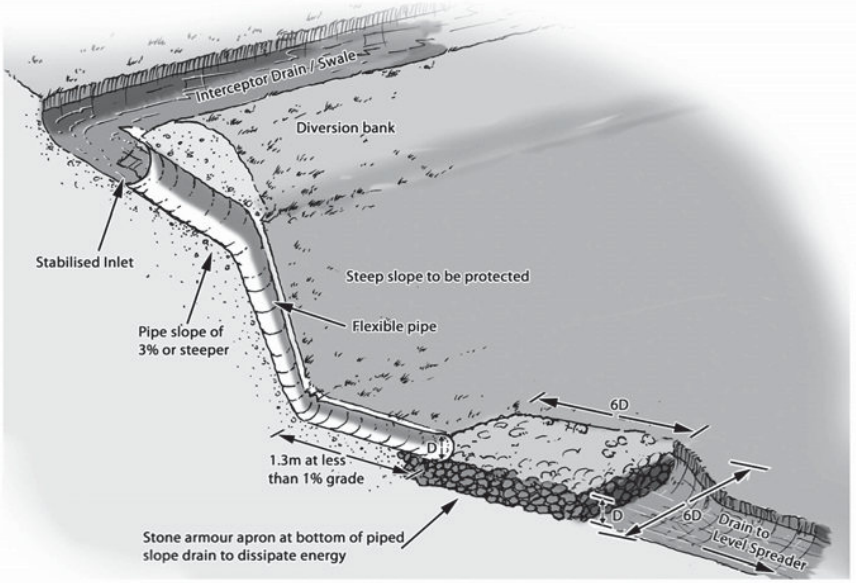
Interceptor Drain



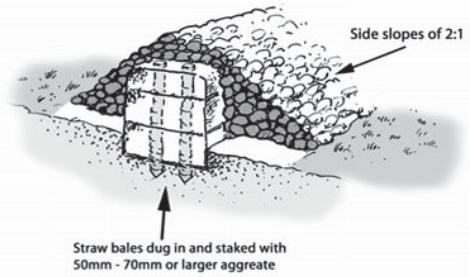
Check Dam (Stone Dam in Drain)



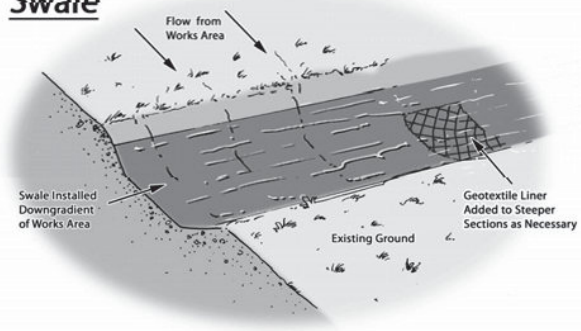
Slope Pipe Drain



Check Dam
(Straw Bale & Stone Dam - Cross Section)

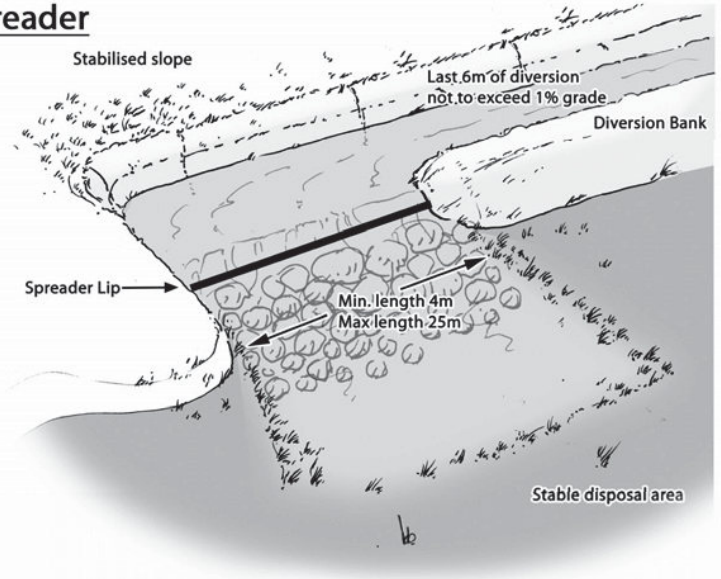


Swale

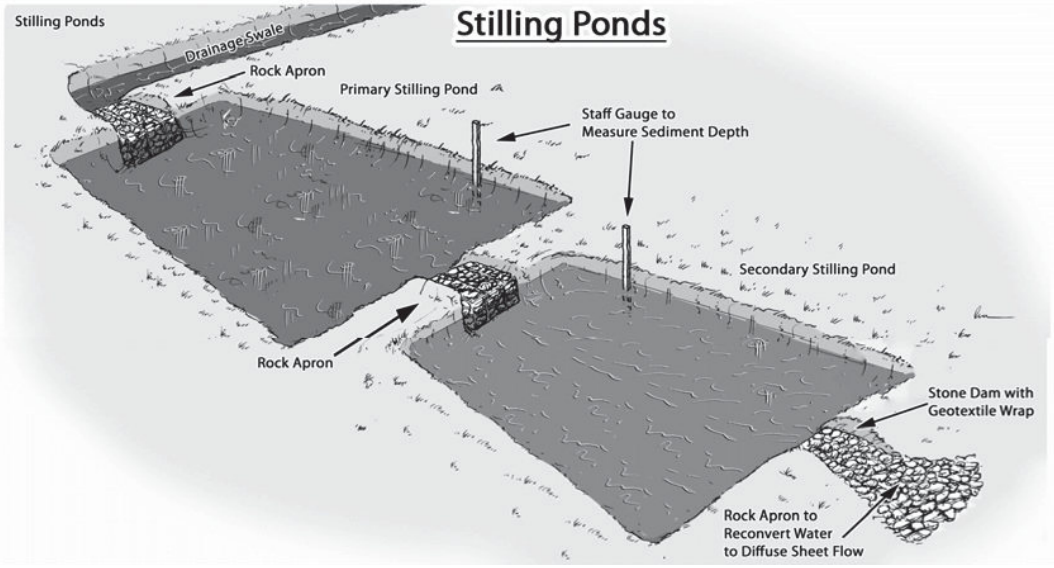


Drainage Design Measures

Level Spreader



Stilling Ponds



Drawing Title: Drainage Design Measures	Drawing No.: Figure 4-25	Scale: NTS
Project Title: Seskin Renewables Wind Farm		Date: 26.06.2025
Drawn By: Edward Ryan	Checked By: Eoin McCarthy	Project No.: 231103

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4.6.4.4 Level Spreaders

A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the Site.

The water carried in interceptor drains will not have come in contact with works areas of the Site, and therefore should be free of silt and sediment. The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion. Figure 4-25, above, shows an illustrative example of a level spreader.

The slope in the channel leading into the spreader will be less than or equal to 1%.

The spreader lip over which the water will spill will be made of a concrete kerb, wooden board, pipe, or other similar piece of material that can create a level edge similar in effect to a weir. The spreader will be level across the top and bottom to prevent channelised flow leaving the spreader or ponding occurring behind the spreader. The top of the spreader lip will be 150mm above the ground behind it. The length of the spreader will be a minimum of four metres and a maximum length of 25 metres, with the actual length of each spreader to be determined by the size of the contributing catchment, slope and ground conditions.

Clean four-inch stone can be placed on the outside of the spreader lip and pressed into the ground mechanically to further dissipate the flow leaving the level spreader over a larger area.

4.6.4.5 Piped Slope Drains

Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders.

The piped slope drains will be semi-rigid corrugated pipes with a stabilised entrance and a rock apron at the outlet to trap sediment and dissipate the energy of the water. The base of drains leading into the top of the piped slope drain will be compacted and concavely formed to channel the water into the corrugated pipe. The entrance at the top of the pipe will be stabilised with sandbags if necessary. The pipe will be anchored in place by staking at approximately 3-4 metre intervals or by weighing down with compacted soil. The bottom of the pipe will be placed on a slope with a grade of less than 1% for a length of 1.5 metres, before outflowing onto a rock apron.

The rock apron at the outlet will consist of 6-inch stone to a depth equal to the diameter of the pipe, a length six times the diameter of the pipe. The width of the rock apron will be three times the diameter of the pipe where the pipe opens onto the apron and will fan out to six times the diameter of the pipe over its length. Figure 4-25, above, shows a diagrammatic example of a piped slope drain and rock apron.

Piped slope drains will only remain in place for the duration of the construction phase of the Proposed Development. on completion of the works, the pipes and rock aprons will be removed and all channels backfilled with the material that was originally excavated from them.

Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked

for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly.

4.6.4.6 Vegetation Filters

Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.

Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration.

Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader.

4.6.4.7 Stilling Ponds (Settlement Ponds)

Stilling or settlement ponds will be used to attenuate runoff from works areas of the site of the Proposed Development during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Development during the operational phase. The purpose of the stilling ponds is to intercept runoff potentially laden with sediment and to reduce the amount of sediment leaving the disturbed area by reducing runoff velocity. Reducing runoff velocity will allow larger particles to settle out in the stilling ponds, before the run-off water is redistributed as diffuse sheet flow in filter strips downgradient of any works areas.

Stilling ponds will be excavated/constructed to the appropriate size at each required location as shown on the drainage design drawings included in Appendix 4-3 (Appendix A) of this EIAR. The points at which water enters and exits the stilling ponds will be stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. The stilling ponds will reduce the velocity of flows in order to allow settlement of silt to occur. Water will flow out of the stilling pond through a stone dam, partially wrapped in geo-textile membrane, which will control flow velocities and trap any sediment that has not settled out.

Water will flow by gravity through the stilling pond system. The stilling ponds have been sized according to the size of the area they will be receiving water from and are large enough to accommodate a 10-year return rainfall event. The settlement ponds are designed for 11hr and 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006)[3]. The stilling ponds will be dimensioned so that the length to width ratio will be greater than 2:1, where the length is the distance between the inlet and the outlet. Where ground conditions allow, stilling ponds will be constructed in a wedge shape, with the inlet located at the narrow end of the wedge. Each stilling pond will be a minimum of 1-1.5 metres in depth. Deeper ponds will be used to minimise the excavation area needed for the required volume.

