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ACRONYMS AND ABBREVIATIONS

SLR	SLR Consulting Limited
EIAR	Environmental Impact Assessment Report
CTMP	Construction Traffic Management Plan (CTMP)
ABP	An Bord Pleanála
CEMP	Construction and Environmental Management Plan
CBM	Cement Bound Material
HDPE	High Density Polyethylene
ESBN	Electricity Supply Board Networks
AEP MRFS	Annual Exceedance Probability Mid-Range Future Scenario
ITM	Irish Transverse Mercator
MWh	Megawatt Hours
NIS	Natura Impact Statement
OPW	Office of Public Works
OS	Ordnance Survey
TSO	Transmission System Operator
SG155	Siemens Gamesa V155
V162	Vestas 162
WEG	Wind Energy Guidelines
WEDGs	Wind Energy Development Guidelines
MCC	Meath County Council
WCC	Westmeath County Council

DESCRIPTION OF THE PROPOSED DEVELOPMENT **2**

INTRODUCTION

2.1 This chapter of the EIAR describes the existing site and the main components of the Proposed Development and provides details on its construction, operation, and decommissioning in accordance with the requirements of the EIA Directive. The chapter provides the basis of the assessments presented within **Chapters 4 to 16.**

2.2 This chapter includes an overview of the Proposed Development followed by a detailed description of the main components and their method of construction and decommissioning. Measures that have been built into the design of the Proposed Development to avoid or reduce effects, also known as 'embedded mitigation', are also described here and in the Construction and Environmental Management Report (CEMP) contained in **Appendix 2-2** of this EIAR.

2.3 In addition to embedded mitigation, mitigation measures specifically arising as a result of the environmental impact assessment process are set out in each individual topic chapter. A schedule of these mitigation measures is also provided in **Chapter 17**.

Submission Figures and Drawings

2.4 An overview of the Proposed Development is provided in the following Figures located at the end of this chapter:

- **Figure 2-1** Proposed Site Layout Overview
- **Figure 2-2** Proposed Cable Routes
- **Figure 2-3** Existing Landuse
- **Figure 2-4** Developments within 20km of the Proposed Development
- **Figure 2-5** Proposed Turbine Delivery Route

2.5 The chapter should be read in conjunction with the Planning Drawings also submitted with this Planning Application.

Statement of Authority

2.6 This chapter has been prepared by Aislinn O'Brien, BA Int, MSC, MCD, Technical Director-Planning and Darren Keogh BEng, MPhil, PHD Civil Engineering, both employed by SLR Consulting.

- Aislinn is a chartered planner and has 15 years' experience in project management, EIA coordination, planning for large scale infrastructure and renewable energy projects and preparing environmental impact assessment chapters and reports for renewable energy and industrial projects.
- Darren is a Chartered Civil Engineer with 22 years' experience in renewable energy developments, electrical transmission, recycling/waste and development sectors. He has a wide variety of experience as a designer in these and other sectors and is now principally a Framework/Project Manager on a number of large and varied engineering projects. Darren's design and project management skills are largely through experience on projects such as sub-stations, transmission route assessment, road schemes, surface water schemes, windfarms, demolition contracts, road designs, bridge assessments, design of waste/recycling facilities, and site investigations for a variety of different types of infrastructure.

PROJECT DESCRIPTION

2.7 Permission is being sought by the Applicant for the construction of 8 No. Wind Turbines, all ancillary works in Co. Westmeath in addition to works along the turbine delivery route, the construction of an underground grid connection with a 33kV cable and a proposed 110kV substation in Clonmellon in Co. Meath. The Proposed Development will also include a section of 110kV cable between the 110kV substation and the existing overhead line. The Proposed Development will be carried out in Counties Meath and Westmeath, refer to **Figure 2-1** for details on the Proposed Site Layout Overview

Statutory Development Description for consent

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

2.9 The Proposed Development will consist of:

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

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

2.10 A 35-year operational life for the Wind Turbines from the date of commissioning of the entire Proposed Development.

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

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

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

2.14 The Applicant is seeking permission for all elements specified in paragraphs 2.8-2.11 above, including the Cable Corridor and Substation, refer to **Figure 2-2**. The general layout of the Proposed Site Layout Overview is shown in **Figure 2-1**.

Definition of Terms

2.15 For the purposes of assessment, the following terms are utilised throughout the EIAR:

- **Proposed Development:** The portions of the Project for which development consent is sought - in this instance, it is the wind farm and its ancillary infrastructure (including access tracks, drainage and internal collector cable), the Substation, the Cable Corridor, electricity cabling and any development associated with the Turbine Delivery Route.
- **Northern Cluster:** the part of the Proposed Development encompassing Turbines T1, T2 and T3 and all associated infrastructure.
- **Southern Cluster:** the part of the Proposed Development encompassing Turbines T4, T5, T6, T7 and T8 and all associated infrastructure.
- **Main Wind Farm Development Site:** part of the Proposed Development Site which includes northern plus the southern cluster.
- **Proposed Development Site:** The subject site where the Proposed Development is located, as defined by the Proposed Development Site Boundary
- **Proposed Cable Corridor:** The grid route corridor within the public road which will accommodate a 33 kV cable connecting the Wind Farm to the proposed 110 kV Substation at Clonmellon in addition to a section of 110kV electricity cabling between the 110kV substation and the existing overhead line at Clonmellon.
- **Proposed Substation:** Proposed 110 kV Substation at Clonmellon
- **Proposed Substation Site:** part of the Proposed Development Site which will include the Proposed Substation.
- **Design Permutations:** This term is to be utilised define each permutation within the turbine range when assessing the dimensional ranges which are set out in **Table 2-1**.

