Environmental Impact Assessment Report

Lemanaghan Wind Farm, Co. Offaly

Chapter 4 Description of the Proposed Project

Table of Contents

GLOSSARY OF TERMS

Terms	Definition
Borrow Pit	A pit resulting from the excavation of material used in construction of the Proposed Wind Farm
Nacelle	Housing component of the turbine generator.
Anchor cage	The bottom section of the turbine (i.e. the foundation) which is backfilled with concrete
Piling	Installation of heavy stakes (piles) to support the foundations of the turbine
Hardstanding	Levelled assembly areas comprising of bare soil surface to support plant and machinery

GLOSSARY OF ACRONYMS

Acronym	Definition
ACP	An Coimisiun Pleanála
BMEP	Biodiversity Management and Enhancement Plan
CEMP	Construction and Environmental Management Plan
DP	Decomissioning Plan

ECoW	Ecological Clerk of Works
EnvCoW	Environmental Clerk of Works
GIS	Gas Insulated Switchgear
HGV	Heavy Goods Vehicle
IPC	Integrated Pollution Control
IPP	Independent Power Provider
JTF	Just Transition Fund
LV	Low Volt
MTN	Midlands Trail Network
MV	Medium Volt
OPW	Office of Public Works
OTE	Over-the-edge drainage
PSMP	Peat and Spoil Management Plan
PSRA	Peat Stability Risk Assessment
RESS	Renewable Energy Support Scheme
RWMP	Resource Waste Management Plan
SAC	Special Area of Conservation
SID	Strategic Infrastructure Development
SOWOR	Schedule of works operation system
SPA	Special Protection Area
SWMP	Surface Water Management Plan
TMP	Traffic Management Plan
TSO	Transmission System Operator

4. DESCRIPTION OF THE PROPOSED PROJECT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the Proposed Project and its component parts which is the subject of a proposed application for planning permission to An Coimisiún Pleanála (ACP) in accordance with Section 37E of the Planning and Development Act 2000, (as amended). Construction methodologies for the main infrastructural components of the development are also included in this chapter (or its associated appendices) of the EIAR.

The Proposed Project will consist of the provision of the following:

(i) *15 no. wind turbines with the following dimensions:*
  a. *A total tip height of 220m;*
  b. *Rotor diameter of 150m;*
  c. *Hub height of 145m.*

(ii) *Permanent turbine foundations, hard-standing and assembly areas;*

(iii) *Underground electrical and communications cabling connecting the 15 no. wind turbines to the proposed 220kV onsite electrical substation;*

(iv) *A new permanent 220kV electrical substation compound (c. 9611m²) in the townland of Cooldorragh consisting of 1 no. Gas Insulated Substation (GIS) building, 1 no. Independent Power Producer (IPP) control building, 2 no. gantry structures, all associated electrical and communications plant and equipment, welfare facilities, 2 no. foul water holding tank, 2 no. bored wells, access roads, security fencing and gates, lightning masts, signage, landscaping, drainage infrastructure and all other ancillary works;*

(v) *A permanent telecommunications tower with a height of 36m and associated foundation and hard-standing area;*

(vi) *The permanent installation of c. 800m of 220kV overhead line, 4 no. new steel masts, temporary tower build areas, temporary tower crane pads and associated hard-standing areas to facilitate the new 'loop-in/loop-out' connection into the existing 220kV Shannonbridge to Maynooth line;*

(vii) *The new permanent overhead line grid connection will require the decommissioning / removal of 1 no. existing steel mast and c. 75m of existing 220 kV line;*

(viii) *A meteorological mast with a height of 145 metres and associated foundation and hard-standing area;*

(ix) *The permanent upgrade of c.1.14km of existing internal site roads/tracks and the provision of c.17.1 km of new permanent internal site access roads, passing bays and a layby area;*

(x) *The permanent upgrade of c.1.8km of existing tracks and the provision of c.3.9km of new permanent tracks for the purposes of amenity, seating areas, and amenity signage;*

(xi) *The provision of temporary access track off the L7001 local road during the construction phase;*

(xii) *Removal of an existing agricultural shed to accommodate the new temporary access track off the L7001 local road;*

(xiii) *2 no. new gated site entrances off the L7002 local road;*

(xiv) *Upgrade of 3 no. existing site entrances off the N62 national road, R436 regional road and L7001 local road;*

(xv) *A temporary access track from the N52 national road to the N62 national road at Kennedy's Cross in the townland of Ballindown to facilitate the delivery of turbine components and other abnormal loads;*

(xvi) 5 no. temporary construction compounds with temporary offices, containers and staff facilities;
(xvii) 3 no. permanent amenity car parks each including 15 no. spaces for private vehicles, 3 no. spaces for accessible parking, parking for buses and bicycle rack facilities;
(xviii) 4 no. temporary borrow pits;
(xix) 5 no. temporary security cabins;
(xx) 2 no. clear span watercourse crossings;
(xxi) Peat and Spoil Management;
(xxii) Site Drainage;
(xxiii) Removal of c.1.02ha of immature woodland and c.0.64 hectares of scrub;
(xxiv) Biodiversity management and enhancement measures;
(xxv) Operational stage site signage; and
(xxvi) All ancillary apparatus and site development works above and below ground, including hard and soft landscaping and drainage infrastructure

This application seeks a 10-year planning permission and 35-year operational life from the date of commissioning of the wind energy development.

The Proposed Project includes for a new proposed onsite 220kV electricity substation in the townland of Cooldorragh, Co, Offaly to facilitate the connection to the national grid via 0.8km of new overhead line cabling breaking into the existing Shannonbridge-Maynooth 220kV overhead line (OHL). The application meets the threshold for wind energy set out in the Seventh Schedule of the Planning and Development Acts 2000 to 2023, on foot of a notice issued by ACP on March 3rd 2026 and is therefore being submitted directly to ACP as a Strategic Infrastructure Development (SID) in accordance with Section 37E of the Planning and Development Act 2000, as amended. Please note, the planning application will encompass all elements of the Proposed Project, including the grid connection 220kV infrastructure and associated works.

All elements of the Proposed Project have been assessed as part of this EIAR.

4.2 Proposed Project Location

The Proposed Project is located in Co. Offaly, approximately 3 kilometres (km) northeast of Ferbane and approximately 2.5 km southwest of the village of Ballycumber in Co. Offaly. The Proposed Wind Farm is located in a peatland setting, comprising a mixture of bare cutaway peat, re-vegetated bare peat, degraded raised bog, scrub, low immature woodland and remnants of high bog. Current land use within the Proposed Wind Farm comprises natural recolonisation of cutaway and degraded bog and small areas of active turbary. Please note, as part of the Proposed Wind Farm, turbine accommodation works will be required at Kennedys Cross located in the townland of Ballindown, Co. Offaly (junction of the N52 and N62 National Secondary Roads). Please see Section 4.7.4 below for further detail on these works.

The nearest Natura 2000 site to the Proposed Wind Farm, i.e., Special Area of Conservation (SAC) or Special Protection Area (SPA), is the Ferbane Bog SAC which is located approximately 1.3km southwest of the Proposed Wind Farm. Elevations within the Proposed Project site range from ~51mOD (metres above Ordnance Datum) in the southwest of the site to ~48m in the northeast of the site. The site is approximately 5.4km in length at its longest point and 4.9km in width at its widest point; the site encompasses an area of approximately 1,258ha.

The Proposed Grid Connection includes for 0.8km of new overhead line (OHL) (0.4km of double looped OHL) from the proposed onsite 220kV substation, in the townland of Cooldorragh, Co. Offaly, and will require to break into the existing Shannonbridge-Maynooth 220kV OHL to facilitate the Proposed Project connection to the national electricity grid. Current land use along the Proposed Grid Connection comprises peatland and pastures.

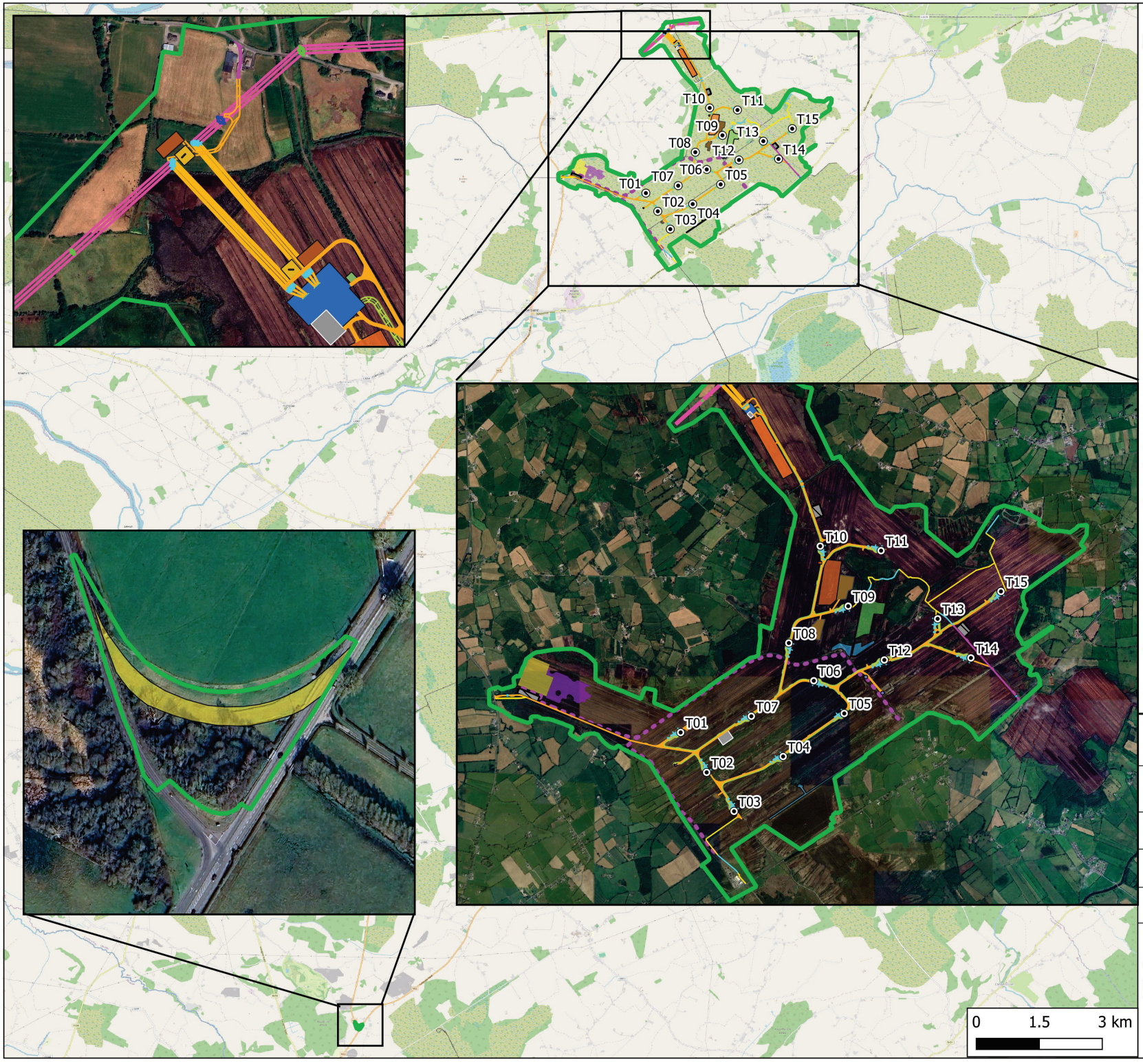
The Proposed Project location is described in detail in Chapters 1-16 of the EIAR.

4.3 Proposed Project Layout

The overall layout of the Proposed Project is shown on Figure 4-1, this includes the Proposed Wind Farm and the Proposed Grid Connection

The layout of the Proposed Project has been designed to minimise the potential environmental effects, while at the same time maximising the energy yield from the wind resource passing over the Proposed Project site. Constraint studies, as described in Section 3.2.5.2.1 of Chapter 3: Site Selection and Reasonable Alternatives of this EIAR, have been carried out to ensure that turbines and all ancillary infrastructure are located in the most appropriate areas of the site. The Proposed Wind Farm layout is shown in Figure 4-2. The Proposed Grid Connection layout is shown in Figure 4-3.

The overall layout of the Proposed Project is shown on Figue 4-1.This drawing shows the proposed locations of the wind turbines, onsite 220kV substation, grid connection OHL cabling, peat deposition areas, meteorological mast, internal access roads, borrow pits, temporary construction compounds, underground internal cabling, grid connection, the turbine delivery route accommodation works, the main site entrance, and all ancillary works and apparatus. Detailed site layout drawings of the Proposed Project are included in Appendix 4-1 to this EIAR.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Foundations
- Proposed Hardstands
- Proposed New Roads
- Proposed Temporary Access Track
- Proposed Upgrades to Existing Roads
- Proposed New Amenity Track
- Proposed Upgrades to Existing Roads for Amenity Track
- Proposed Lay By for Delivery Vehichles
- Proposed Gates
- Proposed Security Hut
- Proposed Onsite 220kV Substation
- Proposed Telecommunications Tower
- Proposed Met Mast
- Proposed Temporary Construction Compounds
- Proposed Amenity Carparks
- Proposed Borrow Pit
- Proposed Peat Deposition Areas
- Pump Stations
- Proposed Pump Station Access Road
- Proposed New Pylons
- Existing Pylon To Be Removed
- Existing Pylons
- Shannonbridge-Maynooth 220kV Overhead Line
- Proposed Overhead Line
- Proposed Tower Pads
- Proposed Crane Pads
- Proposed Gantry Structures
- Proposed TDR SPA Works

Ecological Enhancement

- Marsh Fritillary Habitat Creation
- Woodland Establishment
- Linear Habitat Replanting

Ornithological Enhancement and Mitigation

- Whooper Swan Wetland
- Lapwing Semi-Grassland Mosaic

N

Drawing Title
Proposed Project Layout

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-1
Scale 1:87,500	Date 2026-03-05

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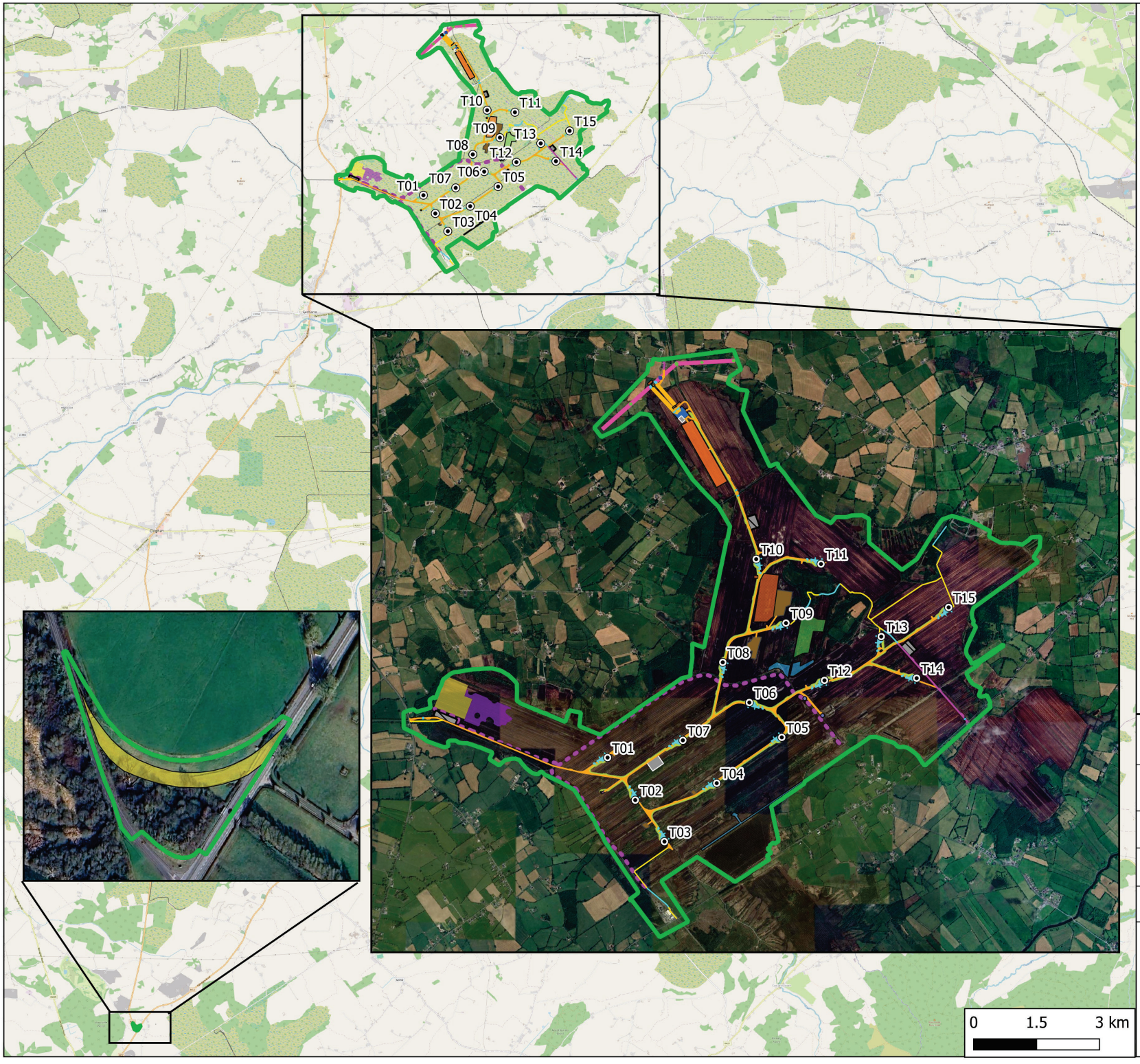