The embankment that forms the sloped sides of the stilling ponds will be stabilised with vegetated turves, which will have been removed during the excavation of the stilling ponds area.

Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is adequate space and ground conditions allow. Otherwise, a swale will be used to carry water exiting the stilling pond system to a level spreader to reconvert the flow to diffuse sheet flow.

[3] Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)

A water level indicator such as a staff gauge will be installed in each stilling pond with marks to identify when sediment is at 10% of the stilling pond capacity. Sediment will be cleaned out of the still pond when it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows. An illustration of a stilling pond is shown in Figure 4-25.

4.6.4.8 Siltbuster

A "siltbuster" or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas if necessary, prior to its discharge to stilling ponds or swales.

Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction sites.

The unit stills the incoming water/solids mix and routes it upwards between a set of inclined plates for separation. Fine particles settle onto the plates and slide down to the base for collection, whilst treated water flows to an outlet weir after passing below a scum board to retain any floating material. The inclined plates dramatically increase the effective settling area of the unit giving it a very small footprint on site and making it highly mobile. Figure 4-26 below shows an illustrative diagram of the Siltbuster.

The Siltbuster units are now considered best practice for the management of dirty water pumped from construction sites. The UK Environment Agency and the Scottish Environmental Protection Agency have all recommended/specified the use of Siltbuster units on construction projects.

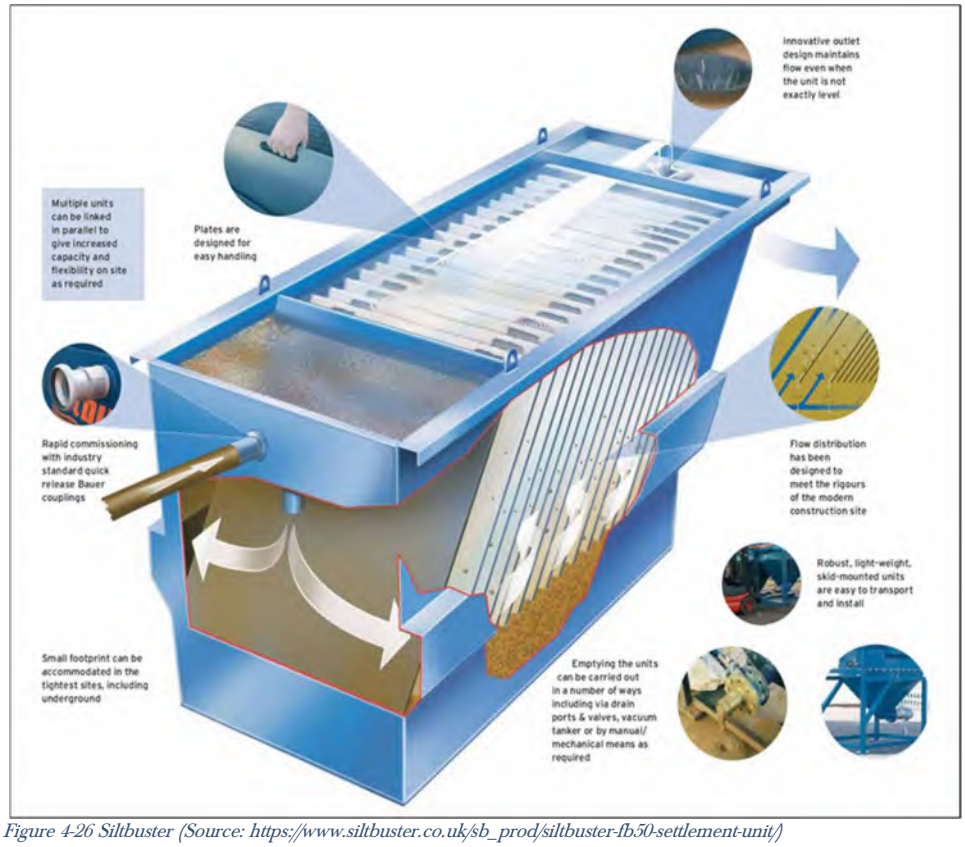


Figure 4-26 Siltbuster (Source: https://www.siltbuster.co.uk/sb_prod/siltbuster-fb50-settlement-unit/)

4.6.4.9 Silt Bags

Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the Site.

Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the Site. The water will flow, via a pipe, from the stilling ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of silt into the stream.

The dewatering silt bag that will be used will be approximately 3 metres in width by 4.5 metres (see Plate 4-5 and Plate 4-6 below) in length and will be capable of trapping approximately four tonnes of silt. The dewatering silt bag, when full, will be removed from Site by a waste contractor with the necessary waste collection permit, who will then transport the silt bag to an appropriate, fully licensed waste facility.



Plate 4-5 Silt Bag with water being pumped through



Plate 4-6 Silt bag under inspection

4.6.4.10 Sedimats

Sediment entrapment mats ((see Plate 4-7 below)), consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.



Plate 4-7 Typical Sedimat Details (Source: https://www.hy-tex.co.uk/)

4.6.4.11 Culverts

All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse.

Some culverts may be installed to manage drainage waters from works areas of the Proposed Development, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

4.6.4.12 Silt Fences

Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50-metre buffer zone of a stream or 100m buffer zone of a lake, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Development. These areas include around existing culverts, around the headwaters of watercourses, and the proposed locations are indicated on the drainage design drawings included in Appendix 4-3 (Appendix A) of this EIAR.

Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document '*Control of Water Pollution from Linear Construction Projects'* published by Construction Industry Research and Information Association (CIRIA, No. C648, 1996). Up to three silt fences may be deployed in series.

All silt fencing will be formed using Terrastop Premium or equivalent silt fence product.

Silt fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.

4.6.4.13 Hydrocarbon Interceptors

A hydrocarbon (or petrol) interceptor is a trap used to filter out hydrocarbons from surface water runoff. A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (i.e., construction compounds and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Development (i.e., construction compounds and substation compound).

4.6.5 Drainage Management and Maintenance

A Surface Water Management Plan (SWMP) has been prepared for the Proposed Development. It is intended, as an accompanying document to the Construction and Environmental Management Plan

(CEMP). It compiles the proposed surface water drainage control and treatment measures, set out in the EIAR, the drainage management and maintenance measures and the proposed surface water monitoring programme, set out in the CEMP, in a single document. The SWMP is included as Appendix 4-3 of this EIAR.

The SWMP also provides details in relation to the activity specific drainage control and mitigation measures including those measures to be implemented for the following:

- Cabling Trench Drainage
- Refuelling, Fuel and Hazardous Material Storage
- Cement Based Product Handling

4.7 Construction Management

It is estimated that the construction phase of the Proposed Development will take approximately 12-18 months from starting on Site to the commissioning of the electrical system. In the interest of breeding birds, construction will not commence during the bird breeding season which runs from the 1st of March to the 31st of August inclusive. Construction may commence at any stage from September onwards to the end of February, so that construction activities are ongoing by the time the next breeding bird season comes around and can continue throughout the next breeding season.

4.7.1 Construction Sequencing

The construction phase can be broken down into three main phases, which overlap partially and will take approximately 12-18 months to complete 1) civil engineering works - 9 months, 2) electrical works including grid connection works - 8 months, and 3) turbine erection and commissioning - 6 months. The main task items under each of the three phases are outlined below.

Civil Engineering Works

- Construct new Site roads to temporary compound.
- Clear and hardcore area for temporary Site offices. Install same.
- Construct bunded area for oil storage.
- Construct new Site roads and hard-standings and crane pads.
- Construct drainage ditches, culverts etc. integral to road construction.
- Excavate for turbine bases. Place blinding concrete to turbine bases. Fix reinforcing steel and anchorage system for tower section. Construct shuttering. Fix any ducts etc. to be cast in. Pour concrete bases. Cure concrete. Remove shutters after 1-2 days.
- Excavate trenches for Site cables, lay cables and backfill. Provide ducts at road crossings.
- Backfill tower foundations and landscape with previously stored topsoil.
- Complete Site works, reinstate Site.
- Remove temporary Site offices. Provide any gates, landscaping, signs etc. which may be required.

Electrical Works

- Construct bases/plinths for substation building.
- Install external electrical equipment at substation.
- Install transformer at compound.
- Erect stock proof and palisade fencing around substation area.
- Install internal collector network and communication cabling.
- Construct grid connection cabling.

Turbine and Meteorological Mast Erection

- Erect towers, nacelles and blades.
- Complete electrical installation.
- Grid connection.
- Install meteorological mast.
- Commission and test turbines.
- Complete Site works, reinstate Site.
- Remove temporary Site offices. Provide any gates, landscaping, signs etc. which may be required.

The phasing and scheduling of the main construction task items are outlined in Figure 4-27 below, where the 1st January has been selected as an arbitrary start date for construction activities.

		Year 1				Year 2	
ID	Task Name	Q1	Q2	Q3	Q4	Q1	Q2
1	Site Health and Safety						
2	Grid Connection						
3	Site Compounds						
4	Site Roads						
5	Substation and Electrical Works						
6	Turbine Hardstands						
7	Turbine Foundations						
8	Backfilling and Landscaping						
9	Turbine Delivery and Erection						
10	Substation Commissioning						
11	Turbine Commissioning						

Figure 4-27 Indicative Construction Schedule

4.7.2 Construction Phase Monitoring and Oversight

The requirement for a Construction and Environmental Management Plan (CEMP) to be prepared in advance of any construction works commencing on any development site and submitted for agreement to the Planning Authority is now well-established. The proposed procedures for the implementation of the mitigation measures outlined in such a CEMP and their effectiveness and completion is typically audited by the Ecological Clerk of Works (ECoW) on behalf of the Project Developer, in an and objective manner. The basis for auditing is presented in Section 6 of the CEMP which effectively lists all mitigation measures prescribed in any of the planning documentation. The first assessment is a simply Yes/No question, has the mitigation measure been employed on-site or not? Following confirmation that the mitigation measure has been implemented, the effectiveness of the mitigation measures has to be the subject of regular review and audit during the full construction stage of the project. If some remedial actions are needed to improve the effectiveness of the mitigation measure, then these are notified to the site staff immediately during the audit site visit, and in writing by way of the circulation

of the findings of the audit. Depending on the importance and urgency of rectifying the issue, the construction site manager is given a timeframe by when the remedial works need to be completed.