Applicant

2.16 The Applicant for the Proposed Development is Knockanarragh Wind Farm Limited, an entity wholly owned by Statkraft, a leading company in hydropower internationally and Europe's largest generator of renewable energy. Statkraft is one of the biggest renewable energy developers in Ireland with over 4GW pipeline of offshore, onshore, solar and grid services projects. The Statkraft Ireland team, which is based in Cork and Tullamore, Co. Offaly, has constructed a portfolio of almost 350MW of wind projects across the country, operates over 500MW, and has an established track record in wind energy in Ireland having previously developed previously wind farms in Counties Clare, Cork, Kerry, Donegal, Limerick, Galway, Waterford, Tipperary, Offaly and Tyrone.

Site Location and Environs

2.17 The Proposed Development will be located west of the N52 National Road from Delvin to Clonmellon in the townlands of Clonmellon, Kilrush Upper, Kilrush Lower, Newtown, Ballinlig, Carnybrogan, Cavestown and Rosmead in County Westmeath and townland of Galboystown in Co. Meath.

2.18 The Main Wind Farm Development Site is located approximately 1km southwest of the village of Clonmellon and c. 2.8km northeast of Delvin, in Co. Westmeath. The Main Wind

Farm Development Site will be accessed directly from the L5542 and an existing agricultural entrance off the N52, a national primary road.

2.19 The western boundary of the Proposed Development Site extends across the Westmeath and Meath County administrative boundary, to include part of the River Boyne and Blackwater cSAC (Site Code: 002299). The River Stonyford and it's tributary D'arcy Crossroad Streams form part of this cSAC.

2.20 The Proposed Development Site predominantly consists of a mixture of agricultural land, primarily grazing, and forestry. The area in which the Applicant has a beneficial interest in, also includes approximately 79.11ha of private plantation and mixed woodland.

2.21 **Figure 2-3** shows land use classifications according to Corine land cover mapping. The predominant land use within the application area is agricultural pastures, with some heterogenous agricultural areas in the north of the site. Land use is characterised by forest and semi-natural areas within the central portion of the Proposed Development Site.

2.22 The Proposed Development Site is generally flat with some gently undulating terrain and levels ranging from c. 85m AOD to 106m AOD. The lowest part is located close to Darcy's Crossroads Stream at the northwest boundary of the Proposed Development Site. This part of the Proposed Development Site includes proposed locations for T1 and T2 and is located at c. 88m AOD. The highest point in the northern cluster is at 106m AOD, c. 820m southeast of turbine location T3. The southern cluster of turbines lies between at c. 90-91m AOD for T5, T6 and T7 and c. 94m AOD at T4. The lowest part of the southern cluster is close to the proposed location for T8 at c. 85m AOD.

2.23 There are several eskers running through the area, some of which show signs of having been locally used for sand and gravel extraction. There are no residential properties within the Proposed Development Site itself, but the residential properties located within 1km of it are shown on **Figure 4-3**. **Chapter 12** identifies the heritage assets that have been assessed in the context of the Proposed Development. These assets include Rosmead House (with associated structures) is an eighteenth century building of heritage interest to the south of the Main Wind Farm Site.

2.24 The site for the Proposed Substation is located in the townland of Galboystown on the western outskirts of Clonmellon town (c. 200m from its settlement boundary). The Proposed Substation Site is currently accessed by the L6821 via an existing agricultural access.

2.25 The Proposed Development Site covers an area of 115.81 Ha.

Landownership

2.26 Ownership of the lands associated with the Proposed Development are a combination of lands owned by private landowners.

On-Site Wind Resource

2.27 The layout of the Proposed Development has been designed to minimise any potentially significant environmental effects, while at the same time maximising the energy yields of the wind resources passing over the site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. The Sustainable Energy Authority of Ireland (SEAI) Wind Mapping System[1] identifies the site as having an average wind

[1] Sustainable Energy Authority of Ireland (SEAI) Wind Mapping System https://gis.seai.ie/wind/

speed of between 5.2 and 5.4 metres per second at 20 m above ground level up to c. 8.8 m/s at 150m.