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Foundations
- Proposed Hardstands
- Proposed New Roads
- Proposed Temporary Access Track
- Proposed Upgrades to Existing Roads
- Proposed New Amenity Track
- Proposed Upgrades to Existing Roads for Amenity Track
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- Proposed Gates
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- Proposed Telecommunications Tower
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- Proposed Overhead Line
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- Proposed Gantry Structures
- Proposed TDR SPA Works

Ecological Enhancement

- Marsh Fritillary Habitat Creation
- Woodland Establishment
- Linear Habitat Replanting

Ornithological Enhancement and Mitigation

- Whooper Swan Wetland
- Lapwing Semi-Grassland Mosaic

N

Drawing Title
Proposed Wind Farm Layout

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
EM	EC
Project No. 200804	Drawing No. Figure 4-2
Scale 1:87,500	Date 2026-03-05

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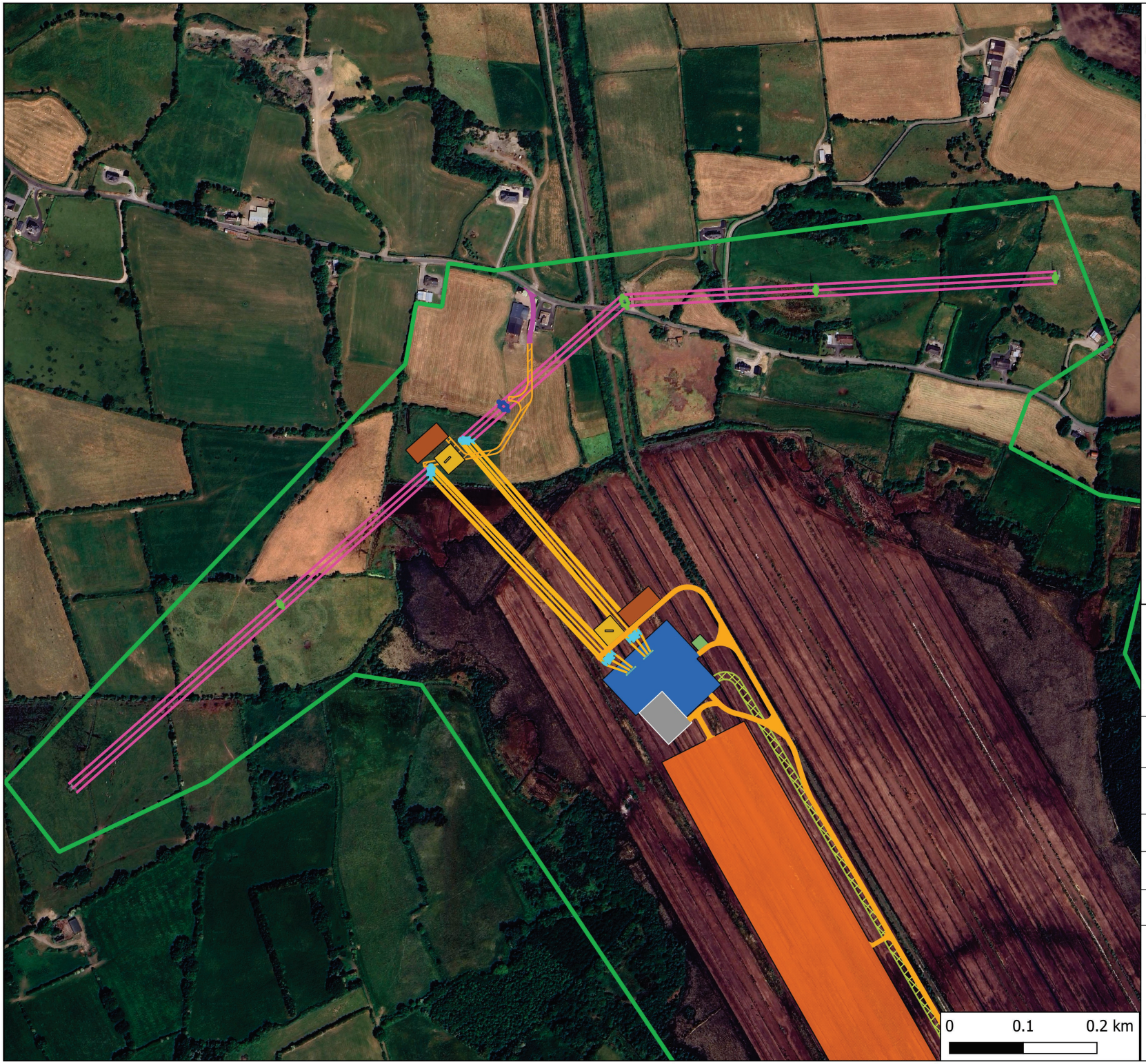

Map Legend

- EIAR Site Boundary
- Proposed Overhead Line
- Shannonbridge-Maynooth 220kV Overhead Line
- Existing Pylon To Be Removed
- Existing Pylons
- Proposed New Pylons
- Proposed Onsite 220kV Substation
- Proposed Telecommunications Tower
- Proposed Gantry Structures
- Proposed Temporary Construction Compounds
- Proposed Crane Pads
- Proposed Tower Pads
- Proposed New Roads
- Proposed Peat Deposition Areas
- Proposed Temporary Works Areas

N

Drawing Title
Proposed Grid Connection

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-3
Scale 1:5,000	Date 2026-02-10

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4.4 Proposed Project Components

This section of the EIAR describes the components of the Proposed Project. Further details regarding Site Activities (Section 4.5), EPA IPC License Actvities (Section 4.6), Access and Transportation (Section 4.7), Community Benefit Proposals (Section 4.8), Site Drainage (Section 4.9), Construction Management (4.10) and Construction Methodologies (Section 4.11) are provided subsequently in this chapter.

4.4.1 Proposed Wind Farm

4.4.1.1 Wind Turbine Components

4.4.1.1.1 *Turbine Locations*

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP [wind resource assessment software]) and WindPro [Computational Fluid Dynamics and WindFarmer]) to maximise the energy yield from the Proposed Project site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance and maintain the minimum setbacks from neighbouring properties as set out in the '*Wind Energy Development Guidelines for Planning Authorities'* (DoEHLG, 2006) (hereafter referred to as the 'DoEHLG 2006 Guidelines') and the Draft Wind Energy Development Guidelines (December 2019) (hereafter referred to as the 'Draft DoHPLG 2019 Guidelines). The Irish Transverse Mercator (ITM) Grid Reference coordinates of the proposed turbine locations are listed in Table 4-1 below.

The final 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.

Table 4-1 Proposed Wind Turbine Locations and Elevations

Turbine	ITM X	ITM Y	Top of Foundation Levels (mOD)
1	614199	727374	51.5
2	614482	726940	51.9
3	614780	726517	50.6
4	615314	727112	52.7
5	615979	727580	48.1
6	615647	727936	50.0
7	614968	727550	51.3
8	615376	728346	50.6
9	616022	728746	52.3
10	615717	729399	53.7
11	616380	729350	55.7
12	616415	728161	48.5
13	616995	728609	51.8
14	617357	728184	48.9
15	617684	728907	52.2

4.4.1.1.2 Site Investigation

As part of the design process for the Proposed Project, site investigations were undertaken across the Proposed Project site, to provide detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Proposed Project site. This provided information on the most suitable location for turbines and associated infrastructure.

The objectives of the site investigations included mapping the subsoil lithology for all proposed turbines and other key locations (i.e., internal access roads) and assessing the underlying bedrock. This data was used to inform the final Proposed Project layout of the site. Please refer to Section 3.2.5 of this EIAR for further information on the evolution of the Proposed Project design.

The first round of geotechnical ground investigations, consisting of trial pitting, was undertaken between the 6th and 9th of April 2021, under the supervision of Fehily Timoney & Company Ltd. (FTC) and Tobar Archaeological Services (Tobar). The second round of geotechnical ground investigations, consisting of trial pitting, was undertaken during the 23rd, 24th, 25th and 28th of March 2022, under the supervision of FTC and Tobar. Finally, the third and final round of geotechnical ground investigations, consisting of trial pitting, was completed over the time period 24th to 27th October 2023, under the supervision FTC and Irish Archaeological Consultancy Ltd (IAC). Please see Section 1.8.2 of Chapter 1: Introduction for detailed biographies of all involved persons in the above identified work.

In summary, a total of 62 no. trial pits, supervised by FTC, and Tobar/IAC, were carried out at all proposed turbine locations and at other key locations (i.e., internal access roads and met mast location) to investigate the underlying mineral soil lithology and subsoil/bedrock interface.

The complete geotechnical ground investigation campaign was carried out in accordance with IS EN 1997-2 and BS5930:2015+A1:2020 Code of Practice for Ground Investigations with precedence given to IS EN 1997-2 where applicable.

The combined geological and hydrological dataset collected from the geotechnical ground investigations and from ground-truthing site walkovers completed by FTC, Hydro-Environmental Services (HES) and MKO have been used in the preparation of this EIAR Chapter.

4.4.1.1.3 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 for the Proposed Wind Farm have the following dimensions:

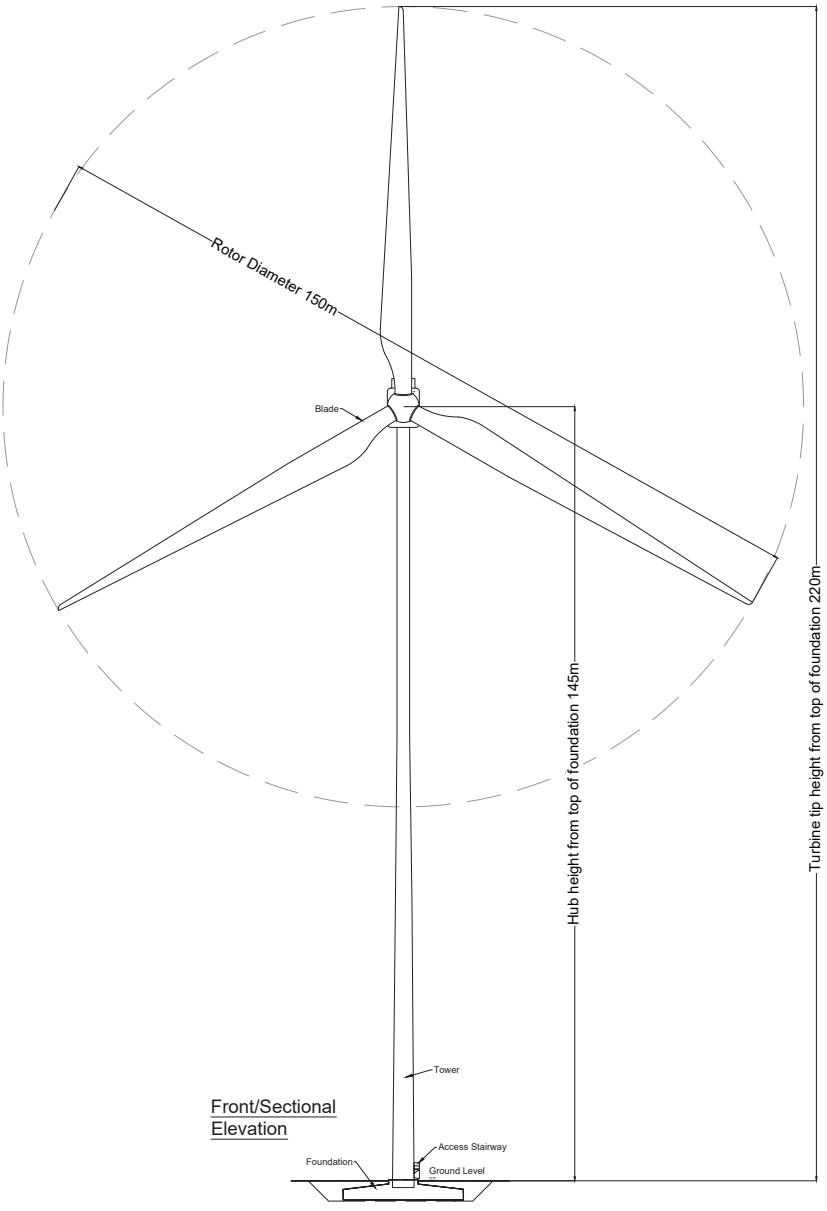
- Turbine Tip Height – 220 metres
- Hub Height – 145 metres
- Blade Rotor Diameter – 150 metres

Turbines from the main turbine manufacturers share common appearance and other major characteristics, with minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the Proposed Wind Farm will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines always rotate in the same direction.

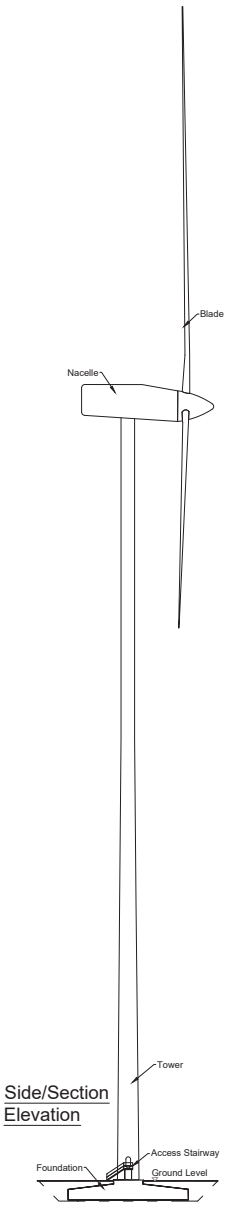
The turbines will be multi-ply coated to protect against corrosion. It is proposed that the turbines would be of a light grey colour to blend into the sky background to minimise visual impact as recommended in the DoEHLG Guidelines (DoEHLG, 2006) and '*The Influence of Colour on the Aesthetics of Wind Turbine Generators*' (ETSU, 1999).

A drawing of the proposed wind turbine is shown in Figure 4-4. Figure 4-4 also shows the turbine base layout, including turbine foundation, hard standing area, assembly area, access road and surrounding works area.

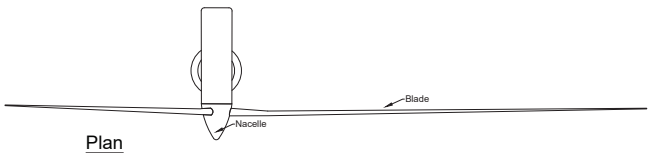
The individual components of a geared wind turbine nacelle and hub are shown in Figure 4-5 below.



Front/Sectional Elevation



Side/Section Elevation



Plan

Drawing Notes

1. Proposed wind turbines to have a maximum ground to blade tip height of 220m, blade length of 75m and hub height of 145m

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DRAWING TITLE: **Wind Turbine Elevations and Plan**			
PROJECT No.: **200804**		DRAWING No.: **Figure 4-4**	SCALE: **1:500 @ A1**
DRAWN BY: **FB**	CHECKED BY: **GO**	DATE: **23.03.2026**	REVISION.: P01

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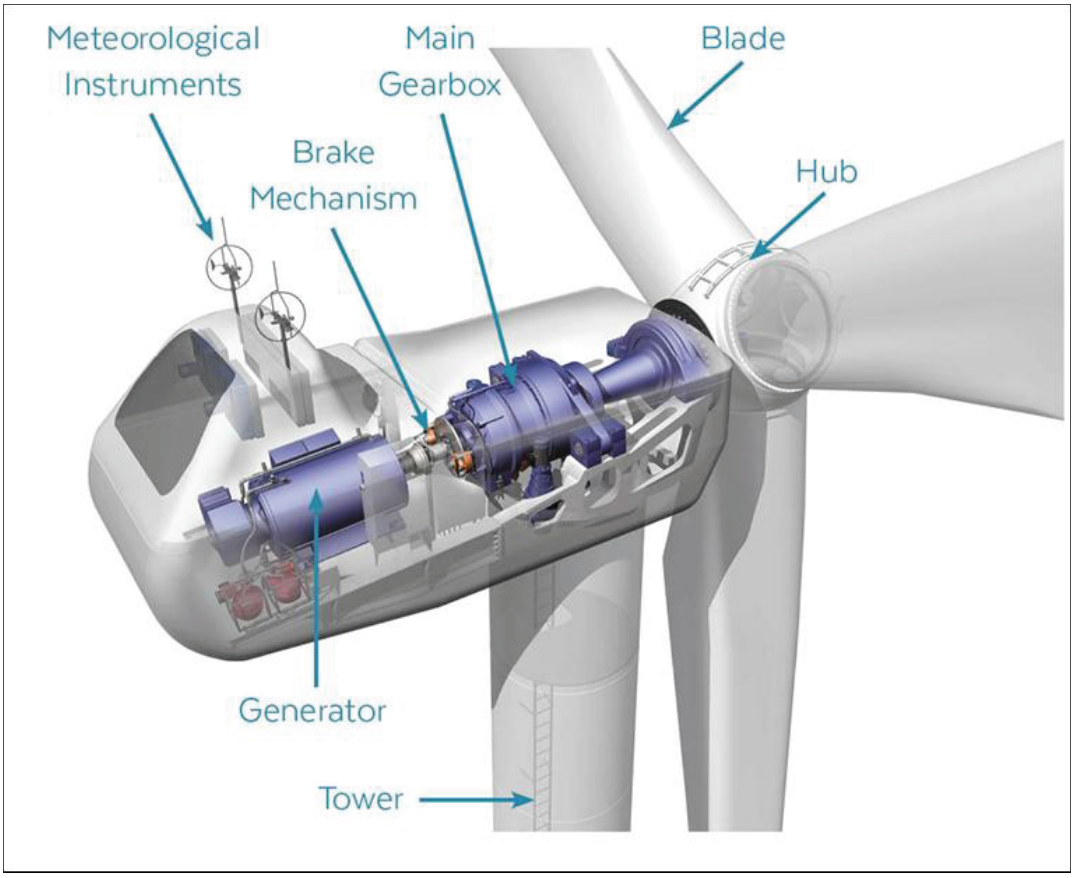


Figure 4-5 Turbine nacelle and hub components

4.4.1.1.4 Hardstanding Areas

Hardstanding areas consisting of levelled and compacted hardcore are required around each turbine base to 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 provide a safe, level working area around each turbine position. The hardstanding areas are extended to cover the turbine foundations once the turbine foundation is in place. All hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The hardstands will be constructed in a similar manner to the excavated site roads detailed in Section 4.11.1.2.2 below and will measure approximately 48m by 75m.