A CEMP has been prepared for the Proposed Development and is included in Appendix 4-2 of this EIAR. The CEMP includes details of drainage, spoil management, waste management etc, and describes how the above-mentioned audit will function and how the findings are presented.

In the event planning permission is granted for the Proposed Development, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for written approval.

The on-site construction staff will be responsible for implementing the mitigation measures specified in the EIAR and compiled in Section 6 of the CEMP. Their implementation will be overseen by the ECoW or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation. The system of auditing referred to above ensures that the mitigation measures are maintained for the duration of the construction phase, and into the operational phase where necessary.

4.8 Construction Methodologies

This section of the chapter outlines the construction methodologies to be used for the various elements of the Proposed Wind Farm and Proposed Grid Connection. Further details in relation to construction methodologies is included in Section 2 of the CEMP, included as Appendix 4-2 of this EIAR.

4.8.1 Proposed Wind Farm

4.8.1.1 Turbine and Met Mast Foundations

Each of the turbines to be erected on the Site will have a reinforced concrete base that is installed below the finished ground level. It is anticipated that the turbine foundations will be formed on competent strata (i.e., bedrock or subsoil of sufficient load bearing capacity). Where the ground conditions do not have a competent stratum of sufficient load bearing capacity, piling method will be utilised. A methodology for piled foundations is included in Section 2 of the CEMP, Appendix 4-2 of this EIAR.

Overburden will be stripped off the foundation area to a suitable formation using a 360° excavator and will be stored locally for later reuse in backfilling around the turbine foundation. A two-metre-wide working area will be required around each turbine foundation, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally for later reuse in backfilling and/or landscaping the working area around the turbine foundation. The excavated material will be sealed using the back of the excavator bucket and surrounded by silt fences to ensure sediment-laden run-off does not occur.

The formation material will have to be approved by an engineer as meeting the turbine manufacturer's requirements. If the formation level is reached at a depth greater than the depth of the foundation, the ground level will have to be raised with clause 804 or similar hardcore material, compacted in 250 millimetres (mm) layers, with sufficient compacted effort (i.e., compacted with seven passes using 12 tonne roller). Drainage measures will be installed to protect the formation by forming an interceptor drain around the perimeter of the base which will be pumped out or outfall out at the lowest point level spreader or settlement pond.

An embankment approximately 600 mm high will be constructed around the perimeter of each turbine foundation base and a fence will be erected to prevent construction traffic from driving into the

excavated hole and to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a pedestrian walkway to 1:12 grade.

There will be a minimum of 100 mm of binding concrete laid on the formation material positioned using concrete skip and 360° excavator to protect ground formation and to give a safe working platform.

The anchor cage is delivered to the Site in 2 or more parts depending on the turbine type. A 360° excavator or crane with suitable approved lifting equipment will be used to unload sections of the anchor cage and reinforcing steel. The anchor cage is positioned in the middle of the turbine foundation base and is assembled accordingly. When the anchor cage is in final position it is checked and levelled by using an appropriate instrument. The anchor cage is positioned 250mm – 300mm from formation level by use of adjustable legs. Reinforcement bars are then placed around the anchor cage, first radial bars, then concentric bars, shear bars and finally the superior group of bars. Earthing material is attached during the steel foundation build up. The level of the anchor cage will be checked again prior to the concrete pour and during the concrete pour. As noted in Section 4.8.1.5 below, the transformer in each turbine is connected to the on-site substation through a network of buried electrical cables which are installed through the centre of the anchor cage.

Formwork to concrete bases will be propped/supported sufficiently so as to prevent failure. Concrete for bases will be poured using a concrete pump. Each base will be poured in three stages. Stage 1 will see the concrete being poured and vibrated in the centre of the anchor cage to bring the concrete up to the required level inside the cage. Stage 2 will see the centre of the steel foundation being poured and vibrated to the required level. Stage 3 will see the remaining concrete being poured around the steel foundation to bring it up to the required finished level. After a period of time when the concrete has set sufficiently the top surface of the concrete surface is to be finished with a power float.

Once the base has sufficient curing time it will be backfilled with suitable fill up to existing ground level and finished with the original material that was excavated.

4.8.1.2 Site Roads and Hardstand Areas

4.8.1.2.1 *New Site Access Road*

The construction methodology for the proposed new access roads and turbine hardstands is outlined as follows:

- Establish alignment of the new road from the construction drawings and mark out the centrelines with ranging rods or timber posts;
- All drainage measures prescribed in the detailed drainage design for the Proposed Development will be implemented around the works area;
- The road layout has been designed to avoid crossings of natural watercourses where possible;
- Where existing culverts are to be upgraded or extended, the works will be carried out to follow a method statement to be prepared in consultation with Inland Fisheries Ireland;
- The access tracks will be of single-track design with a width of 5m with localised widening at bends and changes in direction. (depending on the location within the Site)
- All spoil excavated will be managed on-site. It will be placed within the borrow pit or placed alongside access roads within the Site. Some topsoil may be temporarily stockpiled locally for reuse for landscaping purposes.
- The subsoil will be excavated down to a suitable formation layer of competent stratum;

- The road will be constructed using well-graded granular fill (imported or site-won), spread and compacted in layers typically of 200mm and a suitable capping layer to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be subject to detailed design by Project Engineer in consultation with the Construction Manager based on the characteristics of the material and the compaction plant to be used;
- The new access roads will be constructed with a camber to aid drainage of surface water;
- Excavations side slopes shall not generally be greater than 1(V): 2 (H). Design slopes will be informed by the Geotechnical Engineer;
- At bends or steep inclines from the road, reflective snow poles will be erected to warn traffic on dark mornings and evenings that there is a turn in the road or a sharp incline beyond the road
- .Where underground services are to be traversed during the construction of new roads throughout the Proposed Wind Farm site, they will be traversed as per the methodology as outlined above, as it is not anticipated that any existing services will be encountered when excavating the proposed new site access roads due to the nature of the works.

4.8.1.2.2 *Upgrading of Existing Site Access Road*

Approximately 1.5km of the existing roads will require upgrading which will comprise widening of the roadway to a total running width of approximately five metres, with wider sections at corners and the laying of a new surface dressing on the existing section of roadway where necessary. The road widening will be undertaken as follows:

- If it is considered that the current road formation level is adequate to support required bearing, then no upgrade or widening works will be completed.
- Otherwise, where required, the subsoil in the existing road verge will be excavated down to a suitable formation layer.
- All spoil excavated will be managed on-site. It will be placed within the borrow pit or placed alongside access roads within the Site (which will be located outside identified watercourse 50m buffers). Some topsoil may be temporarily stockpiled locally for reuse for landscaping purposes.
- All drainage measures prescribed in the detailed drainage design for the Proposed Development will be implemented around the works area.
- Well-graded granular fill (imported or site-won) will be spread and compacted in layers up to 200mm to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be decided by the Construction Manager based on the characteristics of the material and the compaction plant to be used.
- These layers of granular fill will be brought to the same level as the top of the existing road surface.
- Where required, a layer of geogrid will be installed directly onto the top of the granular fill layer and the existing road surface.
- A layer of finer well graded stone for the running surface will be laid on the geogrid and compacted.
- Upon completion the upgraded roads will be a single-track design with a width of 5m with localised widening at bends and changes in direction (depending on the location within the Site).
- Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in Appendix 4-3 of the EIAR.

4.8.1.3 Culvert Crossing

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base but will have a minimum 900m diameter. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

4.8.1.4 Temporary Construction Compound

As discussed in Section 4.3.1.6, there are two proposed construction compounds; the primary construction compound will be located at the 240m southeast of T03. There is also one construction compound adjacent to the proposed 38kV substation that forms part of the Proposed Grid Connection. The compounds will be constructed in the same manner as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs and associated settlement ponds will be installed around the perimeter;
- The compound platform will be established using a similar technique as the construction of the substation platform as discussed below in Section 4.8.2.1;
- A layer of geo-grid will be installed where deemed necessary by the designer and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for Site offices and storage containers;
- A limited amount of fuel will have to be stored in appropriately bunded containers and a designated area for oil storage will be constructed within the compound.
- Areas within the compound will be constructed as site roads and used as vehicle hardstandings during deliveries and for parking;
- A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc;
- A waste storage area will be provided within the compound;
- The compound will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Development, the temporary construction compounds will be decommissioned and allowed to vegetate naturally.

4.8.1.5 Underground Electrical (33kV) and Communication Cabling

The transformer in each turbine and the met mast is connected to the on-site substation through a network of buried electrical and communication cabling. The ground is trenched using a mechanical excavator. The top layer of soil (or road surface) is removed and saved so that it is replaced on completion. The cables will be bedded with suitable material. The cables will be laid at a depth of approximately 1.2m below ground level; a suitable marking tape is installed between the cabling and the surface (see Plate 4-8 below illustrating an example of a single cable trench). On completion, the

ground will be reinstated. The route of the underground electrical and communication cabling will follow the access tracks as illustrated on the Proposed Wind Farm layout drawings included as Appendix 4-1 of the EIAR. The cabling may be placed on either side of the road footprint, on both sides of the road and/or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.



Plate 4-1 Typical Cable Trench View

4.8.1.6 Borrow Pit

The estimated volume to be extracted from the borrow pit for the construction of the Proposed Wind Farm is up to 81,075m^3. This figure presented is the anticipated maximum volumes; however, the actual volumes to be removed from the borrow pit will be confirmed at the time of construction and following detailed pre-construction site investigation works.