Detailed Description

2.28 The Proposed Development consists of the following elements:

- Turbines and associated infrastructure (including borrow pits, drainage infrastructure, internal electrical and communications cabling, and access tracks)
- Cable Corridor
- Grid Connection
- Substation
- Tree Felling and Replanting
- Drainage infrastructure
- Turbine Delivery Route

Turbines and Associated Infrastructure

2.29 The turbine and its associated infrastructure will consist of:

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

Wind Turbine Generation

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

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

Turbines

2.31 The proposed turbines will be within the following specifications:

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

2.32 Each candidate turbines fit within the following specifications:

- The turbines will be three bladed, horizontal access type.

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

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

Candidate Turbines

2.34 The exact make and model of the turbine will be dictated by competitive tender process but will remain within the range listed below. The dimensions of the proposed turbines will be within the range of the minimum and maximum permutations set out in **Table 2-1** below. The minimum parameters are based on the Siemens Gamesa 155 and the maximum parameters are based on the Vestas 162. The EIA assesses all permutations within the range of the proposed dimensions.

Table 2-1: Design Parameters to be Assessed

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

2.35 The specification of each candidate turbine is contained in **Appendix 2-1** found in Volume III of this EIAR.

Turbine Layout

2.36 The turbine layout consists of 8 no turbines with:

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

2.37 The layout of the Proposed Development has been designed to minimise the potential environmental effects of the wind turbines on the surrounding area, while at the same time maximising the energy yield of the wind resource which passes over the Proposed Development Site. The Proposed Site Layout Overview layout is shown in **Figure 2-1**. This layout reflects the outcome of an iterative design process. Further detail on the design approach, constraints and alternative layouts is documented in **Chapter 3**.

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

Table 2-2: Proposed Knockanarragh Wind Farm Turbine Coordinates

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

Turbine Blades

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

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

Turbine Tower and Foundation

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

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

Turbine Colour

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

Power Output

2.44 The Proposed Development will have an estimated installed capacity of 52.8MW (SG 155) to 57.6MW (V162) depending on the final turbine technology installed. Turbines of the exact same make, model and dimensions can have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle. A rated capacity has been

used below to calculate the power output of the Proposed Development. Assuming an installed capacity of **52.8- 57.6** MW, the Proposed Development has the potential to produce approximately **152,634 (SG155) to 166,510 (V162)** MWh (megawatt hours) of electricity per year, based on the following calculation:

2.45 A x B x C = megawatt hours of electricity produced per year

Where:

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

2.46 The 152,634 (SG155) to 166,510 (V162) MWh of electricity produced by the Proposed Development would be sufficient to supply approximately 33,037 to 39,645 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity.[2]

2.47 According to the 2022 Census of Ireland, there are a total of 34,087 private households within County Westmeath and 72,977 in County Meath. Based on a capacity factor of 33%, the Proposed Development would therefore produce enough electricity for the equivalent of 96% to 116% of households in County Westmeath and 45% to 54% of Meath as per the Housing stock of the 2022 Census, see **Table 2-3**. The projected housing stock for 2027 of Co. Meath and Co. Westmeath is 91,320 and 39,070.

Table 2-3 Proportion of Household Electricity Potentially Generated per County

County	No. of Private Households	MWh of electricity produced	% of Private where Energy Demand is met
Co. Westmeath	34,087	33,037 to 39,645 Households	96% - 116%
Co. Meath	72,977	33,037 to 39,645 Households	45% - 54%

Access Tracks and Hardstandings

Internal Access Tracks

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

2.49 **Figure 2-1** illustrates the internal access tracks within the Proposed Site Layout Overview. The proposed internal site track layout will permit access for vehicles during the construction phase, for maintenance during the operational phase, and for vehicles to decommission the turbines at the end of the life of the development.

2.50 All access tracks will be approximately 5 m wide. The tracks will be finished with a well graded aggregate. Existing drainage infrastructure will be maintained and upgraded where necessary. The full track construction (at formation level) will extend to allow for cable

[2] March 2017 CER Review of Typical Consumption Figures Decision

trenches and surface water drainage ditches. Additional clearance may be required above ground level to allow for turbine oversail/swept path during turbine delivery. Gradients will be limited to no more than 1 in 12 (8%) and a stone layer provided, so as to provide suitable traction for turbine delivery vehicles and other larger indivisible loads.

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

2.52 Access track formation (see **Table 2-4**) will consist of a proposed minimum 500m hard core on a geotextile membrane. The construction methodology for newly constructed tracks will be as follows:

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

Table 2-4: Internal Access Tracks Details

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

Construction Material Required

2.53 The total amount of construction aggregates required is worked out as shown on **Table 2-5** and the following is the estimated cut and fill balance of construction materials:

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

Table 2-5: Indicative Aggregate Requirement

Location	Aggregate (m^3)
Access Tracks	22,160.00
Turbine Bases	7,259.68
Hardstandings and Laydowns	18,920.00
cv Substation	16,280
TCC	3,614.50
Misc	8,500.00
Total	**76,734**

2.54 The aggregate (4) is based on 0.5m thick construction of tracks and pads, turbines bases, the temporary and operational compounds.

2.55 It is assumed that 10,000m^3 concrete is imported to the site in all scenarios, i.e. where the borrow pits are / are not productive.