The hardstanding areas shown represents a design based on manufacturer's requirements and seeks to accommodate a number of different turbine types and models.

The proposed hard standing areas for each individual turbine are shown as part of the detailed layout drawings included in Appendix 4-1 and using the precautionary principle, represent the maximum sizes required. Figure 4-6 shows a bored turbine base layout and Figure 4-7 shows a gravity turbine base layout, including turbine foundation, hard standing area, assembly area, access road and surrounding works area.

4.4.1.1.5 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 differently shaped turbine foundations, ranging from circular to hexagonal and square, depending on

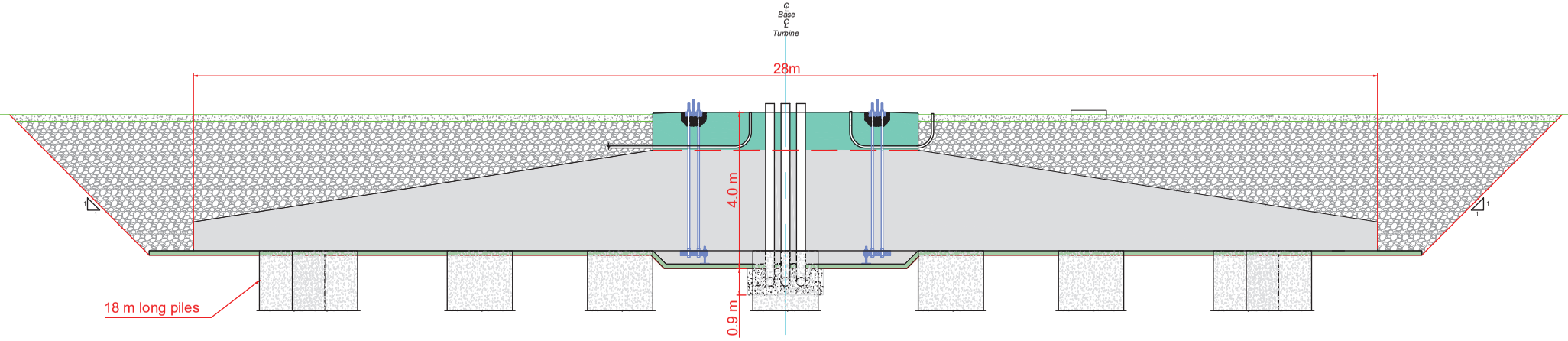
the requirements of the final turbine supplier. Adopting a precautionary approach, however, a foundation area large enough to accommodate modern turbine models has been assessed in this EIAR. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundations will be 28m and 4m respectively, which has been assessed in this EIAR and is shown in Figure 4-6 and Figure 4-7.

After the foundation level of each turbine has been formed using piled foundations, bored foundations or a gravity foundation on competent stratum (i.e., bedrock or subsoil of sufficient load bearing capacity), the “anchor cage” (which 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 the finished surface level (Plate 4-2 below).

Plate 4-2 Turbine 'Anchor Cage' and finished turbine base

4.4.1.1.6 Assembly Area

Levelled assembly areas will be located on either side of the hard-standing area as shown in Figure 4-6 and Figure 4-7. 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 in Figure 4-6 and Figure 4-7 below and the detailed drawing in Appendix 4-1.



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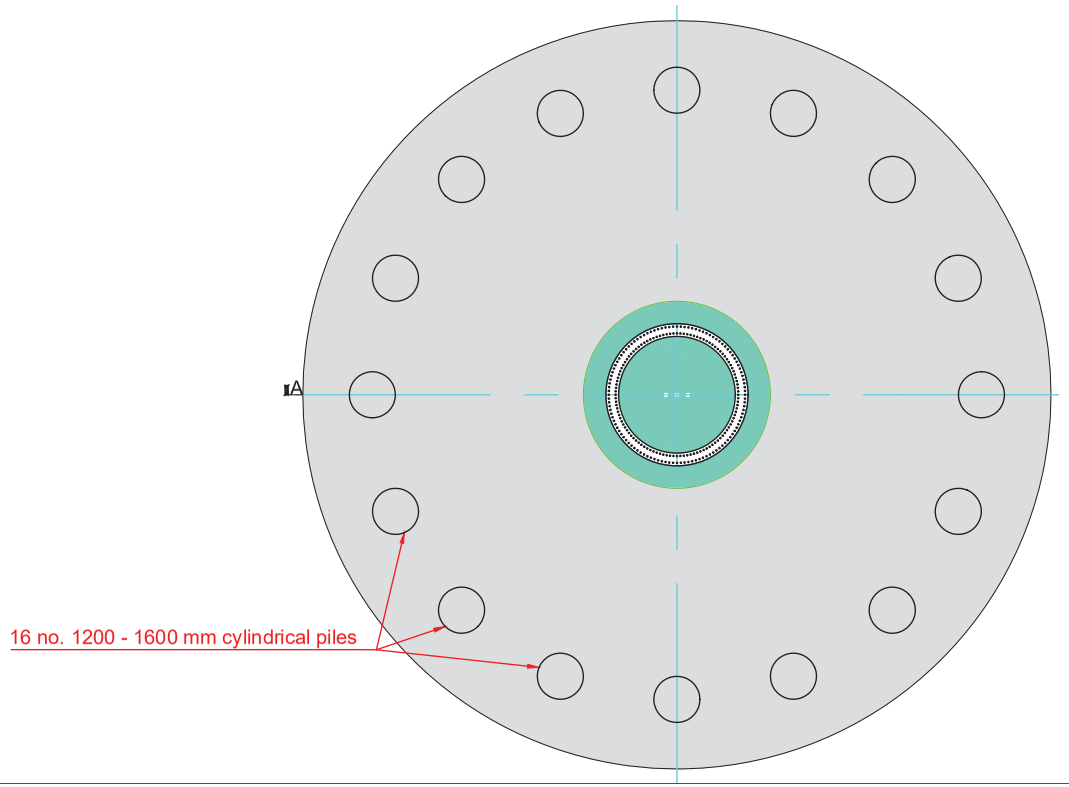
Plan
Scale: 1:200



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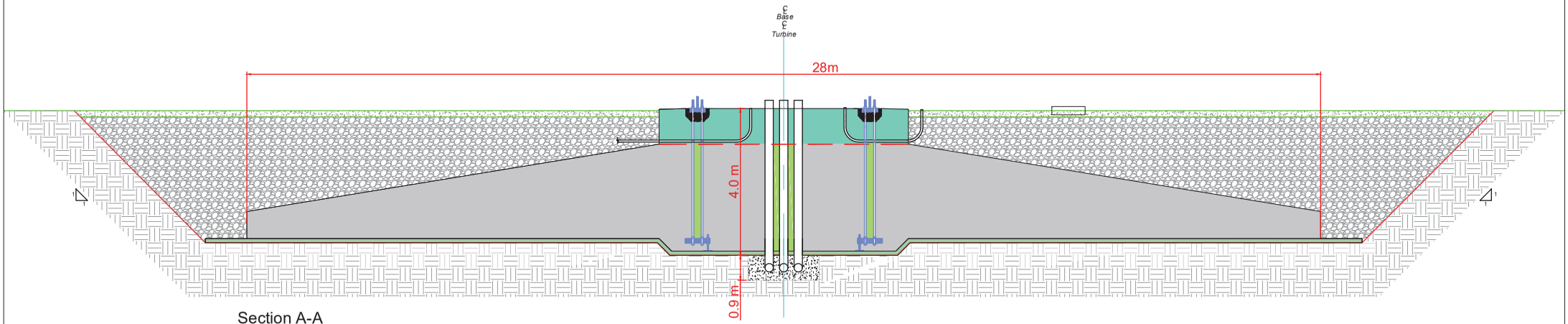
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Bored Pile Foundation Details

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-6	As shown @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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



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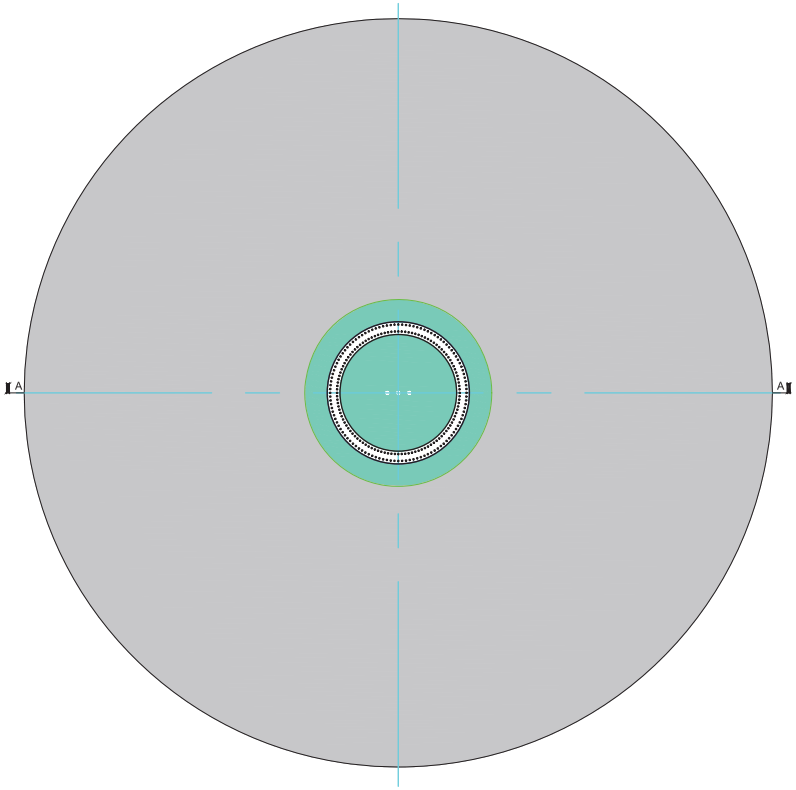

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DRAWING TITLE: Gravity Foundation Details			
PROJECT No.: 200804		DRAWING No.: Figure 4-7	SCALE: As shown @ A3
DRAWN BY: FB	CHECKED BY: GO	DATE: 23.03.2026	REVISION.: P01

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4.4.1.1.7 Power Output

Modern wind turbine generators have a typical generating capacity in the 4MW to 7MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by turbine manufacturers. 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 Project site and will be determined by the selected manufacturer.

For the purposes of this EIAR, a rated output of 6MW has been chosen to calculate the power output of the proposed 15-turbine renewable energy development, which would result in an estimated installed capacity of 90MW.

Assuming an installed capacity of 90MW, the Proposed Project therefore has the potential to produce up to 275,940MWh (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 35% is applied here. This value was determined by the wind priority data for Area J.[1]

C = Rated output of the wind farm: 90MW

The 275,940 MWh of electricity produced by the Proposed Project would be sufficient to supply approximately 65,700 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).

The 2022 Census of Ireland Summary Results recorded a total of 28,923 occupied households in Co. Offaly. Per annum, based on a capacity factor of 35%, the Proposed Project would therefore produce sufficient electricity for the equivalent of over 100% of all households in Co. Offaly.

With regards to the modern turbine generating capacity range of 4 – 7MW, the resulting electricity produced would range from 183,960MWh to 321,930MWh per annum. The lower end of this range (183,960MWh) would be sufficient to supply approximately 43,800 Irish households with electricity per year, based on the average annual Irish household demand of 4.2MWh of electricity. The higher end of this range (321,930MWh) would be sufficient to supply approximately 76,650 Irish households with electricity per year, based on the average annual Irish household demand of 4.2MWh of electricity. Based on the 2022 Census of Ireland results for Co. Offaly, the output range would produce sufficient electricity for the equivalent of over 100% of all households in Co. Offaly.

[1] *Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology Available at: <https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.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/*

4.4.1.2 Site Roads

4.4.1.2.1 *Road Construction Types*

To provide internal access to the Proposed Project site to connect the wind turbines, proposed onsite 220kV substation, and associated infrastructure, approximately 17.1 kilometres of new internal roads will need to be constructed and 1.14km of existing road will be upgraded. Fehily Timoney & Company Ltd. (FTC) was appointed to assess the existing ground conditions and specify the type of road required to access all locations on site. The road construction preliminary design has taken into account the following key factors as stated in the Peat and Spoil Management Plan in Appendix 4-3:

1. *Buildability considerations*
2. *Maximising use of existing infrastructure*
3. *Minimising excavation arisings*
4. *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles*
5. *Requirement to minimise disruption to peat hydrology*

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. It is proposed to construct 19 no. passing bays along the proposed access road network. The proposed new roads will be approximately 6m in width and will be constructed using a similar methodology to proposed new excavated roads as outlined in Section 4.11.1.2.2 below.

Three road construction techniques will be used:

- Construction of New Floating Roads over peat (majority);
  - Construction of new floated roads over an archaeological feature (i.e., a togher);
- Construction of New Excavated Roads through peat;
- Decommissioning of Temporary Access Road, and;
- Upgrades to Exitsing Roads.

The construction techniques proposed to be used for the new roads across the site are shown in the FTC Peat and Spoil Management Plan (Appendix 4-3) and are included in Section 4.11.1.2 below. Cross sections of the road types listed above are shown in Figures 4-8 to Figure 4-10.

Construction of New Floating Roads

The construction methodology for the construction of new floating access roads or tracks, as presented in the *Peat & Spoil Management Plan* in Appendix 4-3 of this EIAR, is summarised in Section 4.11.1.2.1 below.

Sections of New Floating Roads are shown in Figure 4-8 below.

At 2 no. locations, the proposed new floated road will traverse across an identified togher. The first instance of floated road being placed over a togher is located at X615696, Y729579, the second instance is at X615958, Y729395. A detailed construction methodology is summarised in Section 4.11.1.2.1 below; this has been informed through detailed liaison with Tobar Archaeological Services and FTC.

Sections of New Floated Roads over Archaeology is shown in Figure 4-9 below.

Construction of New Excavated Roads

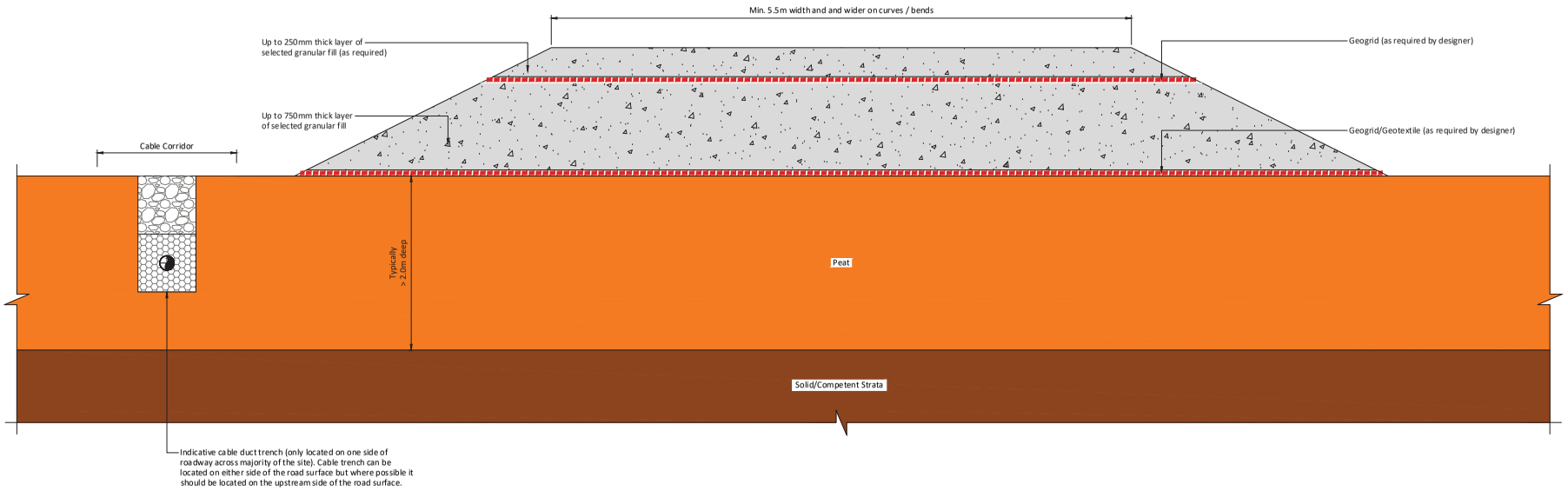
The construction methodology for the construction of new excavated access roads or tracks, as presented in the *Peat & Spoil Management Plan* in Appendix 4-3 of this EIAR, is summarised in Section 4.11.1.2.2 below.