The borrow pit will be excavated and backfilled as follows:

- The area to be used for the borrow pit will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter;
- The initial borrow pit excavation will involve removal of soil to the top of bedrock. These materials will be stored temporarily in the borrow pit or placed alongside access roads;
- All drainage measures prescribed in the detailed drainage design for the Proposed Development will be implemented around the works area;
- The bedrock material will be extracted by breaking and blasting (section 4.8.1.6.1 and 4.8.1.6.2 below) from the borrow pit and stockpiled or used as required;
- The use of material won from the borrow pit will be sequential with new road construction or turbine foundation formations;
- Temporary stockpiling of aggregates will be required to accommodate the cut and fill operations within the borrow pit, and the progression of access roads and turbine excavations;
- As the borrow pit excavation progress and become deeper, surface water and groundwater ingress will be removed via pumping to settlement ponds, and re-distribution locally across natural vegetated areas. Where required, additional

specialist water treatment measures will be employed to ensure no deterioration in downstream water quality occurs;
- When extraction ceases within the borrow pit, the borrow pit will be backfilled with excavated spoil and its associated drainage measures will be removed.
- The extraction area of the borrow pit will have to be permanently secured and a stock-proof fence will be erected around the borrow pit to prevent access to these areas as well as the installation of appropriate health and safety signage.

Two extraction methods have been assessed for breaking out the useful rock below: rock breaking and blasting.

4.8.1.6.1 *Rock Breaking*

Weathered or brittle rock can be extracted by means of a hydraulic excavator and a ripper attachment. This is a common extraction methodology where fragmented rock is encountered as it can be carefully excavated in layers. In areas where stronger rock is encountered and cannot be removed by means of excavating then a rock breaking methodology may be used. Rock breaking equipment comprises a large hydraulic 360-degree excavator with a rock breaker attachment. Given the power required to break out tight and compact stone at depth, the machines are generally large and in the 40-60 tonne size range. Even where rock might appear weathered or brittle at the surface, the extent of weathering can quickly diminish with depth resulting in strong rock requiring significant force to extract it at depths of only a few metres.

A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit area. A smaller rock breaker, in the 30-40 tonne size range, then breaks the rocks down to a size that can then be fed into a crusher.

The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works. The same wheeled loader takes the stone from the crusher conveyor stockpile and stockpiles it elsewhere within the borrow pit, away from the immediate area of the crusher, until it is required elsewhere within the Site.

4.8.1.6.2 *Rock Blasting*

Where blasting is used as an extraction method, a mobile drilling rig is used to drill vertical boreholes into the area of rock that is to be blasted. A drilling rig will drill the necessary number of boreholes required for a single blast in approximately 3 to 4 days. The locations, depth and number of boreholes are determined by the blast engineer. This is a specialist role fulfilled by the blasting contractor.

The blast engineer will arrange for the necessary quantity of explosive to be brought to site to undertake a single blast. The management of explosives on-site and the actual blasting operation will be agreed in advance with and supervised by An Gardaí Siochána. The blast engineer sets the explosives in place in the boreholes, sets the charges, and fires the blast.

A properly designed blast should generate rock of a size that can be loaded directly into a mobile crusher, using the same wheeled loader outlined above. The same method is used for processing the rock generated from a blast, as would be used to process rock generated by rock breaking. Generally, the drilling rig will recommence drilling blast holes for the next blast as soon as one blast is finished. The potential impacts and control measures associated with noise and vibration from this extraction method are assessed in Chapter 12: Noise and Vibration. Any blasting will be carried out in accordance with the *Guidance on the Safe Use of Explosives in Quarries* (Safety and Health

Commission for the Mining and Other Extractive Industries, 2002)[4] and the British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*[5].

4.8.2 Proposed Grid Connection

4.8.2.1 Onsite 38kV Electricity Substation and Control Buildings

A detailed drawing of the proposed onsite 38kV substation is shown in Figure 4-13. The proposed onsite 38kV substation will be constructed by constructed by the following methodology:

- The area of the on-site substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and temporarily stockpiled for later use in landscaping. Any excess material will be sent to the borrow pit or placed alongside access roads.
- 1 no. control building will be built within the on-site substation compound.
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation.
- The roof slabs will be lifted into position using an adequately sized mobile crane.
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on-site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The transformer, electrical equipment, and storage container plinths will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- Lightning poles will be erected at appropriate locations adjacent to the substation. All lightning poles will be appropriately earthed.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.
- The construction and components of the substation will be built to ESBN specifications.

4.8.2.2 Temporary Construction Compound

The temporary construction compound adjacent to the proposed onsite 38kV substation will be constructed as outlined above in Section 4.8.1.4.

4.8.2.3 Underground Cabling Trench

The underground cabling works will consist of the installation of ducts in an excavated trench to accommodate power cables, and a fibre communications cables to allow communications between the proposed 38kV onsite substation and the existing 110kV Ballyragget substation.

[4] https://www.hsa.ie/eng/Publications_and_Forms/Publications/Mines_and_Quarries/Guidance%20on%20the%20Safe%20Use%20of%20Explosives%20in%20Quarries.pdf
[5] https://www.thenbs.com/PublicationIndex/documents/details?Pub=BSI&DocID=305965

The proposed grid connection works will require a road opening licence under Section 254 of the Planning and Development Act 2000, as amended, from Kilkenny County Council. A Traffic Management Plan (TMP) (Appendix 15-2 of this EIAR) will be agreed with the local authority prior to the commencement of the development where required. The TMP will outline the location of traffic management signage, together with the location of any necessary road closures and the routing of appropriate diversions. Where diversions are required, these will be agreed with the local authority in advance of the works commencing.

The UGC will be a single circuit connection consisting of 3 no. 110mm diameter HDPE power cable ducts and 1 no. 110mm diameter HDPE communications duct to be installed in an excavated trench, typically 600mm wide by 1,200mm deep. For trench designs there will be variations on the design to adapt to service crossings and watercourse crossings.

The underground electrical cabling will be laid beneath the surface of the Proposed Development site and the public road using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Kilkenny County Council etc. will be contacted and all up to date drawings for all existing services sought.
- When the cable is located on public roads, a traffic management plan will be prepared prior to any works commencing. A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1200mm, within which the ducts will be laid.
- The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up off of the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,
- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Development.

- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground power cables.

4.8.2.4 Existing Underground Services

The location and avoidance of existing underground services (e.g. watermains, other underground electricity cables, fibre broadband etc.) was a key consideration in determining the position and alignment of the Proposed Grid Connection underground electricity cabling route. However, notwithstanding this consideration, in order to facilitate the installation of an underground grid connection, it may be necessary to relocate existing underground services such as water mains or existing cables. In advance of any construction activity, the contractor will undertake additional surveys of the proposed route to confirm the presence or otherwise of any services. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works.

If existing low voltage underground cables are found be present, a trench will be excavated, and new ducting and cabling will be installed along the new alignment and connected to the network on either end. The trench will be backfilled with suitable material to the required specification. Warning strip and marking tape will be laid at various depths over the cables as required. Marker posts and plates will be installed at surface level to identify the new alignment of the underground cable, the underground cables will then be re-energised.

In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.

4.8.2.5 Joint Bays

Joint bays are typically pre-cast concrete chambers where lengths of cable will be joined to form one continuous cable. They will be located at various points along the ducting route generally between 700 to 1100 metres intervals or as otherwise required by ESB/Eirgrid and electrical requirements. Joint Bays are typically 2.5m x 6m x 1.75m pre-cast concrete structures installed below finished ground level.

Where possible, joint bays will be located in areas where there is a natural widening/wide grass margin on the road in order to accommodate easier construction, cable installation and create less traffic congestion. Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible. During construction the joint bay locations will be completely fenced off once they have been constructed they will be backfilled until cables are being installed. Once the cabling is installed the joint bays will be permanently backfilled with the existing surface re-instated and there will be no discernible evidence of the joint bay on the ground.

In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between the onsite 38kV substation and the existing 110kV Ballyragget substation. Earth Sheath Link Chambers are also required approximately every second joint bay along the cable route. Earth Sheath Links are used for earthing and bonding cable sheaths of underground power cables, installed in a flat formation, so that the circulating currents and induced voltages are eliminated or reduced. Earth Sheath Link Chambers and Communication Chambers are located in close proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will be pre-cast concrete structures with an access cover at finished surface level. The locations of the joint bays and chambers are shown on the site layout drawings included in Appendix 4-1 of this EIAR. Standard joint bay and comms chamber details are shown in Figures 4-28 and 4-29.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers within the curtilage of the public road is subject to approval by ESBN and Eirgrid.

4.8.2.6 Underground Cable Watercourse Crossing

There is one identified EPA/OSI mapped watercourse, the River Nore, along the Proposed Grid Connection underground electrical cabling route. This location is shown in Figure 4-1.

The directional drilling construction methodology for this crossing has been designed to eliminate the requirement for in-stream works or the construction of any clearspan crossing structure at this location.

4.8.2.6.1 *Horizontal Directional Drilling*

Horizontal Directional Drilling (HDD) is a method of drilling under obstacles such as bridges, culverts, railways, watercourses, etc. in order to install cable ducts under the obstacle. This method is employed where installing the ducts using standard installation methods is not possible.

The HDD method of duct installation will be carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 0.55m wide, 2.5m long and 1.5m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator shall commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore shall continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the Site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exits. The directional drilling methodology is further detailed in Figure 4-30.

4.8.2.7 Underground Culvert/Service Crossings

No drainage culverts have been identified along the Proposed Grid Connection underground cabling route. It is likely that underground services exist along this section of the of the N77 National Secondary Road serving the properties along the same. A general description of the various construction methods employed at culvert/ drain/service crossings are described in the following sections below.

In the event that an unidentified existing culvert/service crossing is located during the construction phase, the most appropriate proposed crossing methodology, as outlined below, will be used to traverse the culvert/service depending on culvert/service type, depth, size and local ground conditions.

Should an alternative methodology option be required for individual crossings during the construction process this will be agreed with the relevant authorities including Kilkenny County Council prior to works commencing.