Borrow Pits

2.56 The Proposed Development will include two borrow pits within the Main Wind Farm Development Site.

2.57 The borrow pits are sized on the basis of a 35,000m^3 requirement. The Proposed Development will provide 2 no. borrow pits of 90 x 90m accommodating 5m excavation of rock/aggregate.

Watercourse Crossings

2.58 Within the Main Wind Farm Development Site, there are two new water crossings proposed between Turbine 2 and 3 and two existing crossings between Turbines 1 and 3 that will require an upgrade. Two further watercourse crossings will be upgraded along the Proposed Cable Corridor required for grid connection between the Main Wind Farm development and the Proposed Substation at Clonmellon. See **Figure 7-1** for proposed locations of these.

2.59 Culverts will be appropriately sized and will be designed to facilitate the maximum loadings expected from construction vehicles. The two proposed new culverts over the field drains will be culverted with a 900mm pipe. To upgrade the existing crossing over the arterial drainage drain, Section 50 consent from the OPW will be required. The upgraded crossing structure will retain the existing hydraulic profile to mitigate any impact on local drainage and flood risk.

Electrical Cabling

Internal electrical and communications cabling

2.60 Internal electrical and communications cabling will be provided as an integrated part of the proposed layout within the Northern and Southern Cluster. Internal collector cable routes will generally follow access roads with the exception of a requirement for directional drilling between T5 and T8 to facilitate internal connection at this location.

2.61 The electricity generated from wind turbines between the Northern and Southern Clusters will be collected at a medium voltage 33 kV cable circuits of buried cables which will follow on site access tracks to the access points along the L5542.

2.62 A 33kV collector circuit cable will be embedded within the public roadway between the clusters along the L5542 until it meets the N52 where it will follow this road north in the direction of Clonmellon. At Clonmellon it will then follow the L6821 east to connect with the Proposed Substation, refer to **Figure 2-2** Proposed Cable Routes.

2.63 The electricity will be exported to the grid via the 110 kV overhead line at this location.

Width and Depth of Trench Along Road

Cable Installation

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

2.65 Typical 110kV cable trench detail for the section of 110kV electricity cabling between the 110kV substation and the existing overhead line at Clonmellon, inclusive of interface mast, is also shown on the associated Planning Drawings.

2.66 The specifications for cables and cable installation will be in accordance with EirGrid requirements. A description of cable installation works is found within the CEMP which is contained in **Appendix 2-2** of this EIAR.

Joint Bays

2.67 Joint bays are precast concrete chamber buildings where cables are joined to form one continuous cable. It is assumed that a joint bay will be required at locations of tight angles (typically 90 degree bends) and every 1000m. For the purposes of this assessment, 4 no joint bays will be located in public roads. Locations of joint bays are specified by Eirgrid at detailed design stage and therefore, joint bay locations have been included indicatively as part of this planning application.

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

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

Grid Connection / Cable Route

2.70 Planning permission for the associated cable route from the Proposed Development Site to the permanent 110kV electrical substation which will be constructed west of Clonmellon, Co Meath, is also being sought as part of this planning application. The proposed cable route is shown in **Figure 2-2**.

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

2.72 This will require 33kV underground electricity cabling along the N52 connecting the Main Wind Farm Development Site to the proposed 110 kV electrical substation and construction

of a section of 110kV electricity cabling to the existing overhead line at Clonmellon, inclusive of interface mast.

2.73 Undergrounding of approximately 610 metres of existing 10 kV overhead electrical power line in the vicinity of Turbine 6 will also be required.

2.74 During the consultation and scoping processes for the Proposed Development, searches of existing utility services were carried out to identify areas where existing major assets exist such as high-voltage electricity cables are gas mains. Private utilities and telecommunications companies were also consulted during this period to inform the proposed design (see **Chapter 13**).

2.75 Cable trenching will be carried out with the aid of single lane closure on the N52 and temporary closure of the L5542. A Construction Traffic Management Plan as outlined in **Appendix 14-3** will be agreed with the TII/ RDO and Westmeath County Council prior to commencement of works. Due to the length of cabling within the road corridor (ca 3.85 km), these works will be carried out over a 6-month period of time (ca 26 weeks). The approach will plan the works to ensure minimal impacts on road users and the general public.

Electricity Substation, Control Buildings and Associated Compound

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

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

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

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

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

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

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

Tree Felling and Replant Lands

2.83 The Proposed Development Site includes some areas of mixed woodland and forestry plantation. Felling of between 19.62ha and 20.09ha of forestry is required within and around the wind farm infrastructure to facilitate its construction and operation. The felling area proposed is the minimum necessary to construct the proposed development and will provide necessary mitigation where required.

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

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

2.86 The construction methodology for tree clearance will follow the specifications set out in the Forest Service Forestry Standards and Procedures Manual (2015[3]) and Felling and Reforestation Policy (2017[4]).

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

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

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

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

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

2.90 It is proposed to fell between 19.62ha and 20.09ha hectares of forest to facilitate the Proposed Development. Replant lands are required and this replanting of forestry can occur

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

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

anywhere in the state, subject to licence. Potential replanting sites will be subject to a separate application.