Sections of New Excavated Roads are shown in Figure 4-10 below.

Upgrades to Existing Roads

The construction methodology for the upgrades of existing access roads or tracks, as presented in the *Peat & Spoil Management Plan* in Appendix 4-3 of this EIAR, is summarised in Section 4.11.1.2.4 below.

Sections of road undergoing upgrades are shown in Figure 4-11 below.



Scale 1:20

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	30.05.25
B	FOR INFORMATION	BDH	27.06.25
C	FOR INFORMATION	BDH	22.07.25

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY

CLIENT: MKO

SHEET: SECTION OF NEW FLOATED ROADS

Date: 22.07.25

Project number: 200804

Scale (@ A1): 1:20

Drawn by: POR

Drawing Number: FIGURE 4-8

(Sheet set subset 0800)

Rev: C

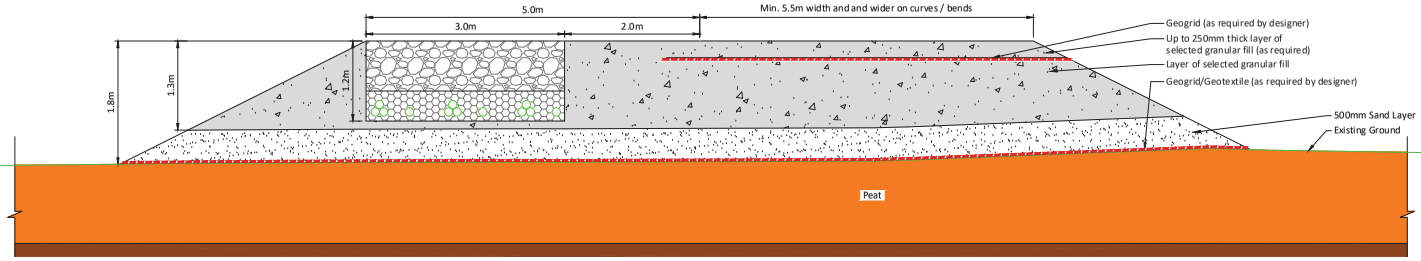
Checked by: AC

O:\ACAD\2020\P20-216\P20-216-0800-0017

9 March 2026

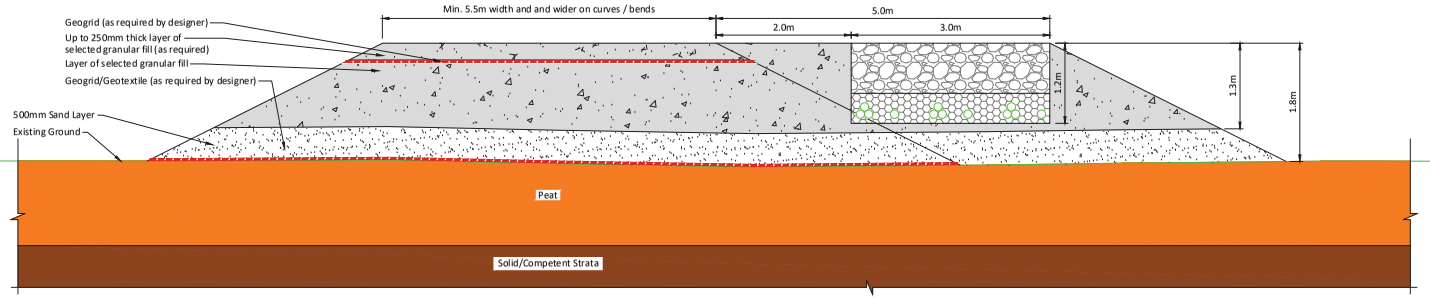
Legend:

Note - See Drawing P20-216-0600-0024 for plan location of sections I - I, G - G and H - H.



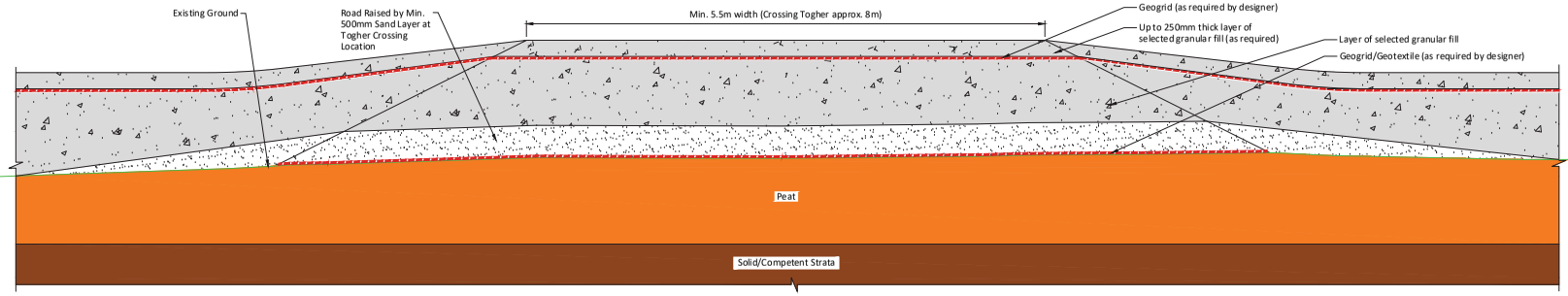
SECTION G - G

Scale 1:40



SECTION H - H

Scale 1:40



LONG SECTION I - I

Scale 1:40

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	09.03.26

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY	CLIENT: MKO		
SHEET: SECTION OF NEW ROAD OVER ARCHAEOLOGY	Date: 09.03.26	Project number: 200804	Scale (@ A1): As Shown
	Drawn by: POR	Drawing Number: FIGURE 4-9	Rev: A
	Checked by: AC	(Sheet set subset 0800)	

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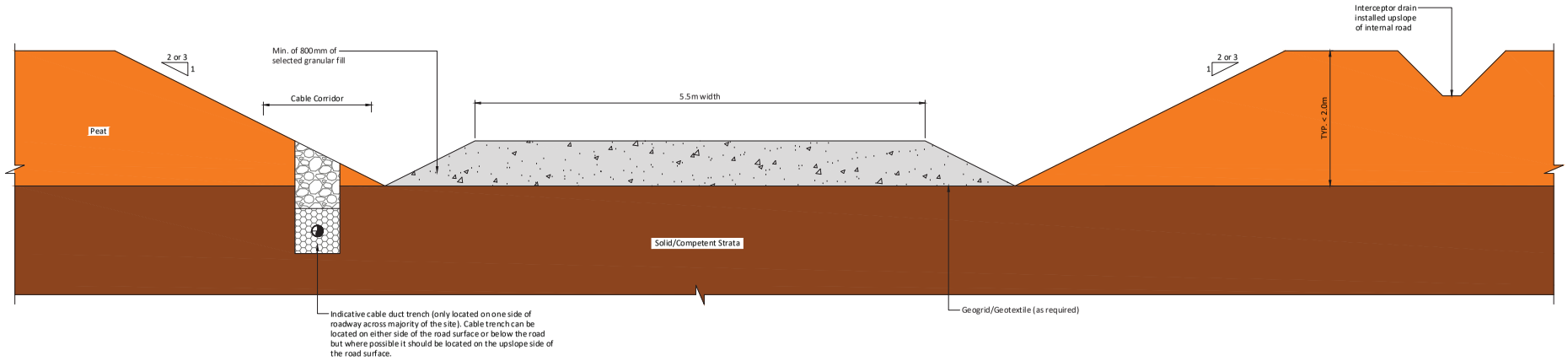
9 March 2026



Scale 1:25

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Rev.	Description	App By	Date
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B	FOR INFORMATION	BDH	27.06.25
C	FOR INFORMATION	BDH	22.07.25

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY

CLIENT: MKO

SHEET: SECTION OF NEW EXCAVATED ROAD

Date: 22.07.25

Project number: 200804

Scale (@ A1): 1:25

Drawn by: POR

Drawing Number: FIGURE 4-10

Rev: C

Checked by: AC

(Sheet set subset 0800)

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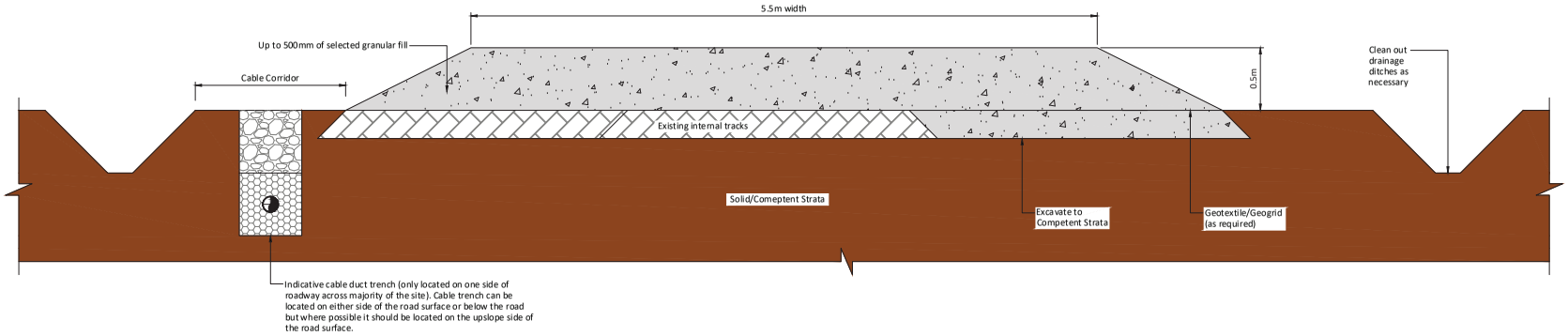
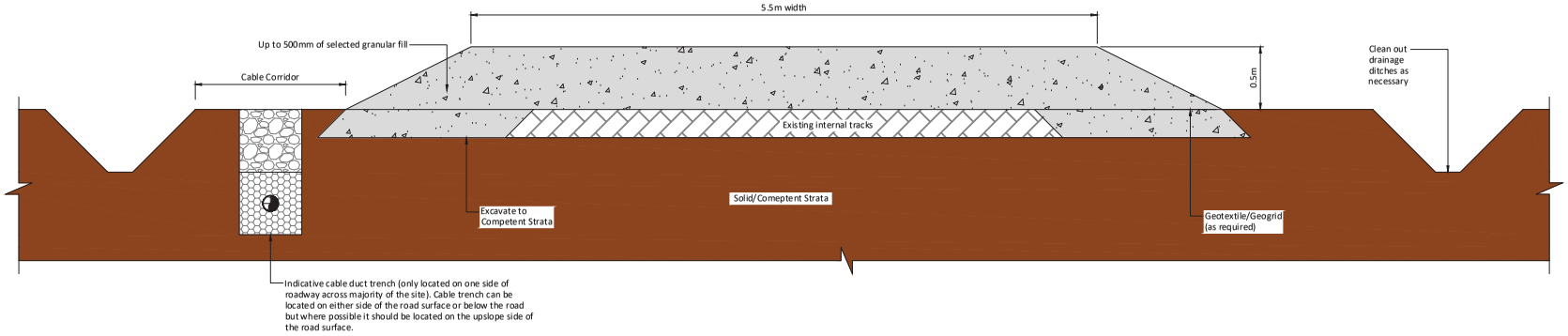
9 March 2026





Scale 1:20

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	30.05.25
B	FOR INFORMATION	BDH	27.06.25
C	FOR INFORMATION	BDH	22.07.25

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY

CLIENT: MKO

SHEET: SECTION OF UPGRADES TO EXISTING ROADS

Date: 22.07.25
Drawn by: POR
Checked by: AC

Project number: 200804
Scale (@ A1): 1:20
Drawing Number: FIGURE 4-11
Rev: C

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9 March 2026

4.4.1.3 Site Underground Electrical and Communications Cabling

Each turbine will be connected to the proposed onsite 220kV electricity substation via underground 20kV or 33kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the proposed onsite 220kV substation (i.e., to the turbine control system within the Independent Power Producer (IPP) Control Building). The electrical and fibre-optic cabling connecting the proposed turbines to the proposed onsite 220kV substation compound will be run in cable ducts adjacent to the proposed internal roads and buried directly alongside the internal roads at depths of approximately 1.2m below ground level to the top of the duct as shown in Figure 4-12. Please note, at 2 no. locations the cable will be floated alongside the proposed new road to minimise impacts on cultural heritage. Please see Section 4.11.1.2.1 below for further details on the construction methodology. The cables will follow the access roads to each proposed turbine location and will cross the L7002 local road at 1 no. location (X615527, Y730068). The proposed underground 20kv or 33kV cable routes are illustrated on the site layout drawings included as Appendix 4-1; the exact number and configuration of cable may vary within the cabling trench. Figure 4-12 below shows the proposed cable trench variations for 33kV cable trenches proposed which will all be utilised within the site; i.e., 1 no. cable trench, 2 no. cable trench, or 3 no. cable trench which will be placed within the ground adjacent to proposed internal roads to facilitate the connection of the proposed turbines to the proposed onsite 220kV substation. Please see Appendix 4-1 Planning Drawings for further detail on the location for each cable trench variation proposed. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50m 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 engineer-approved specified material, which may be imported onto the Proposed Project site should sufficient volumes of suitable material not be encountered during the construction phase of the Proposed Project.

4.4.1.4 Anemometry Mast

One permanent anemometry mast (met mast) is proposed as part of the Proposed Project. The anemometry mast will be equipped with wind monitoring equipment at various heights. The mast will be located within the Proposed Wind Farm at ITM X614131, Y727021, as shown on the site layout in Figure 4-1 and will be a slender structure of 145 metres in height. The mast will be a free-standing structure constructed with a reinforced concrete gravity foundation measuring 12m by 12m designed to cater for the mast loadings. A hard-standing area measuring 15m by 40m to accommodate the installation crane will be constructed adjacent to an existing internal road. The proposed anemometry mast is shown in Figure 4-13.

4.4.1.5 Construction Compounds

There are 5 no. temporary construction compounds proposed as part of the Proposed Project, which will be located within the Proposed Project site in the townlands of Corbane, Lisdermot, Cor More and Cor Beg, Straduff, Tumbeagh, Cappanalosset, Cooldorragh, and Lemanaghan.

The locations of the proposed 5 no. temporary construction compounds are shown on the Proposed Project layout drawing in Figure 4-2 and in Appendix 4-1. The layouts of these construction compounds are shown in Figure 4-14 to Figure 4-18 below.

Table 4-2 Construction Compounds

Compound No.	Townland	Scale	Total Area
1	Lisdermot, Corbane, Cor More and Cor Beg	240m x 60m	14,400m^2
2	Straduff	134.95m x 99.9m	13,494m^2

3	Lemanaghan	134.95m x 99.8m	13,486m^2
4	Tumbeagh	134.95m x 99.9m	13,494m^2
5	Cooldorragh	43.3m x 58.6m	2,523m^2

The proposed 5 no. temporary construction compounds will consist of: bunded refuelling and containment area for the storage of lubricants, oils, and site generators, etc., full retention oil interceptor, storage area (including waste and recycling areas), temporary site offices, staff facilities, 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. The layouts of the proposed 5 no. temporary construction compounds are shown in Figure 4-14 to Figure 4-18 below.

Temporary toilets will be used during the construction phase as part of the welfare facilities for site staff and visitors. Wastewater from toilets will be directed to a sealed storage tank, with all wastewaters tankered off site by an appropriately permitted waste collector to wastewater treatment plants.

The 5 no. temporary construction compounds will be removed from the Proposed Project site as part of the post-construction reinstatement works of the Proposed Project. The concrete foundations of these compounds will be left in situ. The concrete foundations at Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 will be utilised for amenity car parks during the operational phase (please see Section 4.4.1.9 below for further details). The concrete foundations associated with Temporary Construction Compound 2 and Temporary Construction Compound 5, and the areas associated with Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 that will not be used for amenity car parks, will be reinstated with previously excavated peat, and either be reseeded or left to revegetate naturally.

4.4.1.6 Temporary Security Cabins and Proposed Gates

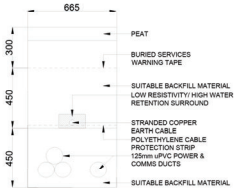
During the construction phase, 4 no. temporary security cabins will be installed within the Proposed Project site for the duration of the construction phase located at the 4 no. construction phase entrance points (please see Table 4-9 in Section 4.7.1 below for detail on each site entrance location and for the location of each security compound). During the construction phase, each temporary security cabin will have a gate installed which will be manned by security stationed within each temporary security compound. The gates will remain on the site during the operational phase to facilitate access during the operational phase of the Proposed Project. Each gate will have a locking mechanism and will be used in the operational phase for amenity purposes and for maintenance and monitoring activities (see Table 4-9 below).

At the end of the construction phase, the temporary security cabins will be removed from the site, however the concrete foundation of these cabins will be left in situ as this is the most environmentally prudent option. These concrete foundations will be reinstated with previously excavated peat, and either be reseeded or left to revegetate naturally.