Where culverts require upgrading, the Applicant will commission a survey of culverts, the results of which will inform the exact details of the upgrade works which will be forwarded to the relevant Local Authority. Having regard to the duration of the consent requested (10 years) it is considered best practice that any such surveys be carried out prior to construction to facilitate accuracy and timely reporting of the surveys.

Inland Fisheries Ireland have published guidelines relating to construction works along water bodies entitled "*Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites*", and these guidelines will be adhered to during the construction of the Proposed Development.

In the event that none of the above methods are appropriate, directional drilling, as described in Section 4.8.2.6.1 above, will be utilised.

4.8.2.7.1 *Crossing Using Standard Trefoil Formation Over – Option A*

Where adequate cover exists above a culvert/service or where a new bottomless box culvert or clear-span structure has been installed at a sufficient depth, the standard ESB approved trefoil arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert. The cable trench will pass over the culvert in a standard trench, as shown in Figure 4-31.

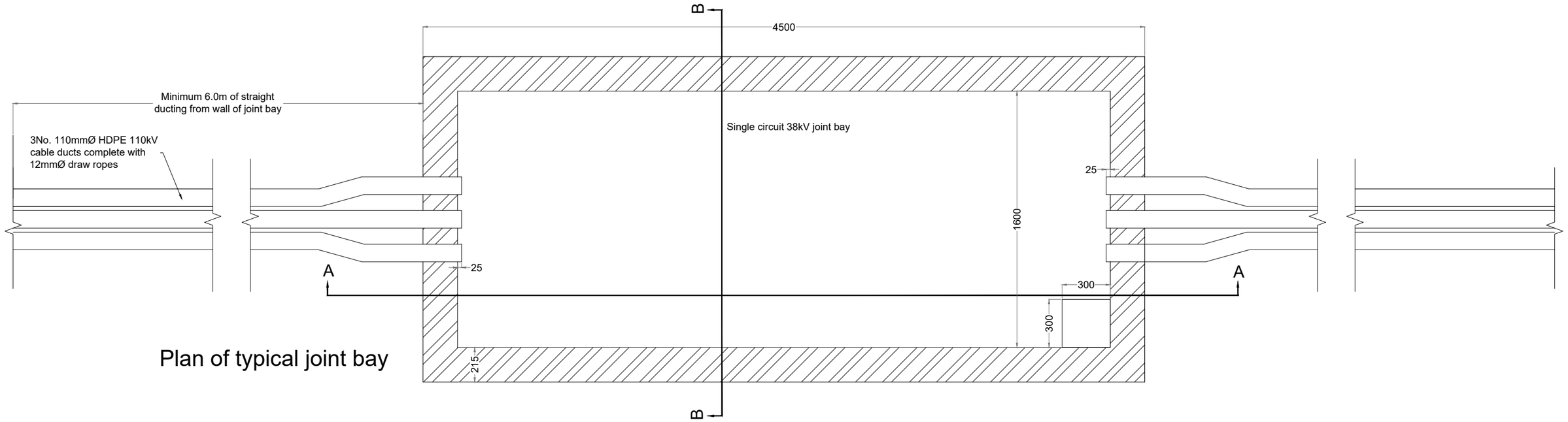
4.8.2.7.2 *Flatbed Formation Under– Option B*

Where cable ducts are to be installed under an existing watercourse or service crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench, the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material under it. The ducts will be laid in this trench in a flatbed formation under the existing culvert/ service and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification as shown in Figure 4-32.

4.8.2.7.3 *Flatbed Formation over– Option C*

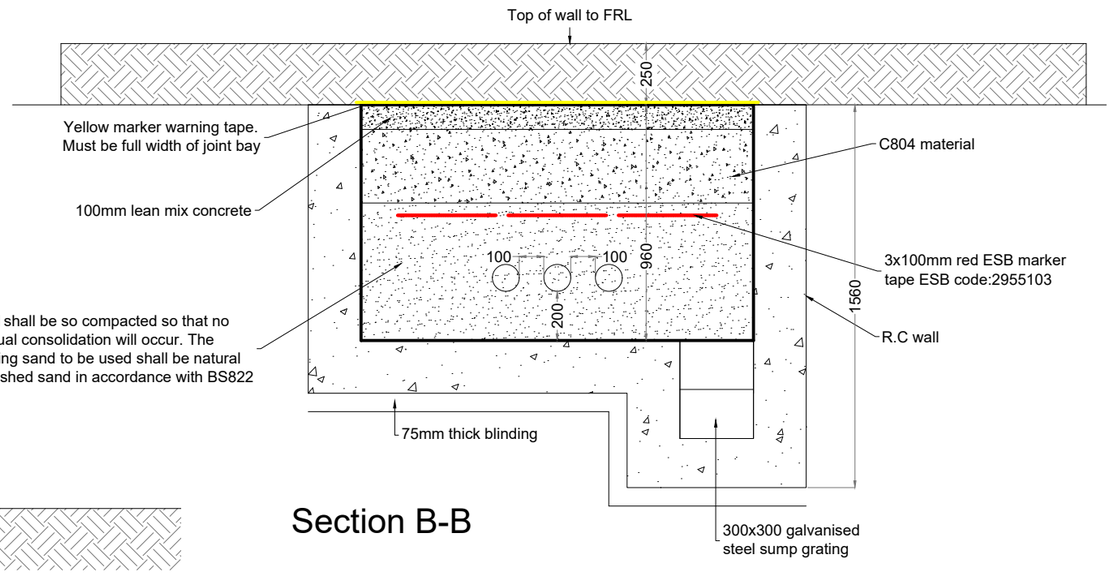
Where cable ducts are to be installed over a culvert or service crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material over it. The ducts will be laid in this trench in a flatbed formation over the existing culvert and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification as shown in Figure 4-33.

Where a culvert or service has insufficient cover depth to fully accommodate the required trench, the ducts can be laid in a flatbed formation partially within the existing road surface as shown in Figure 4-34. Where this option is to be employed, the ducts will also be encased in steel with a concrete surround as per ESB Networks specifications. In order to achieve cover over these ducts and restore the carriageway of the road, it may be necessary to raise the pavement level locally to fully cover the ducts. The increased road level will be achieved by overlaying the existing pavement with a new wearing course as required. Any addition of a new pavement will be tied back into the existing road pavement at grade. After the crossing over the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

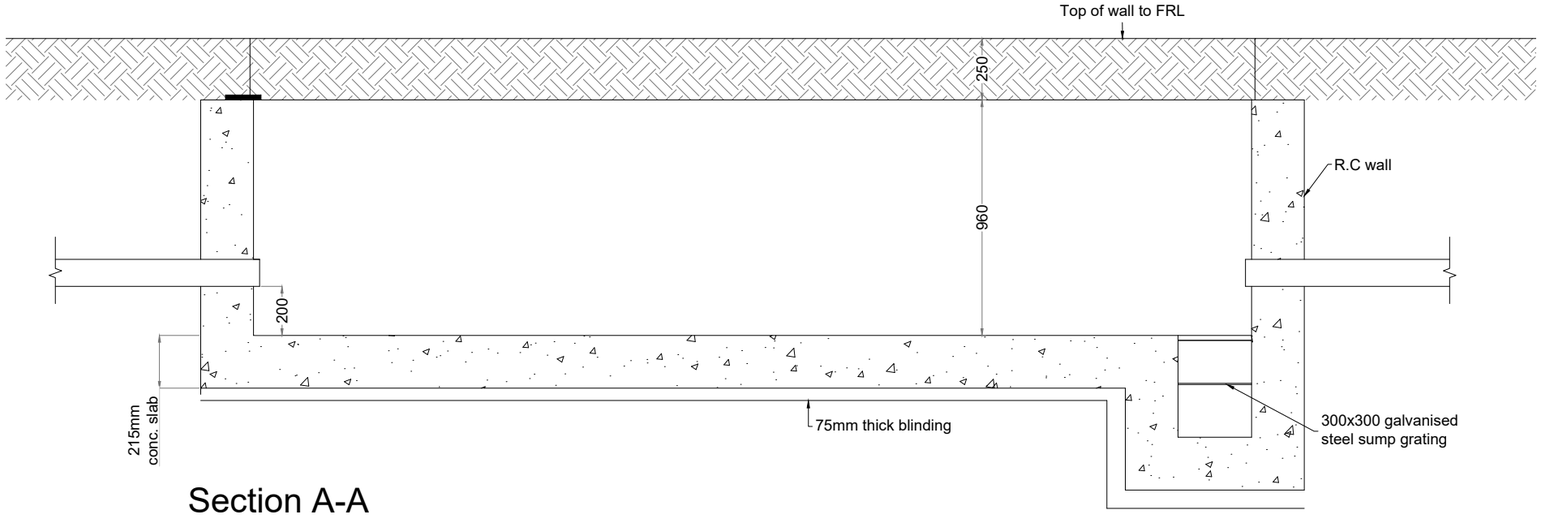


Plan of typical joint bay

Note:
Comms Chamber, as shown in
Dwg No. 231103-31, to be located
adjacent to Joint Bay



Section B-B



Section A-A

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Joint Bay Detail**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-28	1:25 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
JOB	RD	30.06.2025	P01