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

Drainage

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

2.93 Further details on the hydrology and drainage are contained in **Chapter 7** and in the accompanying planning drawings.

Turbine Delivery Route (TDR)

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

2.95 A TDR Assessment was carried out and swept paths for all the node points along the route were completed (see **Figure 2-5** and **Appendix 14-1**). The assessment has identified temporary works to be carried out along the Turbine Delivery Route (TDR) to facilitate the delivery of the Wind Turbine Components (WTC) to the site of the Proposed Development without any obstructions from street furniture, natural elements and utilities along the route.

2.96 The TDR assessment was carried out to identify the optimum delivery route to the Proposed Development Site. Further discussion on this assessment is found in **Chapter 14** and **Appendix 14-1** of this EIAR.

Access

2.97 Access to the Proposed Development will be facilitated as follows:

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

Traffic, Peat and Biodiversity Management During Construction

2.98 A Construction Traffic Management Plan (CTMP) for the proposed development has been prepared and included as **Appendix 14-3** of this EIAR. The purpose of the CTMP is to outline the areas for consideration when preparing the programme of works and when undertaking site construction. It is to be used during the construction phase of the Proposed Development.

2.99 Peat has been observed within the Proposed Development Site following an assessment and walkover of the existing environment. Further information on soils, soil and peat management can be found in **Chapter 6**.

2.100 The Proposed Development includes measures to mitigate and compensate for effects on biodiversity and provide an overall enhancement. These compensation measures are not required or intended to address adverse effects on the integrity of any European site. They include the construction of wader scrapes for snipe and the replacement of hedgerows, plus the management of created and retained habitats, including wetland and fen within the Proposed Development Site boundary. Please refer to **Appendix 5-10**, Habitat and Species Management Plan for further detail.

CONSTRUCTION PROGRAMME

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

2.102 The main activities will include:

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

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

Table 2-6: Indicative Construction Programme

Construction Activity	Months																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site establishment & felling																		
Access tracks																		

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

CEMP

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

2.105 The CEMP is included as **Appendix 2-2** of this EIAR.

Cable Route Electrical Works

2.106 Electrical works for construction of the Proposed Cable Corridor will be carried out in tandem with construction within the Main Wind Farm Development Site. A description of construction techniques for development associated with the Proposed Cable Corridor is contained within the CEMP in **Appendix 2-2**.

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

Site Access Tracks and Drainage

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

2.109 The Proposed Development will require the construction of approximately 6 kilometres of new site access tracks and associated drainage infrastructure. Existing drainage infrastructure shall be retained where possible and improved as necessary.

Cable Trenches

Wind Farm

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

Grid Connection

2.111 The detailed construction sequence for the installation of cabling is detailed in the CEMP in **Appendix 2-2**.

2.112 Typical 33kV cable trench detail for installation along existing / proposed access track and for installation along a public road is shown on the Planning Drawings submitted with this application. Immediately prior to construction taking place the area where excavations are planned will be surveyed and all existing services will be identified, and temporary warning signs erected where necessary.

2.113 The CTMP will be implemented for cable works in the public road. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

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

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

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

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

2.118 Immediately prior to construction taking place the area where excavations are planned will be surveyed and all existing services will be identified, and temporary warning signs erected where necessary.

2.119 The CTMP will be implemented for cable works in the public road. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

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

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

Directional Drilling Works

2.124 Due to constraints between T5 and T8 the cable route between these turbines shall be installed underground using the directional drilling method.

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

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

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

Borrow Pits

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

Rock Breaking

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

Rock Blasting

2.130 In the unlikely event that rock blasting is required, this will be carried out using a mobile drilling rig which is used to drill vertical holes into the rock area that requires blasting. This is where explosives are used. It will take the drilling rig 3 to 4 days to drill the number of

holes required for a single blast. A specialist engineer will be employed to determine the locations and depths of blasting required. The specialist blasting engineer will arrange for the correct amount of explosives to be delivered to the Site for each blast. The management of explosives delivery and storage on-site will be agreed with An Garda Síochána in advance. The blast engineer will set the explosives and manage the blast. The rock generated from the blast will usually be the correct size to be loaded directly into the mobile crusher.

2.131 Notification of each blast will be given in advance of each blast to all residences and farms within 500m radius of the borrow pits.

Substation Compound

2.132 The proposed layout for the substation compound will be 11,194m^2 and will be constructed with up to a 1m thick granular layer to create the finished level. Selected areas within the compound will contain concrete foundations, such as the Eirgrid Building and switchgear foundations.

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

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

Watercourse Crossings

2.135 Watercourse crossings can generally be classified as follows:

- Existing structures (bridges or culverts) that need to be crossed by infrastructure (access tracks or cables) associated with the Proposed Development, without a need to modify the existing structure.
- Installation of new structures to facilitate the crossing of existing watercourses by infrastructure associated with the Proposed Development.
- Existing structures that need to be either replaced or upgraded to facilitate the crossing of existing watercourses by infrastructure associated with the Proposed Development.