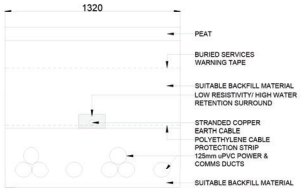
The security cabins will be prefabricated structures measuring approximately 7.2m by 2.5m and 2.85m in height. The cabins will serve as the check-in and check-out point for staff and visitors during the construction phase. The temporary cabins will be removed as part of the post-construction reinstatement works of the wind farm development. The layout and sections of a security cabin is shown on Figure 4-19, and the locations are shown in Figure 4-1 above.

NOTES:

1. ALL DIMENSIONS NOTED ARE IN MM
2. DRAWING IS FOR PLANNING PURPOSES ONLY
3. COPPER STRANDED EARTH CABLE TO BE SIZED IN ACCORDANCE WITH EARTHING AND LIGHTNING STUDIES
4. SUITABLE BACKFILL MATERIAL IS SUBJECT TO THE APPROVAL OF THE RESIDENT ENGINEER
5. TRENCH WIDTHS ARE INDICATIVE ARE TO BE CONFIRMED DURING DETAILED DESIGN
6. DUCTING DESIGN SHOWN IS INDICATIVE AND DUCT TYPE/ LOCATION / SPACING IS TO BE CONFIRMED WITH THE ELECTRICAL CONTRACTOR/ DESIGNER PRIOR TO CONSTRUCTION WORKS COMMENCING
7. CABLE TRENCHING ROUTE IS TO AVOID TURBINE HARD STANDING AREA
8. JOINT SEALER SHALL BE A HOT 50 PEN BITUMEN BINDER OR COLD THIXTROPIC BITUMEN 50-70 PEN TO BE APPLIED TO ALL VERTICAL CUTS IN ACCORDANCE WITH B.S 594987 PRIOR TO APPLICATION OF BITUMINOUS MATERIAL



CABLE TRENCH TYPE 1



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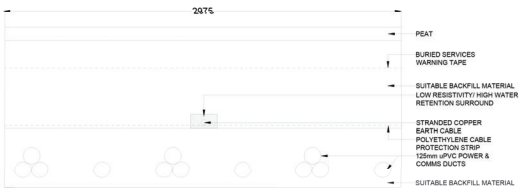

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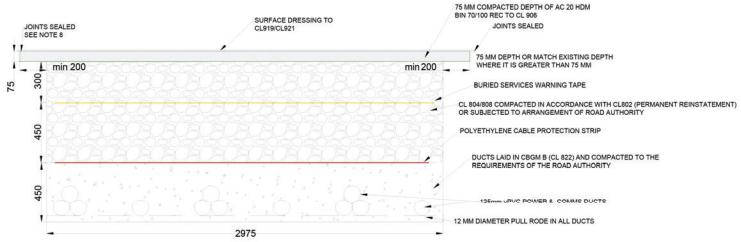
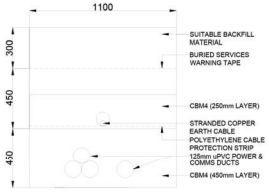
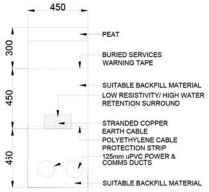


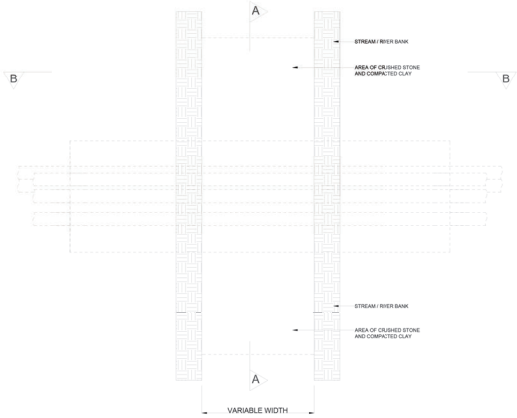
REINSTATEMENT DETAILS BASED ON GUIDELINES
FOR MANAGING OPENINGS IN PUBLIC ROADS



ROAD CROSSING TRENCH DETAIL

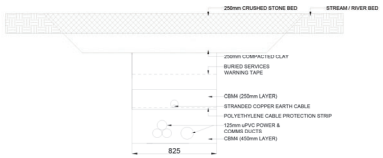


MET MAST TRENCH DETAIL

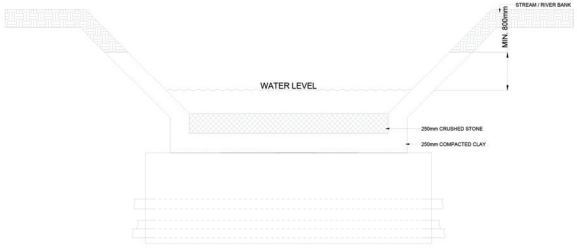


STREAM CROSSING TRENCH DETAIL
PLAN VIEW

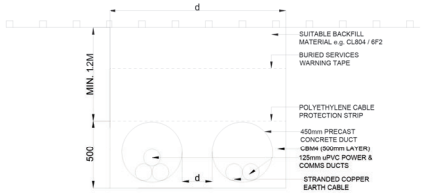
RAIL CROSSING TRENCH DETAIL
PLAN VIEW



STREAM CROSSING TRENCH DETAIL
SECTION VIEW A - A



STREAM CROSSING TRENCH DETAIL
SECTION VIEW B - B



RAIL CROSSING TRENCH DETAIL
SECTION VIEW A - A

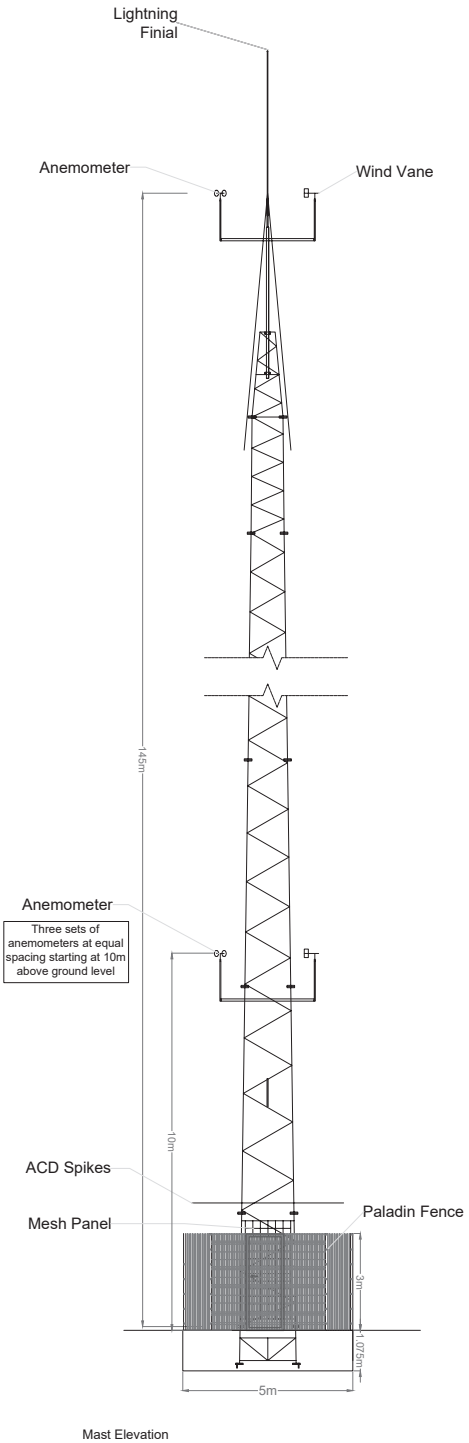
PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Internal Collector Network Trench Arrangement Detail

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-12	1:20 @ A1

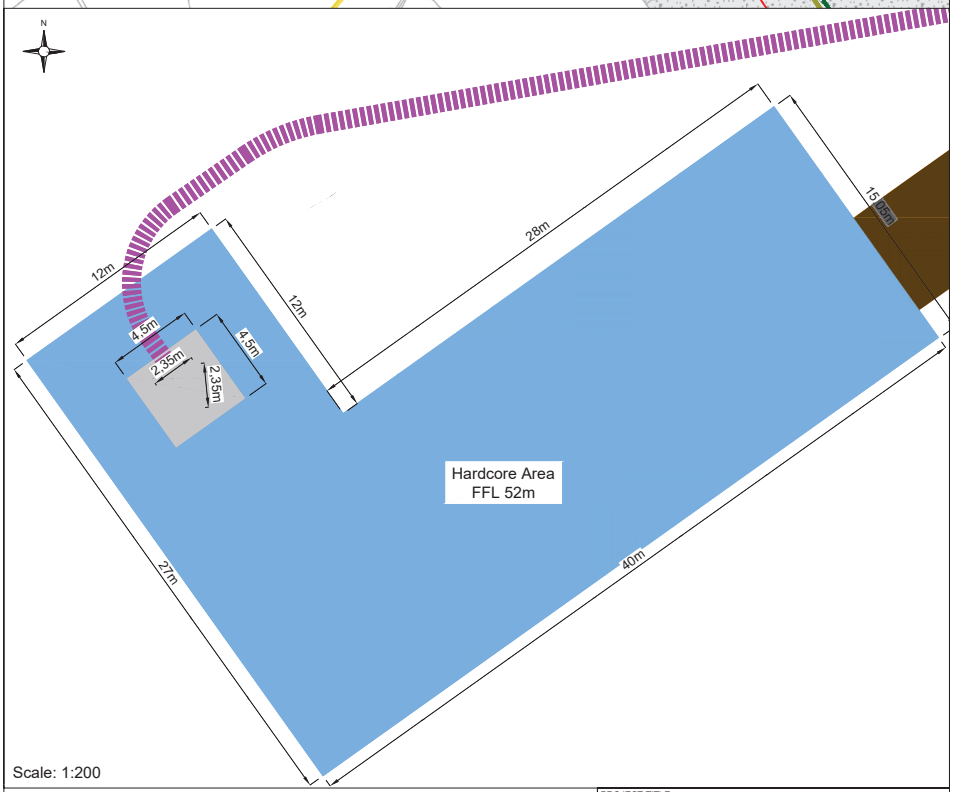
DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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



Mast Elevation

Scale: 1:100



Scale: 1:200

NOTES:

1. Met Mast Exact detail may differ depending on the selected manufacturer.
2. Finished level of the mast to match ground conditions
3. Mast/foundation orientation to be confirmed with met mast supplier
4. Earthing and ducting requirements to be confirmed with met mast supplier and forwarded to foundation designer

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Anemometry Mast

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-13	As shown @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
GO	RD	03.03.2026	D03

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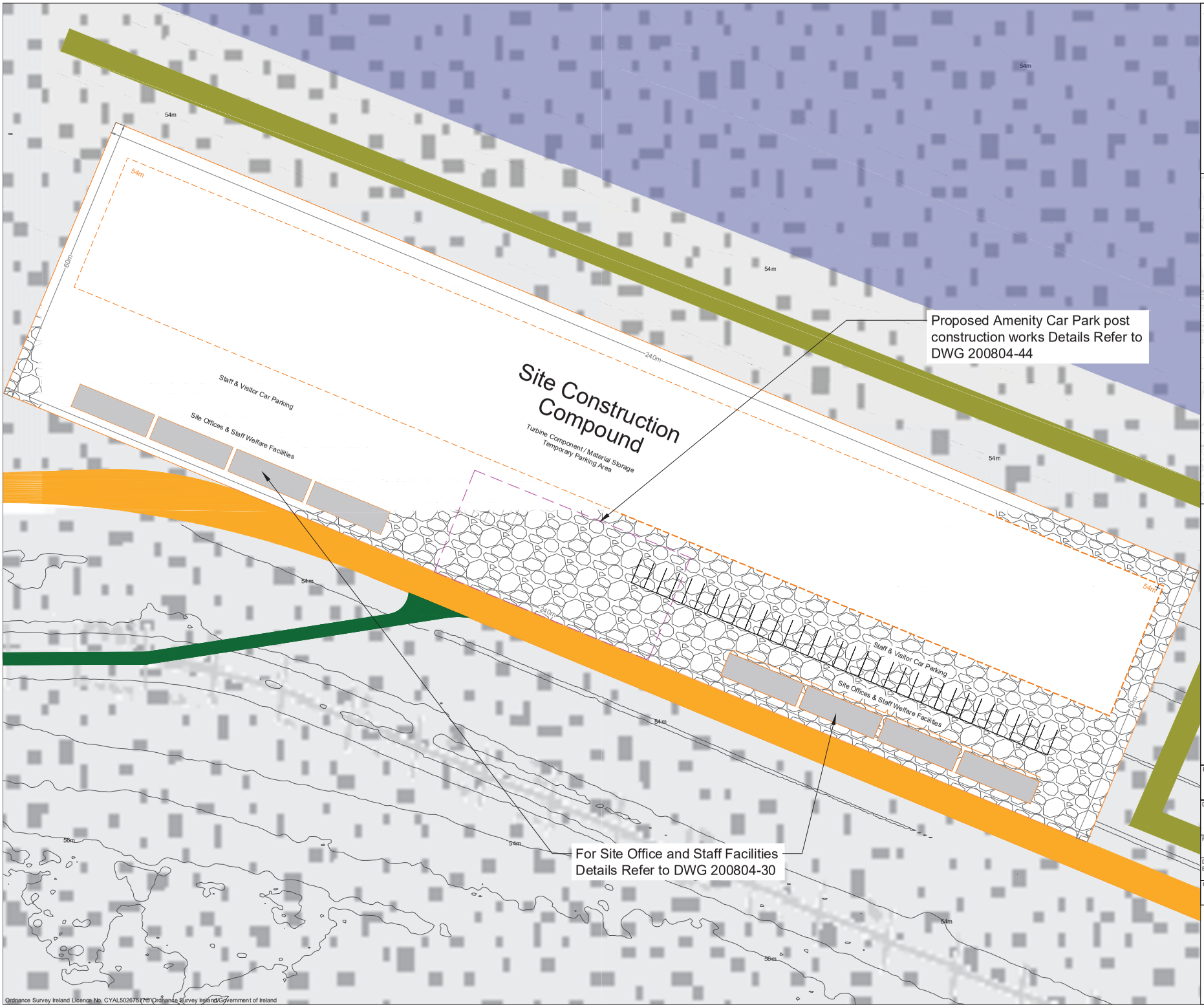

Project Design Drawing Notes

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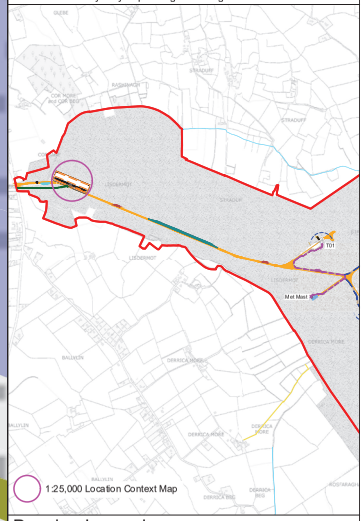
5. All contractors, whether main or sub-contractors, must visit the site and are responsible for taking and checking any and all dimensions and levels that relate to the works.
6. The use of or reliance upon this drawing shall be deemed to be acceptance of these conditions of use unless otherwise agreed in writing, such written agreement to be sought from and issued by the copyright holder to the use or reliance upon this drawing.
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 Road
- Proposed New Amenity Track
- Ornithological Enhancement and Mitigation
- Linear Replanting

N

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Temporary Construction Compound 1

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-14	1:500 @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
GO	RD	23.03.2026	P01

OS SHEET No.:
3302, 3303, 3304, 3365, 3366, 3367, 3428, 3429, 3430

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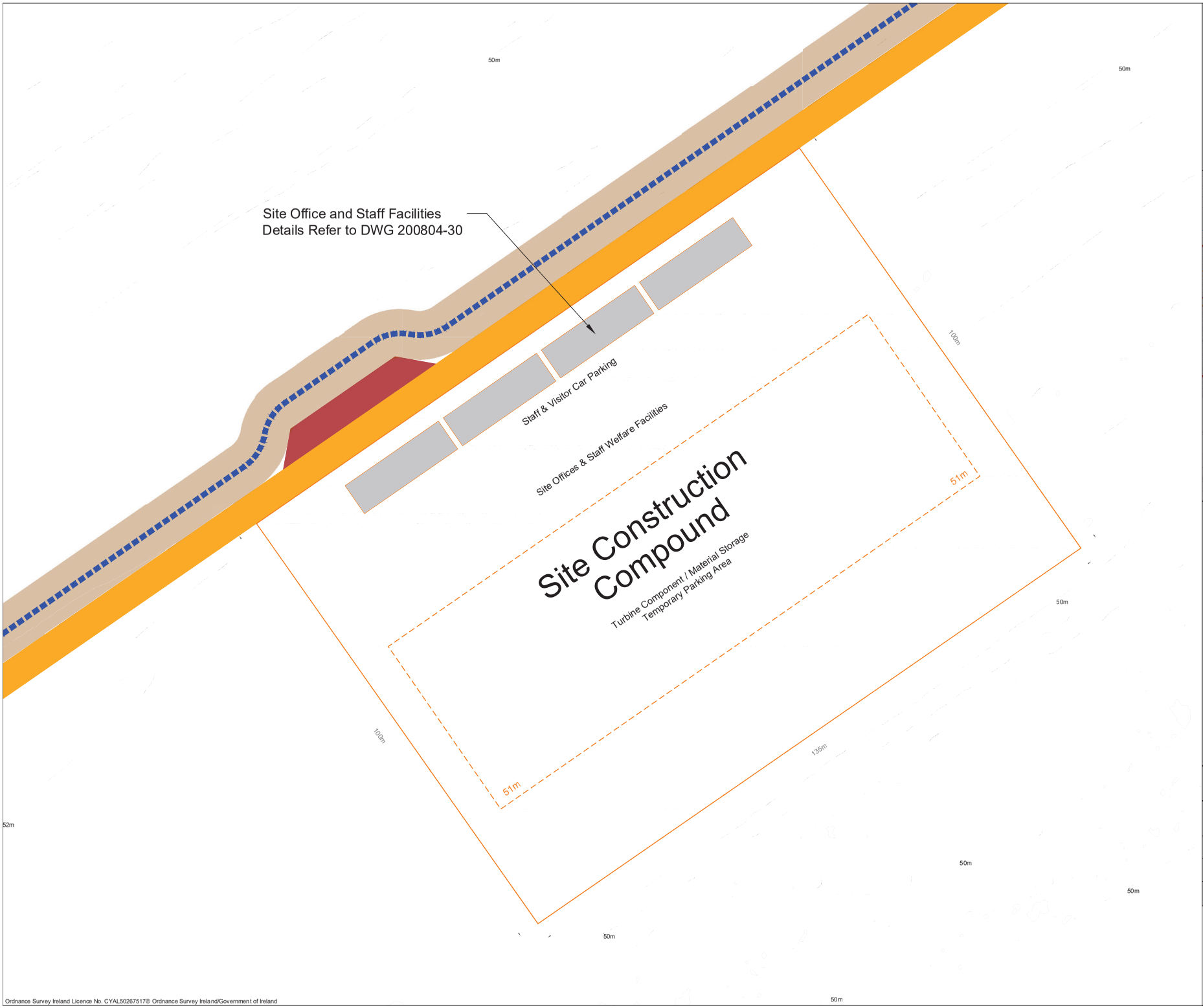

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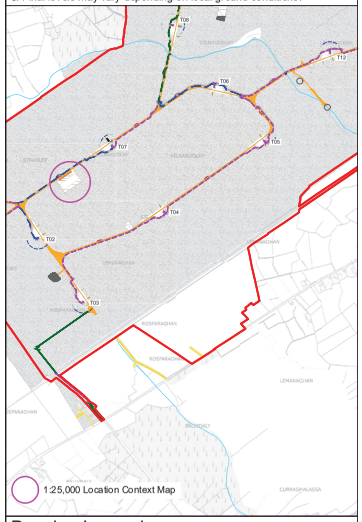
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.