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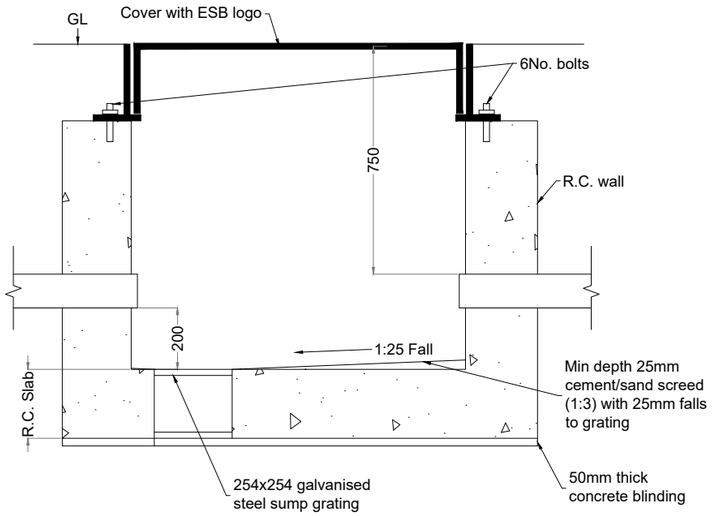
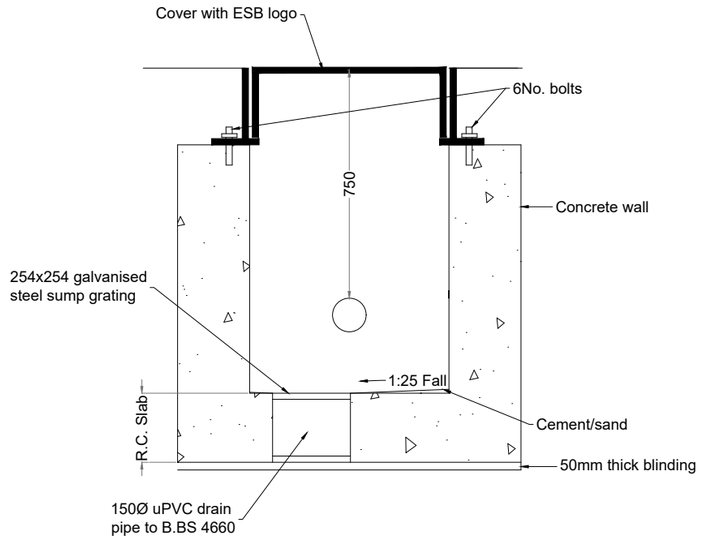
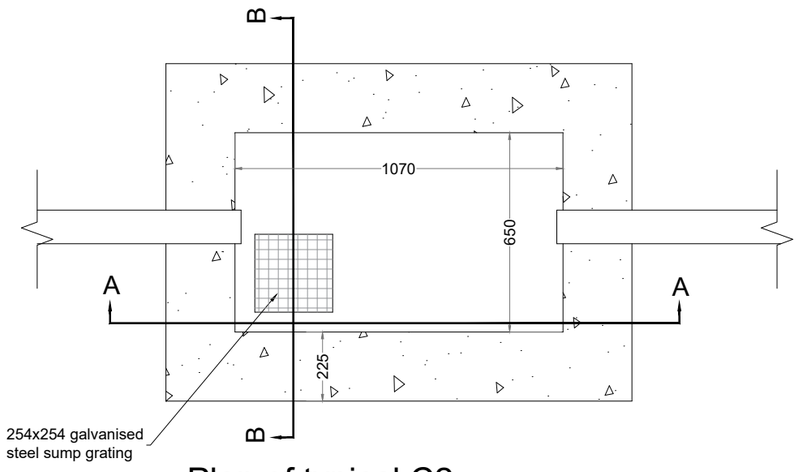


Section A-A



Section B-B



Plan of typical C2
communications chamber

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **C2 Comms Chamber Detail**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-29	1:20 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
JOB	RD	30.06.2025	P01

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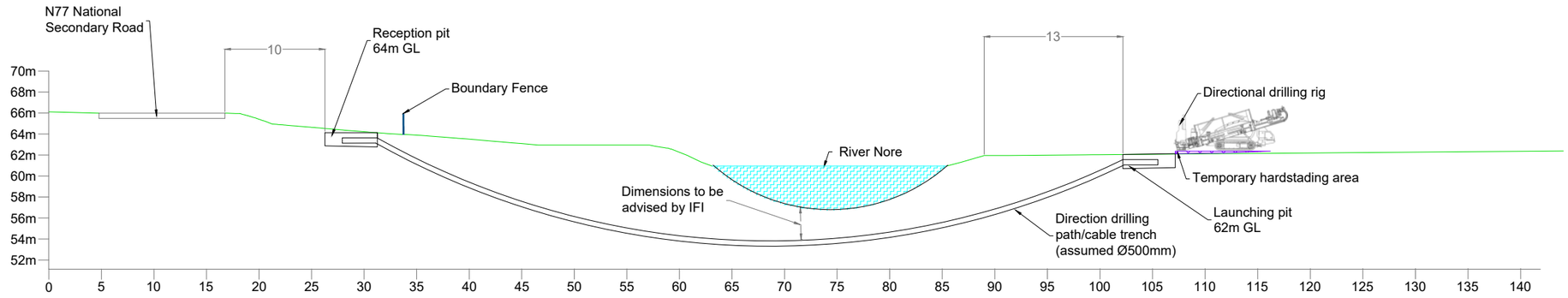
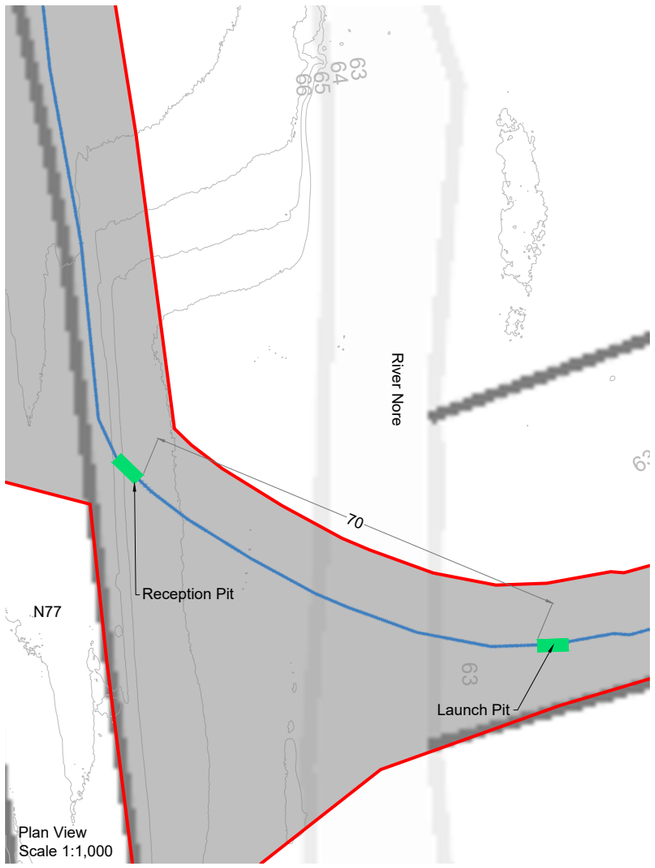


Contextual Section
Scale 1:500



Plan View
Scale 1:1,000



Directional Drilling Rig



Drilling Rig & Launch Pit

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Directional Drilling**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-30	1:500 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
JOB	RD	30.06.2025	P01

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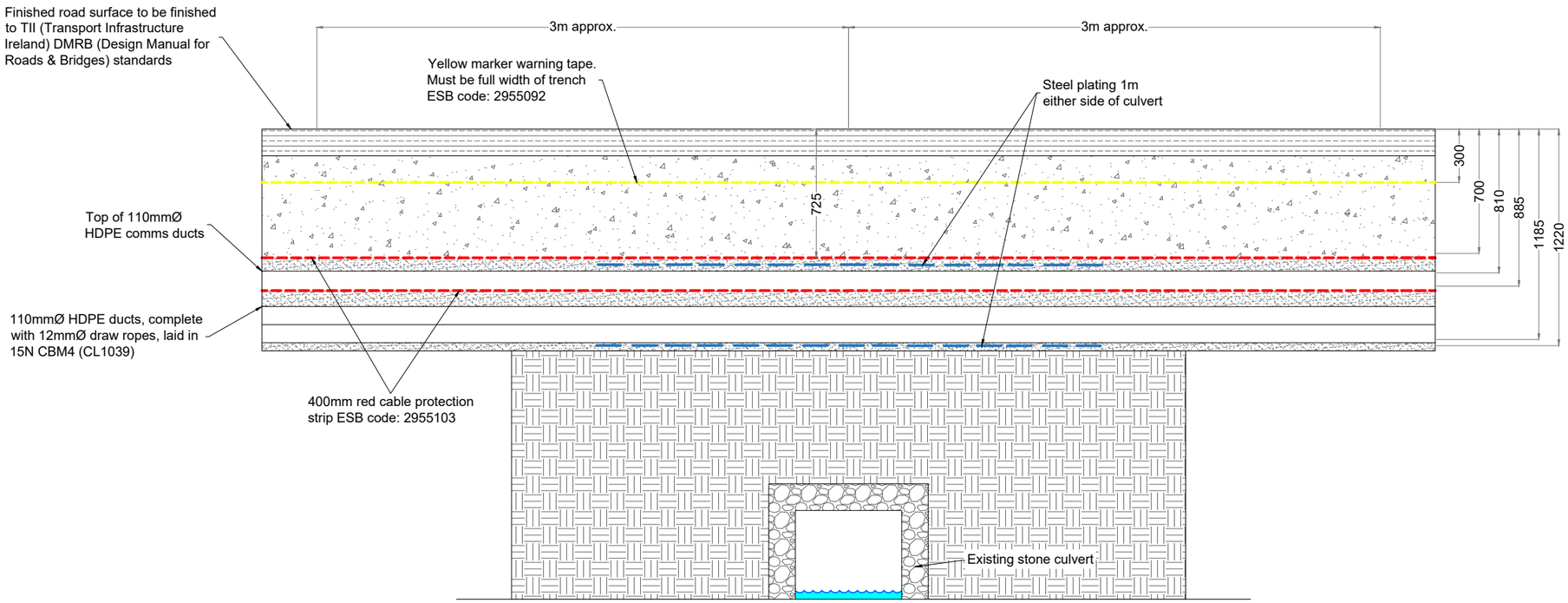
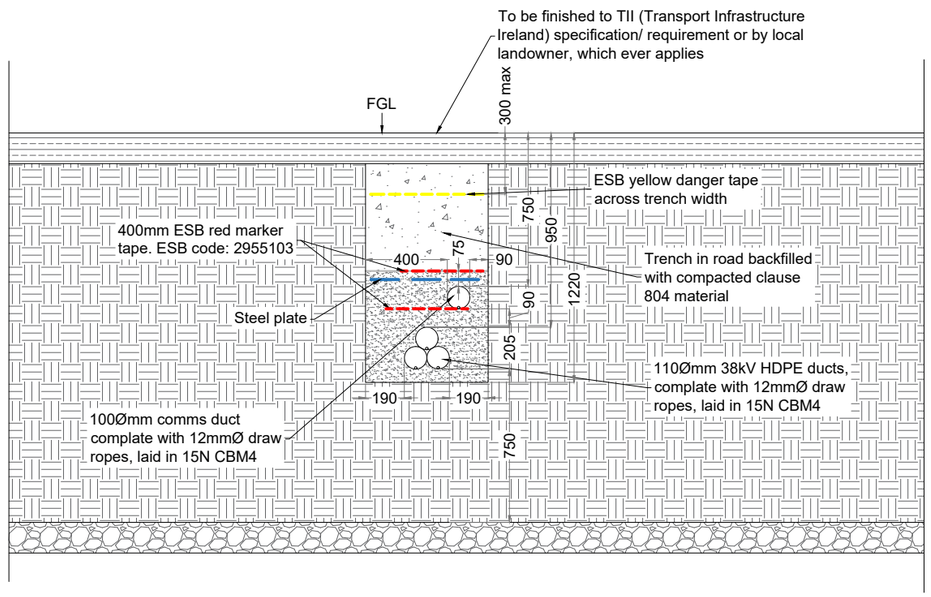