2.136 There are 2 no. new watercourse crossings and 4 no. upgraded watercourse crossings required to facilitate the Proposed Development. Proposed methods for crossing existing watercourses along the cable routes are set out in **Table 2-7**.

2.137 New crossings will be designed to convey 1% AEP MRFS (Annual exceedance probability Mid-range future scenario) storm event with minimum 300mm freeboard level. This is in line with the OPW requirements.

2.138 Where watercourse crossings are required for the purposes of the cable route, the most relevant of the following methodologies will apply, to be assessed on a case-by-case basis:

- Piped culvert crossings – where sufficient cover is available, the cable ducts will be laid above the culvert with a minimum separation distance of 300 mm. Where sufficient cover is not available, cable ducts will be laid under the culverts with a separation distance of 300 mm.
- Flatbed formation over culvert – where the cable duct is to be installed over or below an existing culvert where sufficient cover is not available, 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 culvert. The ducts will be laid in this trench in a flatbed formation over the existing culvert and it will be encased in 6 mm thick steel galvanised pleat with the concrete surround as per EirGrid specification.

Table 2-7: Watercourse / Ditch Crossings

Crossing Point	Existing / Proposed	X coordinate (ITM)	Y coordinate (ITM)	Crossing type	Watercourse
WF-HF1	Existing Culvert that requires improvement to enable access	663112	767688	Flatbed Culvert, retaining the existing hydraulic profile	Field Drain
WF-HF2	Existing Culvert that requires improvement to enable access	663072	767714	900mm Piped Culvert	Field Drain
WF-HF3	Proposed new culverted crossing over a field ditch approaching Turbine 2.	662835	767827	900mm Piped Culvert	Field Drain
WF-HF4	Proposed new culverted crossing	662698	767830	900mm Piped Culvert	Field Drain
GCR-1	Existing	664687	768427	Piped Culvert	Kilskeer Stream
GCR-2	Existing	664293	768880	Box Culvert	Clonmellon Stream

Turbine Hardstands

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

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

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

2.142 The Proposed Development will utilise material extracted from borrow pits and supplemented by local quarries if needed. These quarries will be sourced once planning consent for the project is granted.

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

- Topsoil and soils will be excavated to create a formation surface.
- The formation will be prepared to receive the geotextile membrane.
- Stone will be placed and compacted in layers to a minimum of 500mm depth.

- A drainage ditch will be formed, within the excavated width and along the sides of the hard standing.
- Surplus topsoil will be placed along the side of the hard standing and dressed to blend in with surrounding landscaping for use in future restoration of the hardstandings.
- Surplus excavated subsoil will be used for landscaping, visual screening and reinstatement of borrow pits.

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

Turbine Foundation

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

Turbine Erection

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

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

Waste Management

Waste Generated

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

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

- construction and demolition waste,
- waste oil and hydrocarbons,

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

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

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

Waste Reduction Practices

2.152 All efforts will be made by site management to minimise the creation of waste throughout the lifetime of the Proposed Development. Such efforts include:

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

Waste Reuse

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

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

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

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

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

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

Wastewater

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

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

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

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

Waste Recycling, Recovery and Disposal

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

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

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

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

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

Construction Timeline

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

OPERATION AND LIFESPAN OF THE PROPOSED DEVELOPMENT

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

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

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

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

Project Decommissioning

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

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

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

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

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

2.175 Underground cabling will be cut back and left in situ.

2.176 A detailed decommissioning plan will be agreed in advance of construction with An Bord Pleanála.

Cumulative Projects to be Assessed

Wind Farms in the Surrounding Area

2.177 There are no constructed wind farms in the immediate vicinity (5km) of the Proposed Development. At the time of this assessment, there are several wind farms (proposed and permitted) within 20km and are shown in **Figure 2-4**.

Projects to be Assessed Cumulatively

2.178 In terms of all proposed and permitted developments within vicinity of the site, the details of developments considered in the cumulative assessment are presented in **Appendix 1-1** 'Projects Considered in the Cumulative Assessment' found in Volume III of this EIAR – this is the cumulative long list of projects. The short list of these projects which are included as part of this assessment are set out in Table 2-8**Error! Reference source not found.Table 2-8**. These projects were selected for two reasons: 1) they are wind farms within 20km of the Proposed Development or 2) they utilise the same road networks as the Proposed Development. Please also refer to **Figure 2-4**.