Drawing Legend

- Proposed Road
- Electrical Cable Trench Type 02 *Total Distance 3525m*
- Passing Bay
- Temporary Works Area

N

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Temporary Construction Compound 2

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-15	1:500 @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
GO	RD	23.03.2026	P01

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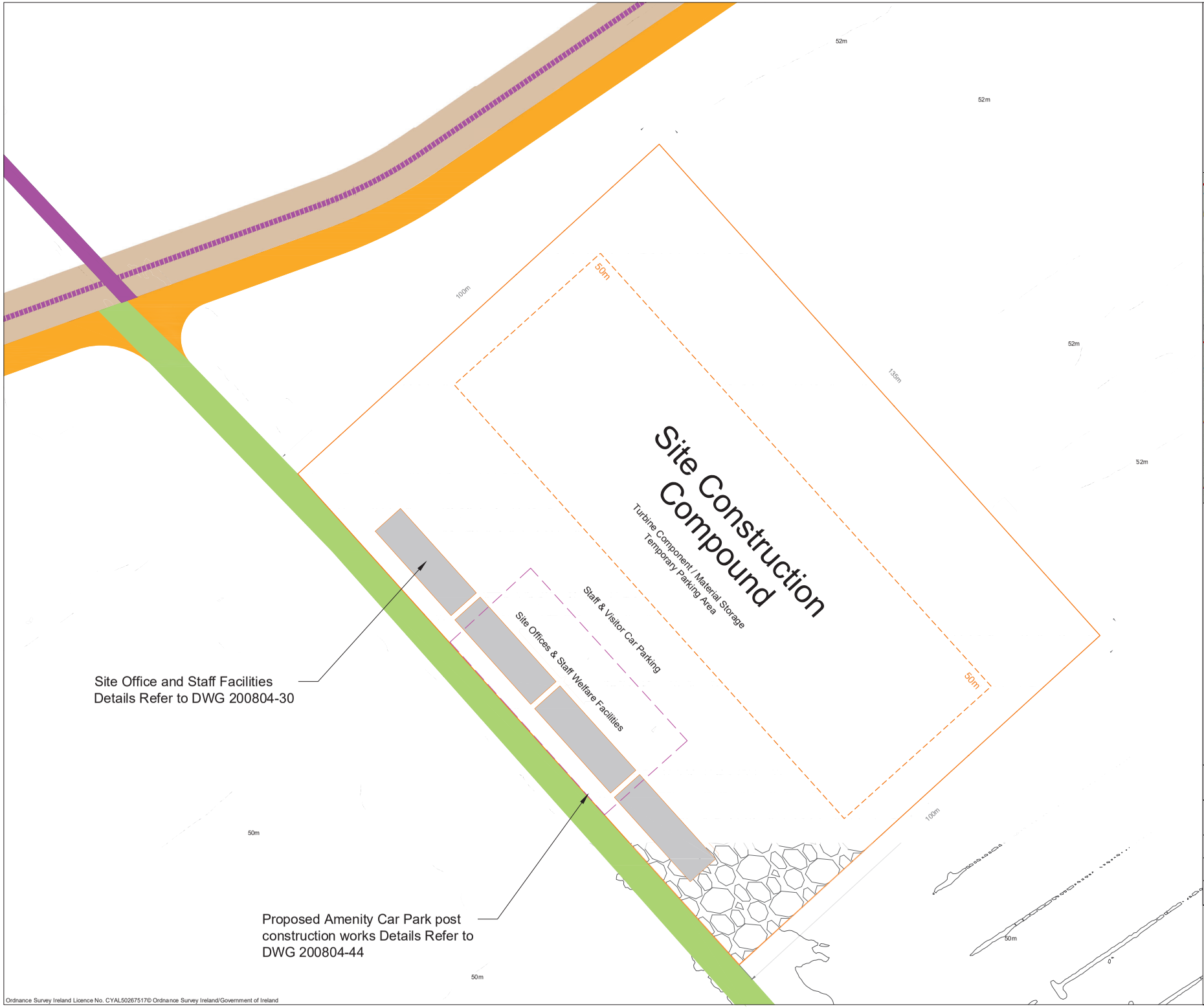

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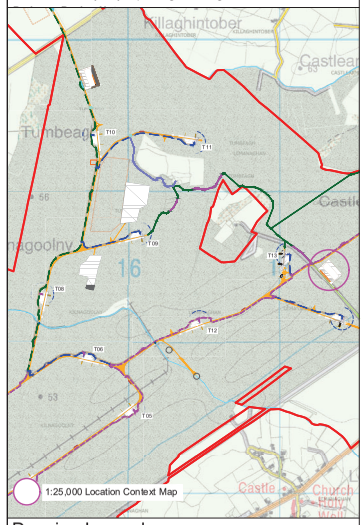
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.



Drawing Legend

- Existing Road to be Upgraded
- Proposed Road
- Proposed Upgrades to Existing Roads for Amenity Track
- Electrical Cable Trench Type 01 *Total Distance 6261m*
- Temporary Works Area

N

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Temporary Construction Compound 3

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-16	1:500 @ A2

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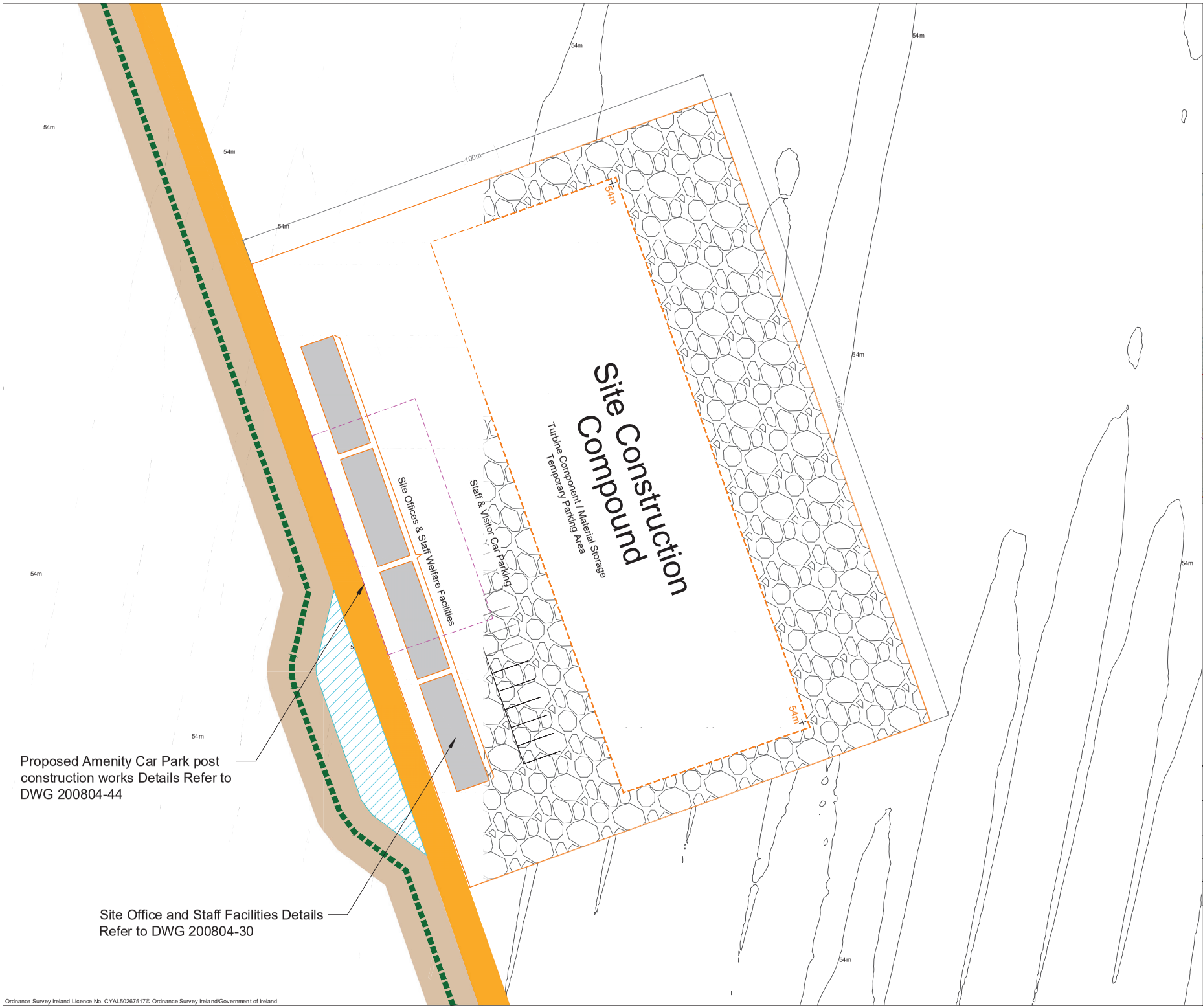

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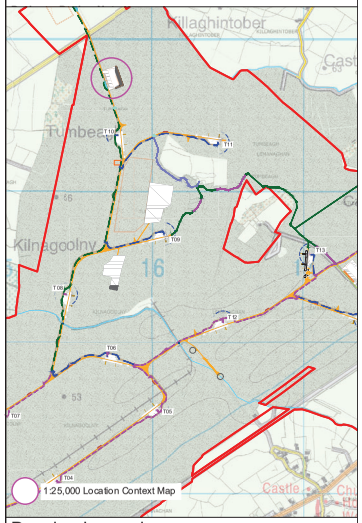
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.



Drawing Legend

- Proposed Road
- Electrical Cable Trench Type 03 *Total Distance 3422m*
- Wheelwash
- Temporary Works Area

N

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Temporary Construction Compound 4

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-17	1:500 @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
GO	RD	23.03.2026	P01

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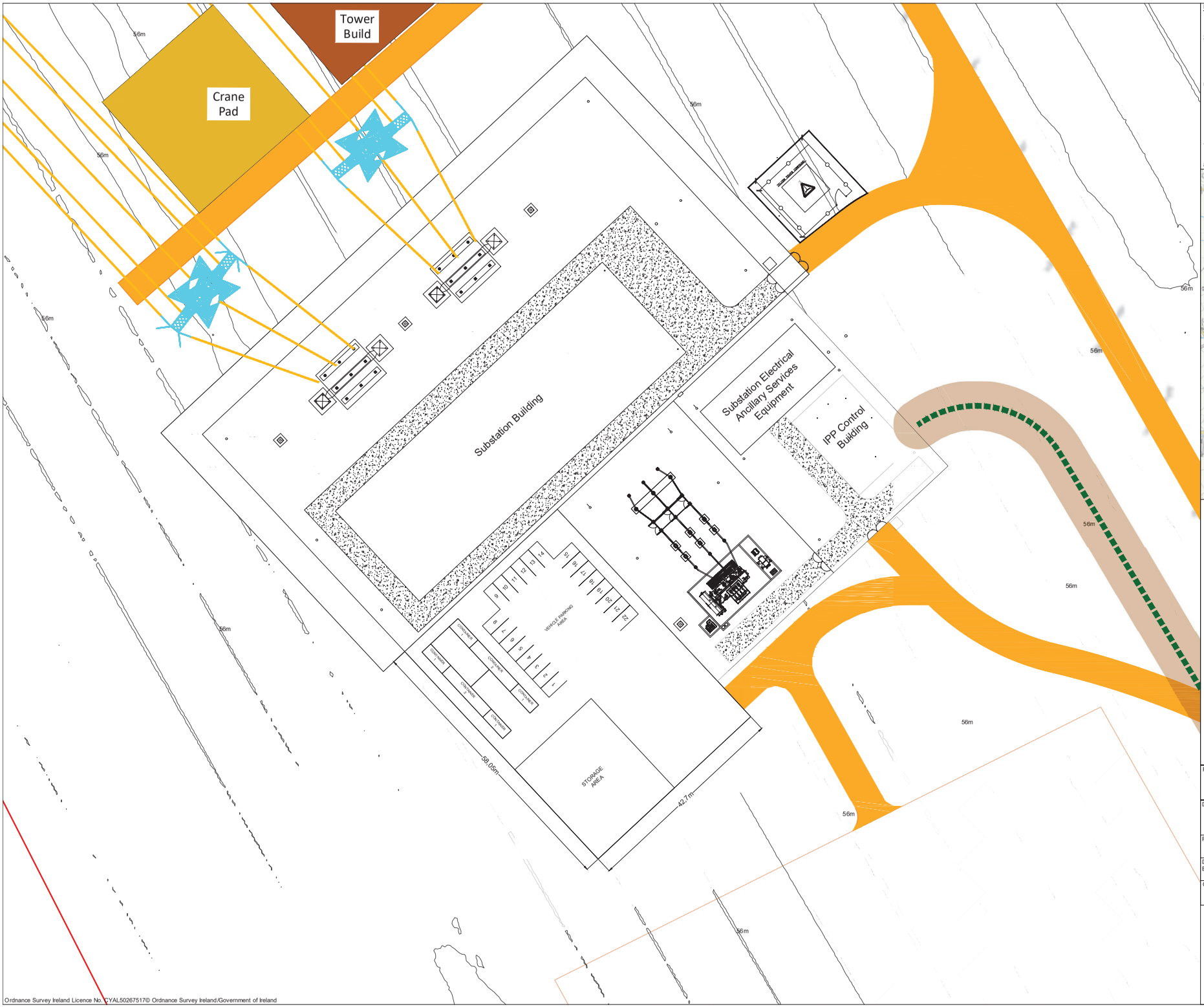

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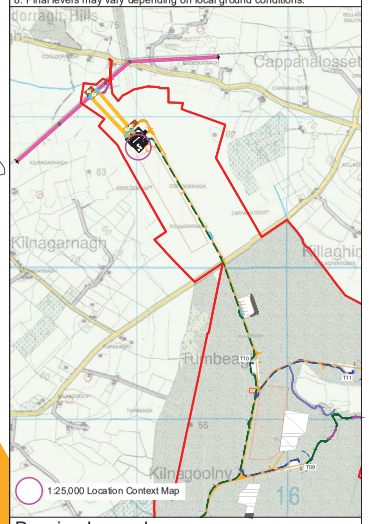
7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
8. Final levels may vary depending on local ground conditions.



Drawing Legend

- Planning Application Boundary
- Proposed Road
- Electrical Cable Trench Type 03 *Total Distance 3422m*
- Peat Deposition Area
- Proposed Steel Mast
- Proposed OHL
- Temporary Works Area

N

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Temporary Construction Compound 5 & Substation Compound

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-18	1:500 @ A2

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Note:

All dimensions are in m, unless noted otherwise.

All dimensions to be checked on site and any discrepancy to be reported to the engineer.

Figured dimensions only to be used, drawings not to be scaled. If in doubt ask.