Longitudal section at watercourse crossing



Cross section at watercourse crossing

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Cable Trench Over Culvert**			
PROJECT No.: **231103**		DRAWING No.: **Fig 4-31**	SCALE: **1:30 @ A3**
DRAWN BY: **JOB**	CHECKED BY: **RD**	DATE: **30.06.2025**	REVISION.: P01

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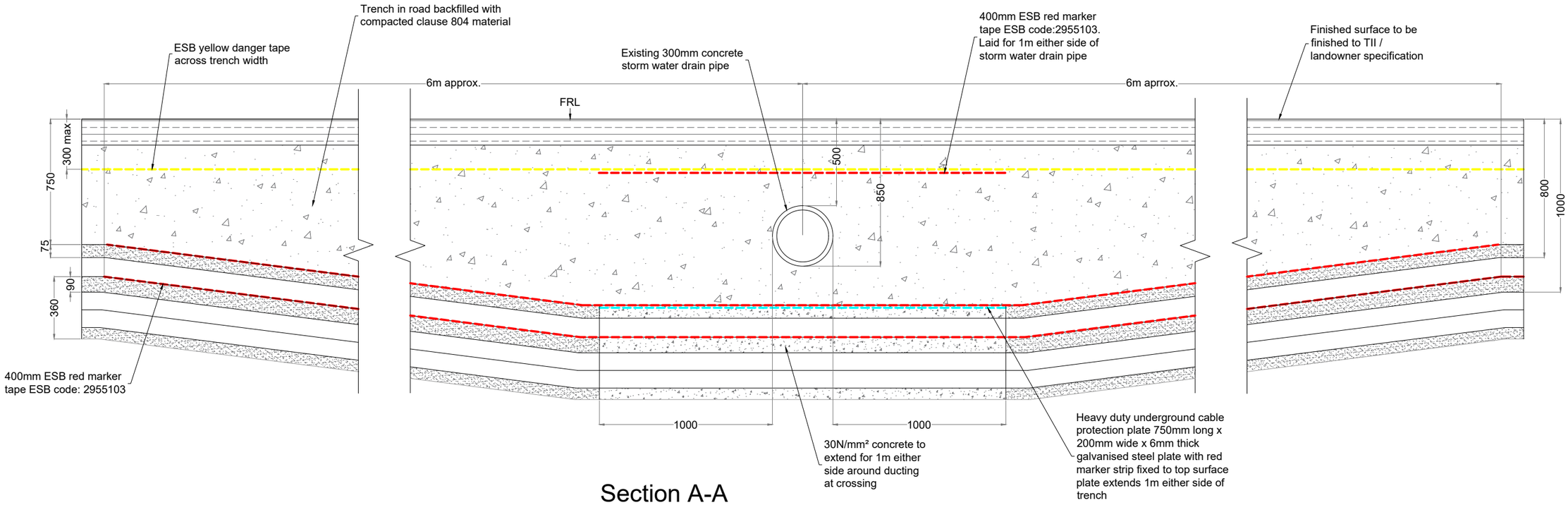
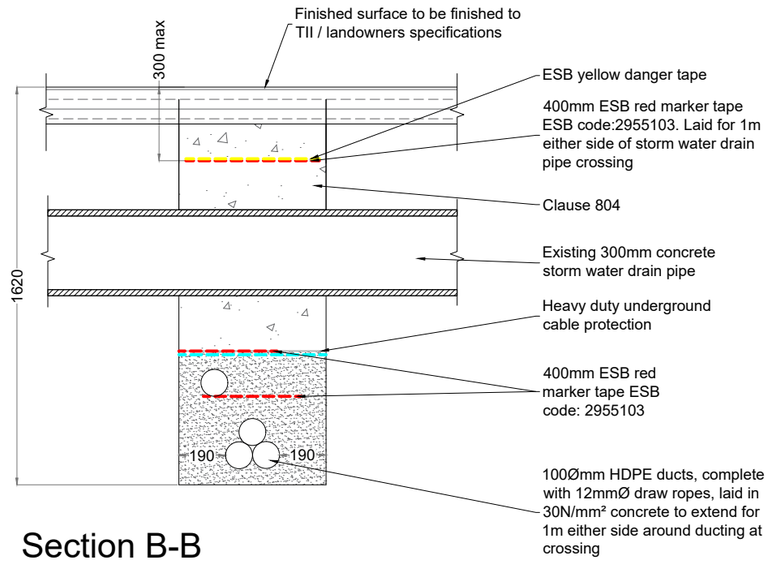


Section A-A

Scale 1:25



Section B-B

Scale 1:25

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**

DRAWING TITLE: **Cable Trench Under Piped Culvert**

PROJECT No.:	DRAWING No.:	SCALE:
231103	Fig 4-32	1:25 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
JOB	RD	30.06.2025	P01

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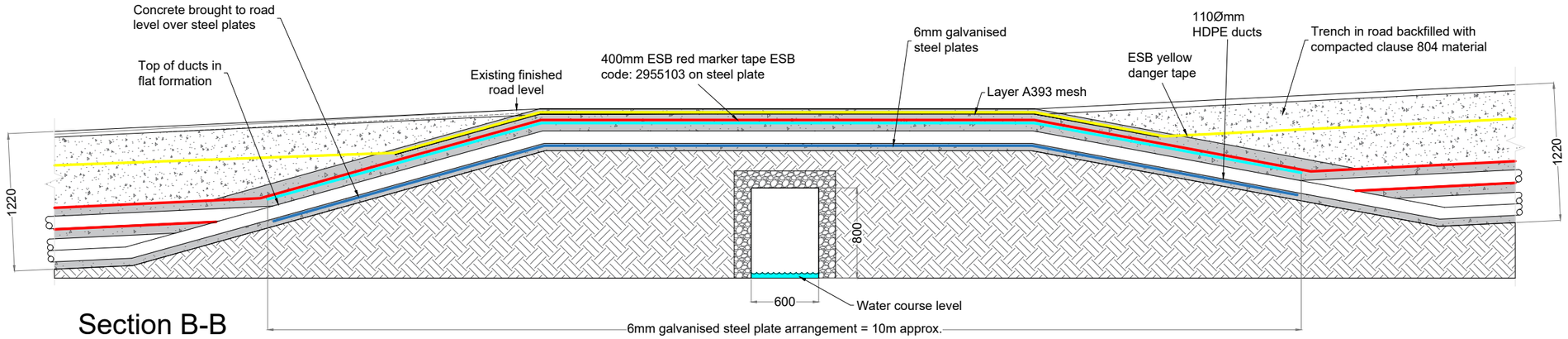
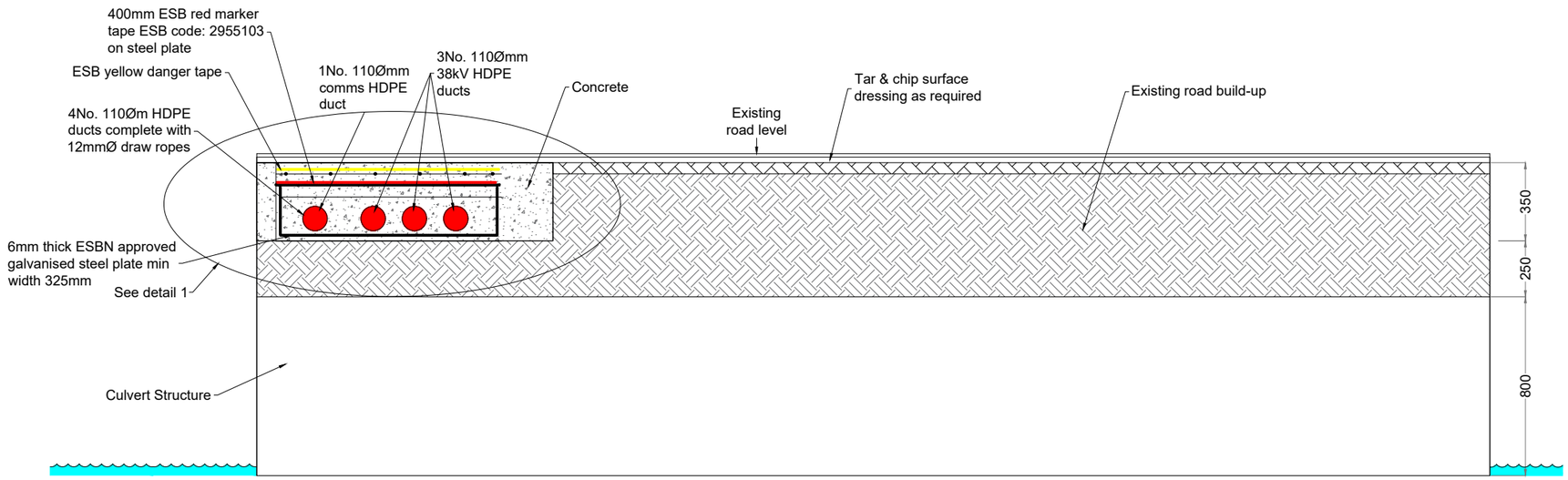