Table 2-8: List of Cumulative Projects within 20km of the Proposed Development

Applicant / Development Name	Development Type	Reg. Ref.	Distance to Development
Bracklyn Wind Farm Ballagh (Mullingar Rural E.D.), Billistown, Ballynacor, and Bracklin, County Westmeath; and Coolronan, Co. Meath	SID - 9 no. Turbines	ABP REF. PA25M.311565	5.0 km south
Bord na Móna Powergen Ltd. Lisclogher Great, Cockstown, Clonmorrill, Clonleame, Bracklin, Craddanstown, Killagh, Grange More and Riverdale in County Westmeath and the townlands of Clondalee More, Derryconor, Clonycavan, Robinstown, Coolronan, Doolystown and Moyfeagher in County Meath	SID - 26 no. Turbines	ABP REF. PA25M.316212	4.8 km south
Coole Wind Farm Limited Camagh, Carlanstown, Coole, Clonrobert, Clonsura, Doon, Monktown, Mullagh, Newcastle, Boherquill, Corralanna, Culvin, Joanstown, Mayne, Fearmore (Fore by), Newtown (Fore by), Simonstown (fore by), Ballinealoe, Shrubbywood, Clonava, Lackan (Corkaree by), Soho, Ballynaclonagh,	SID - 15 no. Turbines	ABP REF. PA25M.309770	< 20 km northwest

Applicant / Development Name	Development Type	Reg. Ref.	Distance to Development
Abbeyland, Rathganny, Ballindurrow, Cullendarragh, Culleenabohoge, Ballynafid, Knightswood, Portnashangan, Culleen More, Farranistick, and Irishtown (Moyashel by), Co. Westmeath.			
Reforce Energy Ltd, Dryderstown, Delvin		12/2054	
Raymond Oliver, Corbetstown, Kilucan		00/197	

FIGURES

662000

664000

666000

768000

766000

T1

T2

T3

T4

T5

T6

T7

T8

MEATH

WESTMEATH

Milestone Cross Roads

Lough Shesk Cross Roads

Clonmellon

Killua Castle Deer Park

N52

N51

N

LEGEND

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

Delvin

Athboy

0 0.5 1

Kilometres

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KNOCKANARRAGH WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DESCRIPTION OF THE DEVELOPMENT

PROPOSED SITE LAYOUT OVERVIEW

FIGURE 2-1

Scale 1:20,000 @ A3

Date MARCH 2024

02036.00812.0113.0 Proposed Site Layout Overview

662000
663000
664000
665000
769000
768000

T1
T2
T3

N

0
0.5
1
Kilometres

LEGEND

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

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KNOCKANARRAGH WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DESCRIPTION OF THE DEVELOPMENT

PROPOSED CABLE ROUTE

FIGURE 2-2

Scale 1:12,000 @ A3

Date MARCH 2024

02036.00812.0114.0 Proposed Cable Routes

662000
664000
666000
768000
766000

T1
T2
T3
T4
T5
T6
T7
T8

Clonmellon
N52
Killua Castle Deer Park
County Westmeath
County Meath
MEATH
WESTMEATH

N

0 0.5 1
Kilometres

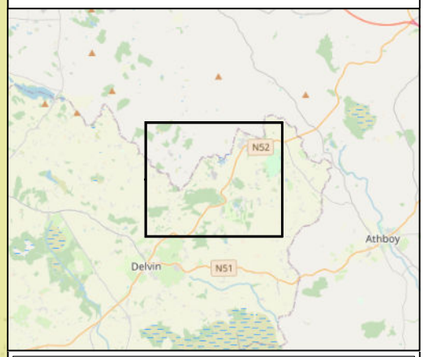
LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Cable Route
- Proposed Substation Location
- Existing High Voltage Transmission Line
- County Boundary

Corine Land Cover (2018)

- 211 Non-irrigated Land
- 231 Pastures
- 243 Land Principally Occupied by Agriculture with Areas of Natural Vegetation
- 311 Broad-leaved Forest
- 313 Mixed Forest
- 324 Transitional Woodland Scrub
- 423 Intertidal Flats

Note
Error on Corrine Land Cover data for Clonmellen. From site experience should be classified as 118 Artificial Surface.



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KNOCKANARRAGH WIND FARM
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DESCRIPTION OF THE DEVELOPMENT

EXISTING LANDUSE

FIGURE 2-3

Scale 1:20,000 @ A3

Date OCTOBER 2023

02036.00812.0116.0 Existing Landuse

640000

660000

680000

780000

760000

02036.00812.0118.0 Windfarms Within 20 km

CAVAN
LONGFORD
CAVAN
WESTMEATH
LONGFORD
WESTMEATH
CAVAN
MEATH
WESTMEATH
MEATH

2020211
2020158
2021137
2022228
2023142
2021019
2021054
2017078
2021266
2023088
2023126
2022010
2022175
2020200
2022079
2021201
2021201
2021201
2023049
2021201
2023049
2020077
2021201
2021201
2020077
2019031
2023049
2020077
2021232
2019062
2019073
2020049
2018039
2019080