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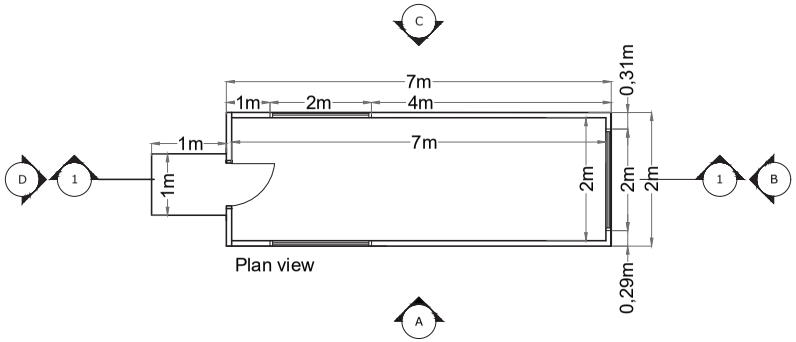
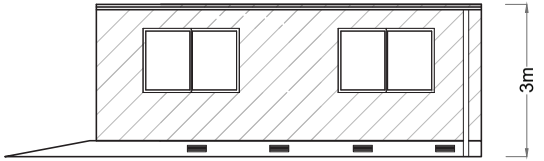


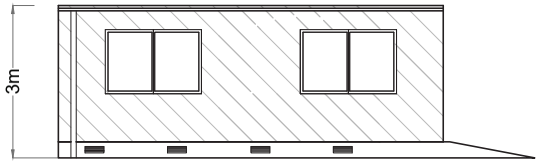
Plan view



Rainwater gutter & down pipe

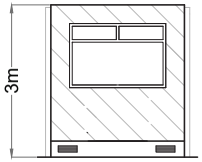
Elevation A

Rainwater gutter & down pipe

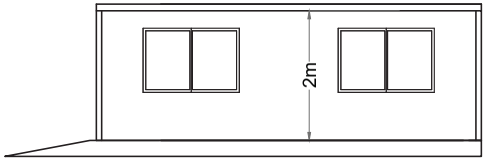


Elevation C

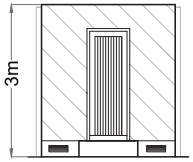
Rainwater gutter & down pipe



Elevation B



Rainwater gutter & down pipe



Elevation D

PROJECT TITLE:

Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:

Security Cabin Detail

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-19	1:100 @ A3

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4.4.1.7 Biodiversity Mitigation and Enhancement

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project and is included as Appendix 6-5 of this EIAR. This plan has been developed to offset the loss of habitats identified within the Proposed Project site and further enhance the biodiversity of the site and its environs. These measures have also been considered in the landscape and visual impact assessment which is included in Chapter 14: Landscape & Visual, of this EIAR. Similarly, the drainage design for the Proposed Project, which has been prepared by Hydro Environmental Services Ltd. (HES) and is included in Appendix 9-1 of this EIAR, has taken the BMEP measures into consideration from a drainage perspective.

Please note that irrespective of the consenting or construction of the Proposed Project, the measures outlined in the Draft Cutaway Bog Decommissioning and Rehabilitation Plan (Draft Rehabilitation Plan) (Appendix 2-4) will be implemented by BnM in agreement with the EPA, per the BnM's IPC Licence Obligations (P0500-01). The Draft Rehabilitation Plan included provides a description of Lemanaghan Bog and its ecology and has been taken account in describing the baseline environment in this EIAR. It also provides a framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the Draft Rehabilitation Plan will be implemented. Irrespective any further development on the site, the measures outlined in the Draft Rehabilitation Plan (Appendix 2-4) will be implemented by BnM in agreement with the EPA, per BnM's IPC Licence Obligations. Please see Section 4.6 below and Section 2.10.2.3 of Chapter 2: Background to the Proposed Project for further detail.

Consideration is given to the Draft Rehabilitation Plan in Section 1.2 of the BMEP.

4.4.1.7.1 *Ornithological Mitigation and Enhancement*

Whooper Swan

An enhancement area is proposed for whooper swan to replace the loss of roosting habitat to the Proposed Project. As detailed in Section 7.3.7.2 of Chapter 7, roosting was recorded across a total of five areas within the Proposed Project site across the five winter seasons surveyed, with a maximum of four areas being used in any one season.

The c. 10ha area is proposed in the northwest of the Proposed Project site, (please see Figure 3-1 for location details) in an area of bare cutover peat. The measures proposed includes the controlled flooding of an area of approximately 10ha to a depth of approximately 1.5m. This will be achieved by creating an encircling embankment to contain the water. The controlled flooding will be such that water will be present during the winter months when whooper swan are present (October to March). Visual screening from the internal road and car park will be created via planting of native scrub of *c.*3m width

As previously outlined, the objective is to create a shallow water body of approximately 10ha and 1.5m depth to accommodate winter roosting whooper swan. Proposed enhancement and mitigation measures are outlined in Section 3.2.2.1 of the BMEP. Monitoring for Whooper Swan is included in Section 4.1.3 of the BMEP and implementation proposals are included in Section 3.3 of the same.

Lapwing

An enhancement area is proposed for lapwing to replace the breeding habitat lost to the Proposed Project. As detailed in Section 7.3.7.13 of Chapter 7, lapwing breeding activity was identified within the Proposed Project site, with an estimated two pairs breeding present in the most recent breeding seasons surveyed (i.e. 2023 & 2024).

The 10ha area is proposed in the west of the Proposed Project site adjacent to Site Entrance 1 (see Table 4-9 below) (please see Figure 3-1 for location details) in an area of bare cutover peat. Proposed enhancement and mitigation measures are outlined in Section 3.2.2.2 of the BMEP. Monitoring for Lapwing is included in Section 4.1.3 of the BMEP and implementation proposals are included in Section 3.3 of the same.

4.4.1.7.2 *Ecological Enhancement*

Marsh Fritillary Habitat Enhancement

Surveys undertaken within the Proposed Project site identified small, scattered areas of suitable habitat, associated with dry meadows and grassy verges (GS2). No active larval webs were recorded during targeted marsh fritillary surveys undertaken in 2021, 2023 and 2024. However, inactive larval webs were recorded within one patch of suitable habitat during the 2023 surveys, indicating previous use of the site by the species.

The proposed enhancement measures are therefore intended to increase the extent, quality and connectivity of suitable grassland habitat within the Proposed Project site, with a focus on promoting a structurally diverse sward and increasing the availability of the larval foodplant, devil's-bit scabious (*Succisa pratensis*), to support future use of the site by marsh fritillary.

It is proposed to enhance approximately 6.7 ha of grassland (GS2) habitat to improve its suitability for marsh fritillary by increasing habitat heterogeneity and the abundance and accessibility of devil's-bit scabious. These measures are designed to function as a potential network of habitats within the wider landscape, which is recognised as important for the long-term viability of marsh fritillary metapopulations.

Enhancement will focus on three existing areas of grassland habitat within the Proposed Project site that already exhibit characteristics suitable for marsh fritillary, as shown in Figure 3-1 of the BMEP.

Proposed implementation and management measures are outlined in Section 3.1.1.1 of the BMEP.

Native Hedgerow Planting

It is proposed to plant approximately 6.5 km of native hedgerow within the Proposed Project site. The locations of proposed hedgerow planting are shown on Figure 3-1 and have been selected to enhance ecological connectivity across the site by linking existing features such as woodland edges and watercourse corridors and to support commuting routes for bats and other species. All proposed hedgerow planting is located within areas of cutover peat (PB4).

Species composition will comprise approximately 75% hawthorn, comprising a mix of planting stock including whips and selected advanced nursery stock (typically 10–12 cm girth), to increase early structural diversity. The remaining 25% will be made up of a mix of locally appropriate native species, including:

- Hazel (*Corylus avellana)*
- Blackthorn (*Prunus spinosa*)
- Rowan (*Sorbus aucuparia*)
- Elder (*Sambucus nigra*)
- Goat willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)

Proposed implementation and management measures are outlined in Section 3.1.2.1 of the BMEP

Native Woodland Planting

It is proposed to provide approximately 7.8 ha of native woodland enhancement within the Proposed Project site, as shown on Figure 3-1. The proposed woodland area is located within recolonising peatland habitat where natural succession is already occurring, and the enhancement measures are intended to diversify structure and species composition through targeted planting.

Local variation in ground levels and hydrological conditions within the proposed planting area will be taken into account during implementation. LiDAR topographic data and onsite observations will be used to inform species selection and planting layout, to ensure that planting is appropriate to local conditions. Where lower lying or wetter areas are identified, planting will be adapted accordingly, either through the use of appropriate wet woodland species or by allowing areas to remain as more open or transitional habitats. This approach will ensure that woodland enhancement is aligned with site conditions and allows for the gradual establishment of a structurally diverse woodland/wetland mosaic alongside ongoing peatland rehabilitation.

Proposed implementation and management measures are outlined in Section 3.1.3.1 of the BMEP

4.4.1.8 Vegetation Removal and Replanting

4.4.1.8.1 *Vegetation Removal*

As part of the Proposed Project, no commercial forestry felling will occur. However, the removal of immature woodland (WS2) (hereafter referred to as vegetation removal) will be required within and around development footprint to allow for the construction of the site entrances, access roads, underground cabling, and other ancillary infrastructure.

A total of 1.02 hectares of WS2 removal will occur as part of the Proposed Project. The 1.02ha of WS2 being removed to accommodate the Proposed Project will be replanted within the site as part of the proposed ecological enhancement detailed in Section 4.4.1.7 above. Please see Chapter 6: Biodiversity and Appendix 6-5 for details.

Further details on the vegetation removal required within and around the development footprint on the Proposed Project site is detailed in Chapter 6 of this EIAR.

4.4.1.8.2 *Replanting*

In line with the Forest Service's published policy on felling for wind farm developments, areas cleared of commercial forestry for access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare-for-hectare basis for the footprint of the infrastructure developments.

The estimated 1.02 hectares of immature woodland (WS2) that will be removed within and around the Proposed Wind Farm along with existing linear boundaries is not subject to a Felling Licence from the Forestry Service and will be replanted within the site as detailed above.

4.4.1.9 Amenity Track and Carparks

The Proposed Project will upgrade approximately 1.14km of existing roads within the site and provide approximately 17.1km of new roads (Section 4.4.1.2.1 above) to be used for maintenance and monitoring activity as well as for amenity purposes such as walkways and cycleways when the Proposed Wind Farm becomes operational.

An additional 3.9km of a new dedicated amenity track, along with the further upgrade of approximately 1.8km of existing track, for the purposes of amenity, is also proposed as part of the

Proposed Project to provide a greater variety of walking loops. The amenity pathways will be surfaced with a granular material. These amenity pathways and additional connections are discussed and shown on the Lemanaghan Amenity Map in Appendix 4-2 and are illustrated in Figure 4-1. The additional connections will be 3m in width and will be constructed using a similar methodology to proposed new roads as outlined in Section 4.11.1.2 below.

Three new public car parks will provide for recreational use during the operational stage. The car parks will be accessible via Site Entrance 1, Site Entrance 2 and Site Entrance 4 (per Table 4-9 below). The location and configuration of the proposed car parks are shown in Appendix 4-1. All three car parks will provide 15 no. spaces for private vehicles, 3 no. spaces for accessible parking, and parking for buses. Each car park will also provide bicycle rack facilities for those who want to cycle to the area and then utilise the amenity loops for walking.

If planning permission is granted for the Proposed Wind Farm, the associated amenity pathways will connect into the permitted Offaly West portion of the Midlands Trail Network (MTN). The MTN is a long-term plan to create a network of walking and cycling trails that connects rural areas to open spaces. The MTN will:

- Deliver a network of connected walking and cycling trails across the Midlands.
- Provide trails which will interconnect with the existing and emerging arterial Greenway network, including the repurposing of former narrow-gauge rail track beds, culverts and underpasses.
- Include related infrastructure to enhance the experience, e.g., repurpose industrial bridges formerly used to transport peat to factories for Just Transition Fund (JTF) place-making and art installations, signage and interpretation to create a sense of connectivity across the towns, villages, bogs and waterways of the JTF region.

The MTN will consist of a serviced network of inclusive off-road trails that enables local people and visitors to explore the Midlands region by bike, e-bike and on foot. The network will connect rural settlements to open spaces, traversing peatlands, waterways and other habitats and linking to heritage sites and visitor attractions. The planning application for the Offaly West portion of the MTN was granted by Offaly County Council on 7th August 2025 (PL Ref: 25/60014).

The MTN will help expand tourism in the region and regenerate the landscape in a sustainable way. It will also support Ireland's Hidden Heartland and Ireland's Ancient East strategies. Please see Section 5.3.9 of Chapter 5: Population and Human Health of this EIAR for further detail.

4.4.1.10 Watercourse / Culvert Crossings

The site is extensively drained by a network of manmade land drains and traversed by the Lemanaghan Stream (EPA Code 25_3841).

To facilitate the construction of Proposed Wind Farm roads, it is required to cross the Lemanaghan Stream at 2 no. locations. Watercourse Crossing no. 1 is located at ITM X615354, Y728152 and will comprise a new proposed watercourse crossing via a clear-span watercourse crossing or bottomless box culvert. Watercourse Crossing no. 2 is located at ITM X616121, Y728023 and an existing crossing is in place that will be removed and a new clear-span watercourse crossing or bottomless box culvert will be installed.

Please see Section 4.11.1.5 below for detail on the 2 no. watercourse crossing to be used at the Proposed Wind Farm and associated construction methodologies.

4.4.1.10.1 *Clear-Span Crossing*

The 2 no. crossings of the Lemanaghan Stream will comprise a clear-span watercourse crossing or bottomless box culvert. The construction methodology for these crossings, inclusive of the

decommissioning methodology for the existing watercourse crossing at Watercourse Crossing no. 2, have been designed to eliminate the requirement for in-stream works at these locations. The watercourse crossings will be constructed to the specifications of the Office of Public Works (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 (IFI).

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 locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing. Please see Appendix 4-1 for the location of the proposed clear-span crossings, Figure 4-45 for the design details and Section 4.11.1.5 for the construction methodology.

4.4.1.10.2 *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 must be taken from one side of an existing roadway to the other for discharge. The size of the culverts will be influenced by the depth of the track or road sub-base. In all cases, culverts will be oversized to allow mammals to pass through the culvert. Culverts will be constructed as per the methodology detailed in Section 4.11.1.6 below. All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

4.4.2 Proposed Grid Connection

4.4.2.1 Electricity Substation

It is proposed to construct a 220kV electricity substation within the Proposed Project site, as shown in Figure 4-1. The proposed onsite 220kV substation is located in the northern section of the site, in the townland of Cooldorragh, with close proximity to the existing Shannonbridge-Maynooth 220kV OHL located approximately 0.4km north of the proposed onsite 220kV substation at its closest point. The construction and detailed design of electrical equipment in the proposed onsite 220kV substation will be to ESB/EirGrid network specifications and will be under the ownership of EirGrid or ESB Networks. Access to the proposed onsite 220kV substation will be from Site Entrance 4 as delineated in Table 4-9 below. Access to the L7002 local road is via the N62 which runs along the western boundary of the Proposed Project site and the L7001 local road which runs along the northeastern boundary of the Proposed Project site. Please see Section 4.7.1 below for detail on site entrances for the Proposed Project. This site entrance location will facilitate EirGrid/ESB access during the operational phase of the Proposed Project and beyond. Upon decommissioning of the Proposed Project, the proposed onsite 220kV substation will remain in situ and form part of the national electricity grid infrastructure.

The footprint of the proposed onsite 220kV substation compound measures 11,057m^2 in area and will include 1 no. control building and the electrical components necessary to consolidate the electrical energy generated by each wind turbine and export that electricity from the Proposed Wind Farm to the national grid. The layouts, elevations and sections of the proposed onsite 220kV substation are shown on Figure 4-20 to Figure 4-25. Further details regarding the connection of the proposed onsite 220kV substation to the national electricity grid are provided in Section 4.4.2.3 below.

The substation compound will be surrounded by an approximately 2.6m high steel palisade fence as shown in Figure 4-26 (or as otherwise required by ESB/EirGrid), and internal fences will also segregate different areas within the main substation. The construction and exact layout of electrical equipment in the onsite electricity substation will be to ESB/EirGrid networks specifications.

4.4.2.2 Wind Farm Control Buildings

The substation control building will be located within the proposed onsite 220kV substation compound and will accommodate both Independent Power Producer (IPP) control building infrastructure and Transmission System Operator (TSO) control building infrastructure. The control building will measure 19m by 12m and will have a total area of 228m^2. The layout and elevation of the control building is shown on Figure 4-27.

The wind farm control building will include staff welfare facilities that will work on the Proposed Project during the operational phase. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the Proposed Project, there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the Proposed Project does not necessitate a potable source. It is proposed to install a bored 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 (subject to final design). Bottled water will be supplied for drinking, if required. Please see Section 4.11.2.2.1 for details on the construction methodology of the bored well.

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, measuring 9m^2 in area, and 2m in depth, with a holding capacity of 10,000 litres. Please see Figure 4-28 below for detail on the storage tank. All wastewater will be tankered off site by an appropriately licensed waste collector to wastewater treatment plants. It is not proposed to treat wastewater on site, and therefore the EPA's 2009 *'Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses'* (EPA, 2009) does not apply. Similarly, the EPA's 1999 manual on *'Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'* also does not apply, as it too deals with scenarios where it is proposed to treat wastewater on site.

Such a proposal for managing the wastewater arising on site has become standard practice on wind farm 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 Coimisiún 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 will 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 wind turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours per 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 site. When the final destination of the materials is known following the appointment of a permitted contractor, this information can be submitted to the Planning Authority if necessary.