Section B-B

Scale 1:45



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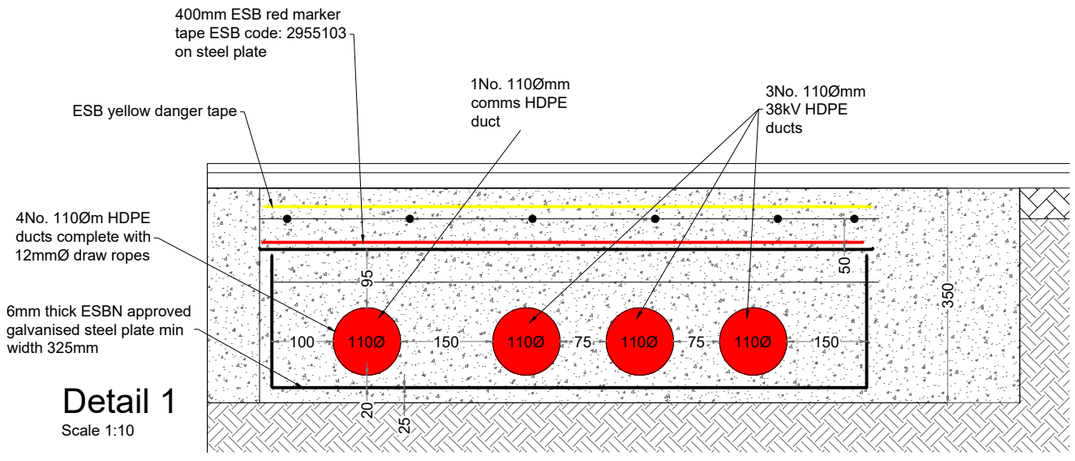

Detail 1

Scale 1:10

PROJECT TITLE: **Seskin Renewables Wind Farm, Co. Kilkenny/Laois**			
DRAWING TITLE: **Cable Trench Flatbed Formation Over Culvert**			
PROJECT No.: **231103**	DRAWING No.: **Fig 4-33**	SCALE: **As Shown @ A3**	
DRAWN BY: **JOB**	CHECKED BY: **RD**	DATE: **30.06.2025**	REVISION.: **P01**

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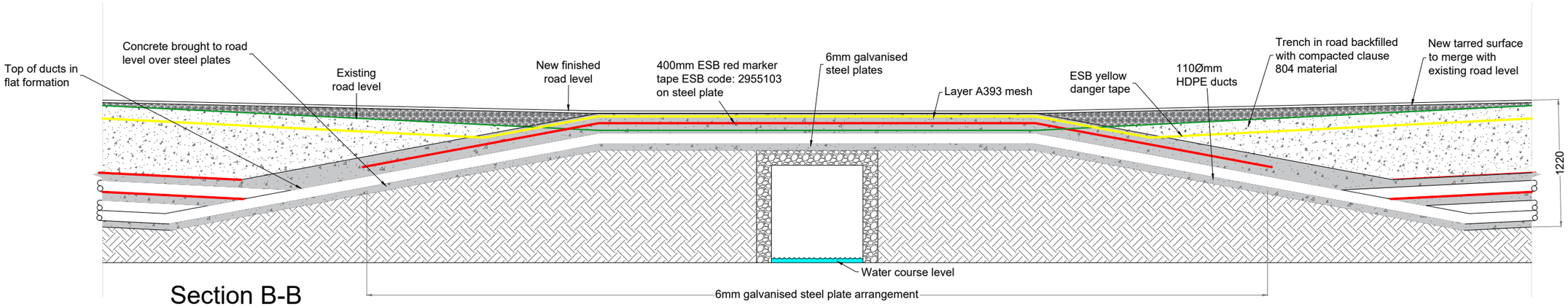

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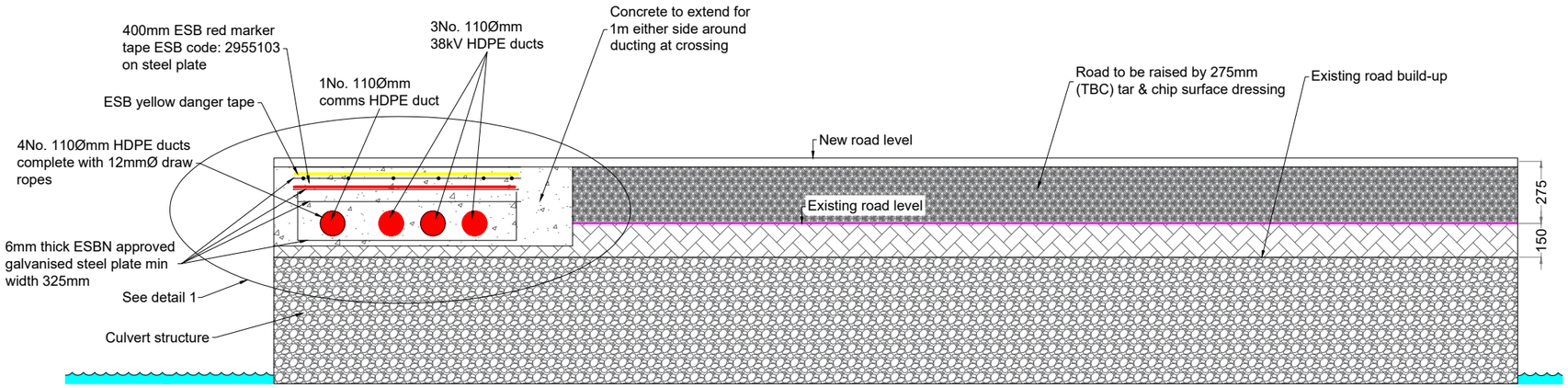
Scale 1:45



Section A-A

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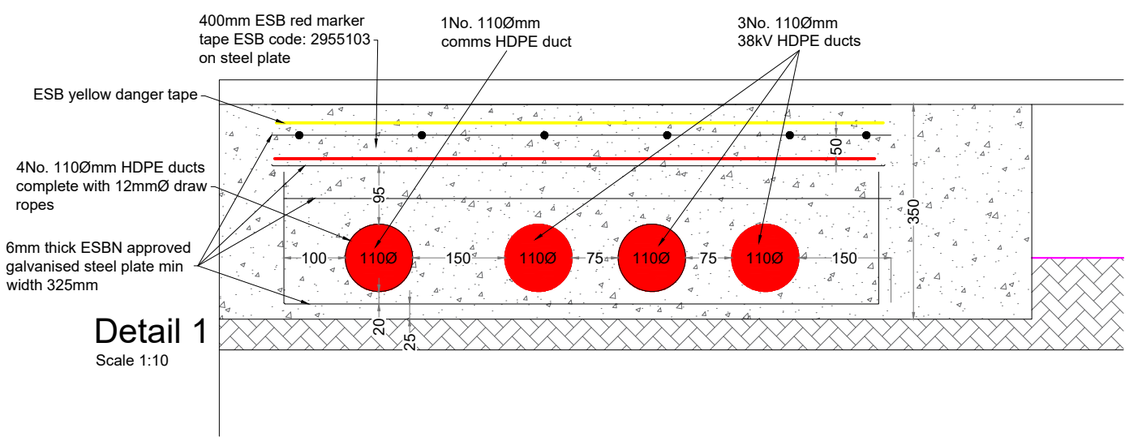

Detail 1

Scale 1:10

PROJECT TITLE:	**Seskin Renewables Wind Farm, Co. Kilkenny/Laois**
DRAWING TITLE:	**Cable Trench Flatbed at Road Surface Level**
PROJECT No.: **231103**	DRAWING No.: **Fig 4-34**
SCALE: **As Shown @ A3**	
DRAWN BY: **JOB**	CHECKED BY: **RD**
DATE: **30.06.2025**	REVISION.: P01

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4.9 Operation

The Proposed Development is expected to have a lifespan of approximately 35 years. As part of the Proposed Development site planning application, permission is being sought for a 35-year operation period commencing from the date of full operational commissioning of the Proposed Development. During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of meteorological equipment and control systems to changes in wind speed and direction.

The wind turbines will be connected together and data relayed from the wind turbines to a central control unit at the on-site substation which will facilitate off-site remote monitoring of the wind farm. Each turbine will be monitored off-site by the appointed Operations and Maintenance contractor (typically the wind turbine manufacturer) and also a wind farm operations management company. The monitoring of turbine output, performance, wind speeds, and responses to any key alarms will be monitored off-site by both parties 24-hours per day. Regular on-site visual inspections will also be carried out by the wind farm operations management company.

Certain Proposed Development site components will be subject to routine and periodic maintenance. Each turbine would be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition there is often a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically maintenance traffic will consist of four-wheel drive vehicles or vans. The site roads will also require periodic maintenance.

4.10 Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of the operational life of the wind farm, the wind turbines may be retained and the operational life extended or replaced with a new set of turbines, subject to planning permission being obtained. In the event that neither of the above options are implemented, the Proposed Development will be decommissioned fully as agreed with the Planning Authority. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Seskin Renewables Wind Farm, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the Proposed Development by the time the decommissioning of the Proposed Development is to be considered, and therefore it may be more appropriate to leave the Site roads in situ for future use. It is envisaged that the roads will provide a useful means of transport as agricultural roads for the pastoral farming on the Site.

The underground grid connection cabling and on-site substation will remain in place as it will be under the ownership and control of the ESB and Eirgrid.

A Decommissioning Plan has been prepared and included as Appendix 4-4 of this EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the proposed renewable energy development have been assessed in this EIAR.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

> *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".*