N

LEGEND

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

0 5 10
Kilometres

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KNOCKANARRAGH WIND FARM
ENVIRONMENTAL IMPACT
ASSESSMENT REPORT

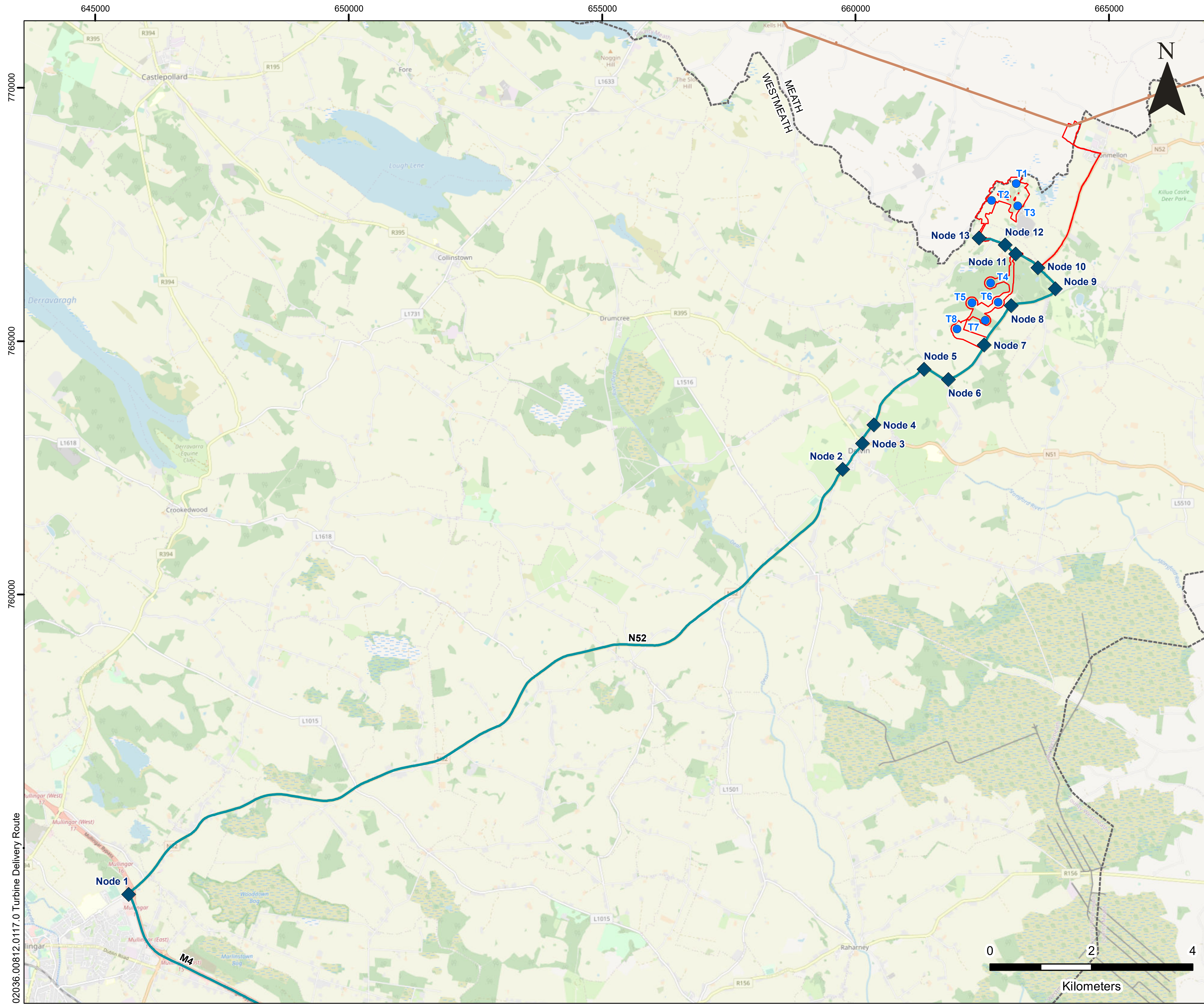
DESCRIPTION OF THE DEVELOPMENT

CUMULATIVE DEVELOPMENTS WITHIN 20KM OF PROPOSED DEVELOPMENT

FIGURE 2-4

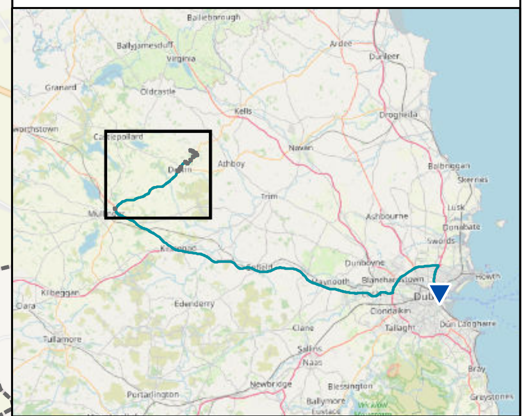
Scale 1:180,000 @ A3

Date FEBRUARY 2024



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Dublin Port
- Proposed Turbine Delivery Route Node
- Proposed Turbine Delivery Route
- Existing High Voltage Transmission Line
- County Boundary



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KNOCKANARRAGH WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DESCRIPTION OF DEVELOPMENT

PROPOSED TURBINE DELIVERY ROUTE

FIGURE 2-5

Scale 1:70,000 @ A3

Date MARCH 2024

02036.00812.0117.0 Turbine Delivery Route

APPENDICES

Appendix 2-1: Candidate Turbine Specifications

Appendix 2-2: CEMP

(Refer to EIAR Volume III for Appendices)