4.4.2.3 Overhead Line Grid Connection Electrical Cabling Route

A 220kV connection between the Proposed Project and the national electricity grid will be necessary to export electricity from the Proposed Project. It is proposed to construct an onsite 220kV substation within the Proposed Project site and to connect this to the existing Shannonbridge-Maynooth 220kV OHL via an OHL connection in the townland of Cooldorragh, Co. Offaly. The location of the Proposed Grid Connection is detailed in Figure 4-1 and Figure 4-3 above.

The Proposed Grid Connection OHL will consist of approximately 0.8km of overhead line (comprising 0.4km of OHL from the proposed steel masts for the double loop-in/loop-out from the proposed onsite

220kV substation to the existing OHL), 4 no. new steel masts, 2 no. new gantry structures, and the removal of 1 no. existing steel mast.

The proposed design for the Proposed Grid Connection will require two new mast structures which will be constructed under the existing Shannonbridge-Maynooth 220kV OHL. The existing transmission line will be deviated between two existing towers (Tower 60 and Tower 61) into 2 no. new steel masts which will connect to a further 2 no. new steel masts on the northern boundary of the proposed onsite 220kV substation. The transmission line will then be connected into 2 no. new gantry structures located within the proposed onsite 220kV substation. As part of the construction works, the existing Tower 61 will be removed. Please see the locations of the 4 no. new steel masts and 2 no. new gantry structures on Plate 4-3 below.

Each new steel mast will have a footprint of approximately 20m^2 and an overall height of 28m. They will be steel masts with cross-arms which can extend over the base footprint and internal bracing. The exact final detail and specifications of the Proposed Grid Connection will ultimately be decided by ESB or EirGrid. The design of the proposed lattice masts to facilitate the Proposed Grid Connection is shown in Figure 4-29 below.

Each new gantry structure will have a footprint of approximately 20m^2. The design of the proposed gantry masts to facilitate the Proposed Grid Connection is shown in Figure 4-21 to Figure 4-23 below.

Please see Section 4.11.2 below for detail on the proposed construction methodology to facilitate the connection of the Proposed Wind Farm to the national grid via the existing Shannonbridge-Maynooth 220kV OHL.

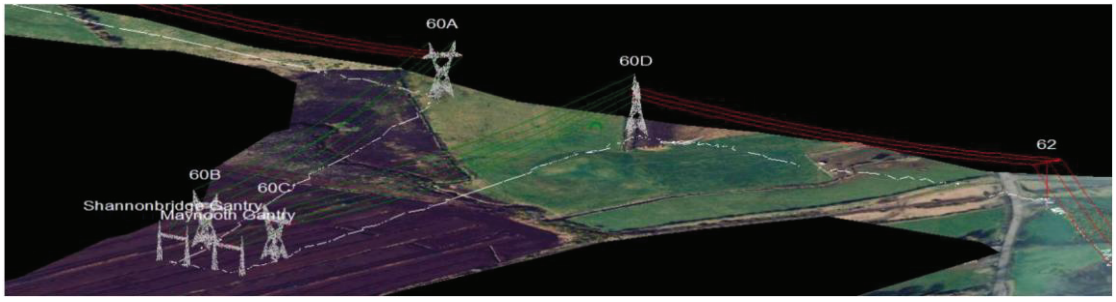


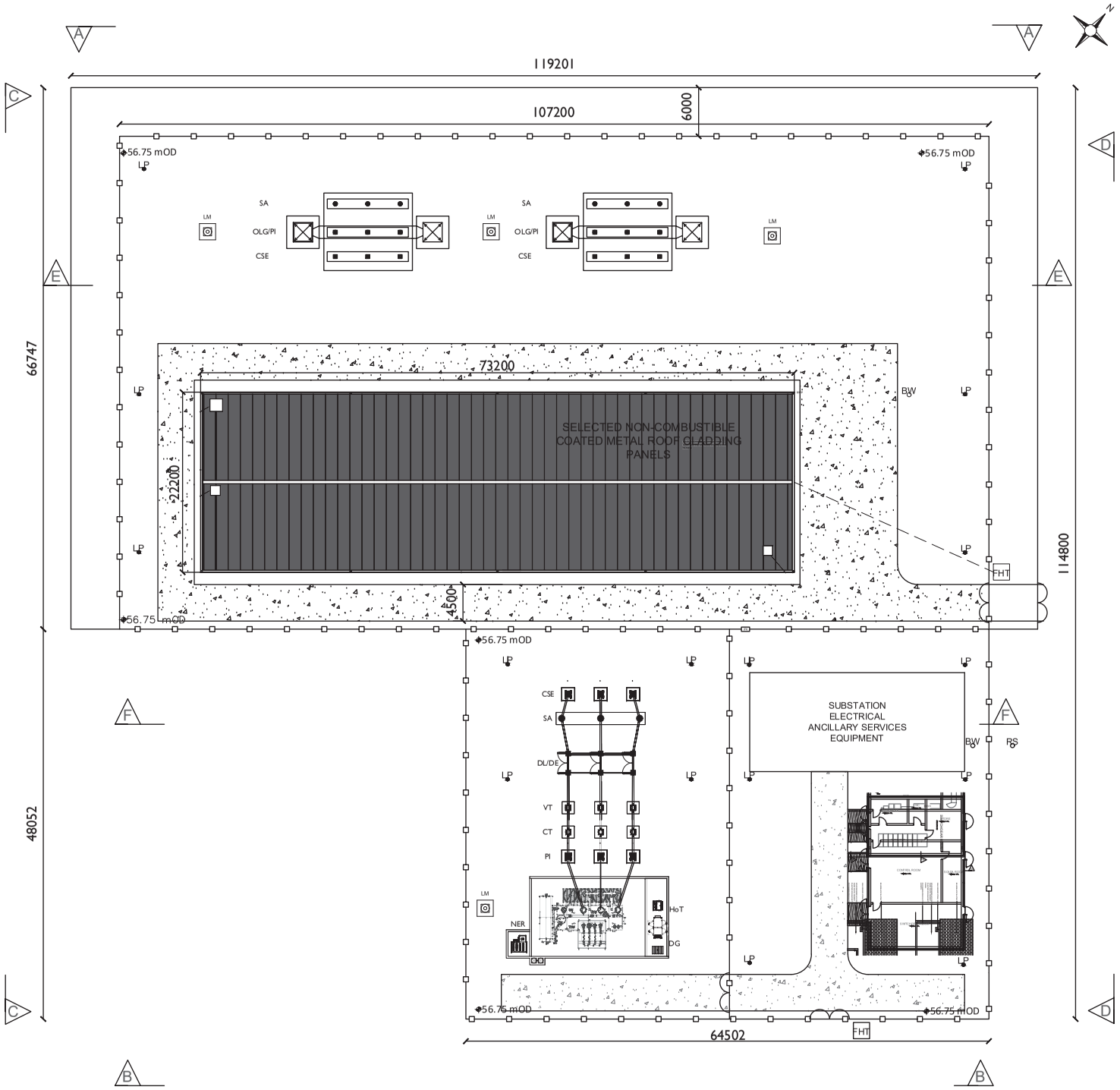
Plate 4-3 Position of steel masts and gantry structure

4.4.2.4 Rural (Local) Electricity Supply

A rural/local electricity supply will be required as a back-up power supply to the proposed onsite 220kV substation for light, heat and power purposes. There is a local medium-voltage (MV) supply adjacent to the development location which could be utilised; this is the Shannonbridge – Lumcloon MV supply. The rural/local supply will be designed and constructed by ESB Networks. The exact source of supply is to be confirmed by ESB Networks prior to construction. The rural/local supply will have an associated step-down transformer (i.e., MV to low voltage (LV)) and will enter the substation building by underground cable and terminate onto the control building alternating current (AC) distribution board.

4.4.2.5 Telecommunications Tower

A telecommunications tower is proposed next to the proposed onsite 220kV substation and serve to provide as a communication link during the operational stage and to relay data between the Proposed Project and external monitoring/management stations. The tower will be free-standing structure of 36m in height and will be constructed on a hard-standing area measuring 13m by 13m to accommodate the crane that will be used to erect the mast, adjacent to proposed roads. The typical design of the proposed telecoms tower masts is shown in Figure 4-30 below.



Notes:

1. ALL MEASUREMENTS SHOWN ARE IN MM
2. DRAWING FOR PLANNING PURPOSES ONLY
3. NO. AND LOCATION OF LIGHTING POLES AND LIGHTNING MASTS ARE SUBJECT TO CHANGE UNDER THE DETAILED DESIGN STAGE
4. THIS DRAWING HAS BEEN DEVELOPED IN ACCORDANCE WITH EIRGRID STANDARD XDN-LAY-ELV-STND-F-004 REV 1
5. LOCATION OF FOUL HOLDING TANK ARE SUBJECT TO CHANGE UNDER DETAILED DESIGN STAGE

LEGEND:

ID	DESCRIPTION
BW	BORED WELL
CT	CURRENT TRANSFORMER
CSE	CABLE SEALING END
DL/DE	LINE DISCONNECTOR/EARTH SWITCH
DG	DIESEL GENERATOR
FHT	FOUL HOLDING TANK
HOT	HOUSE TRANSFORMER
IFK	INTERFACE KIOSK
LM	LIGHTNING MAST
LP	LAMP POST
NER	NETRUAL EARTHING RESISTOR
OLG	OVERHEAD LINE GANTRY
PI	POST INSULATOR
RS	RURAL SUPPLY
SA	SURGE ARRESTER
VT	VOLTAGE TRANSFORMER

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
220kV Substation Compound Plan

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-20	1:500 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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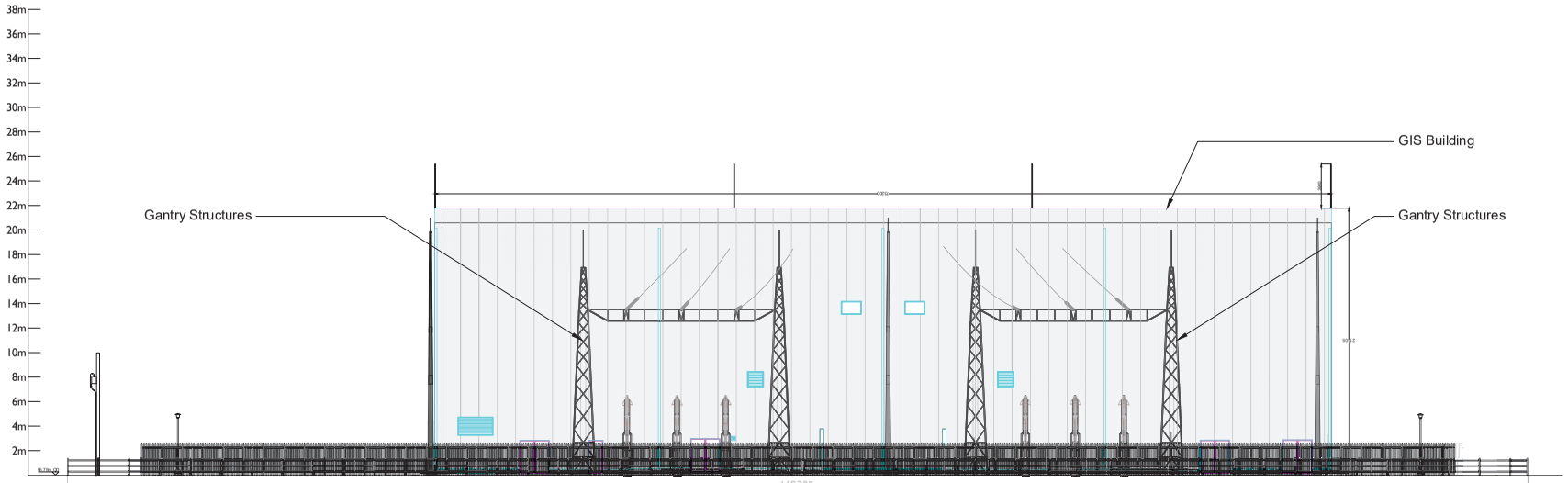
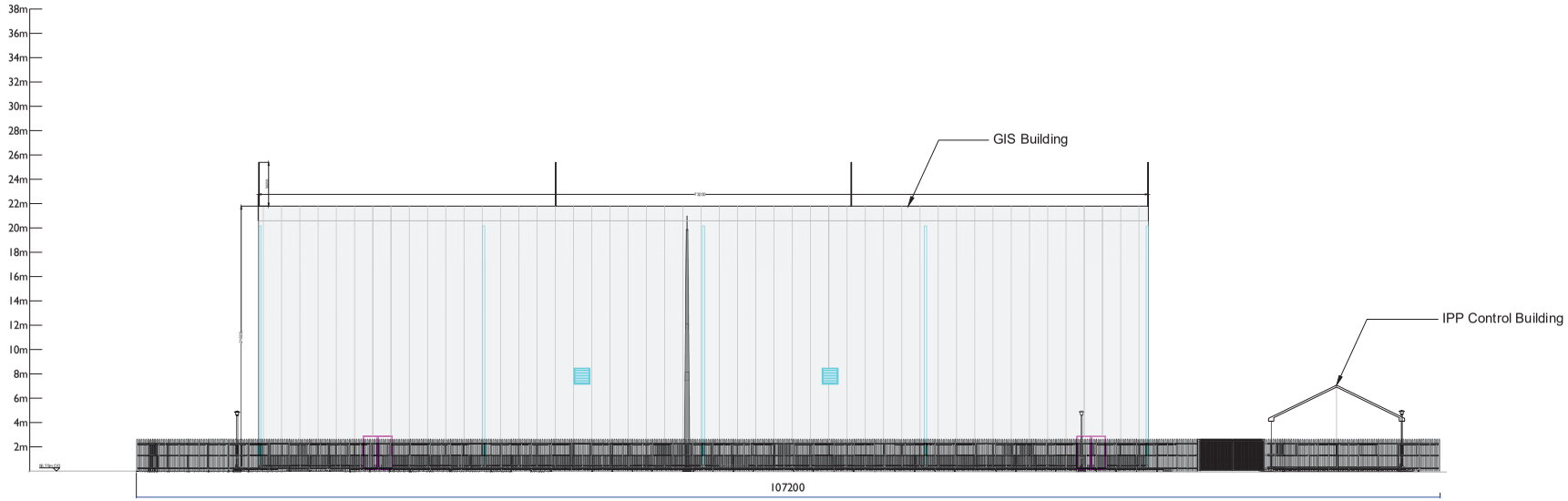


ELEVATION A-A



ELEVATION B-B

Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. BUILDING COLOURS WILL RANGE WITHIN A MUTED MID-DARK GRAY AND GREEN SPECTRUM. REFER TO EIAR VOL. II, APPENDIX 10A FOR INDICATIVE DETAIL
4. FINAL DETAIL OF BUILDING FINISHES TO BE AGREED WITH PLANNING AUTHORITY IN ADVANCE OF DEVELOPMENT COMMENCING

PROJECT TITLE:

Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:

220kV Substation Compound Elevations

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-21	1:200 @ A1

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	24.03.2026	P01

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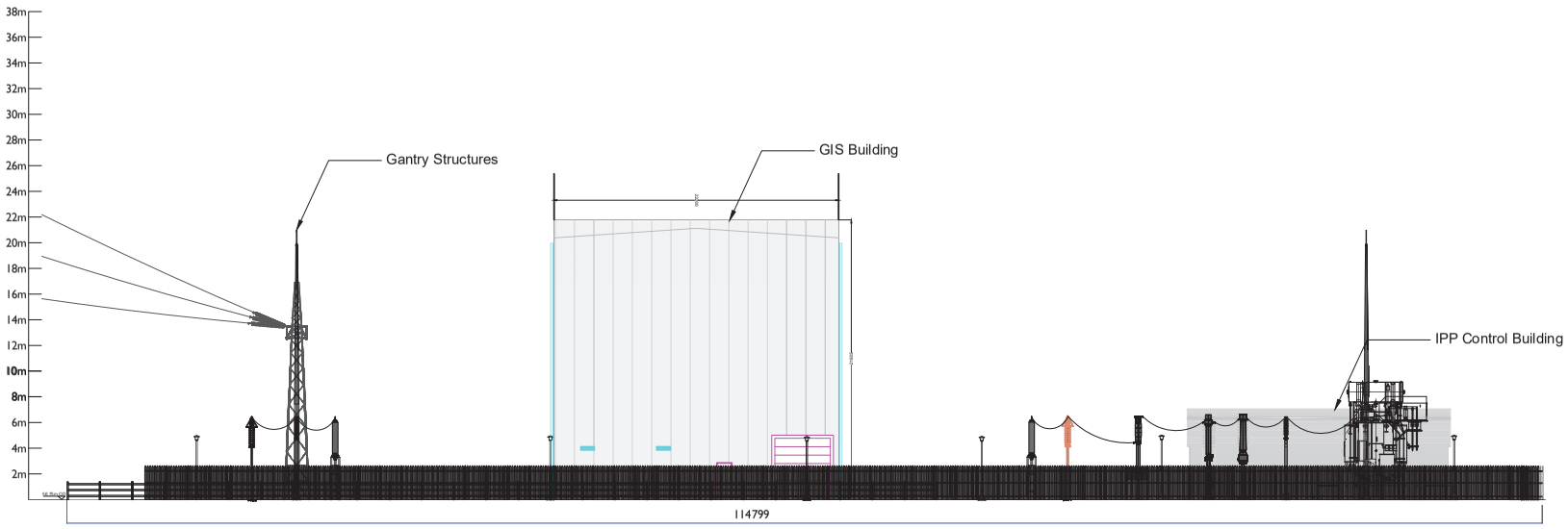
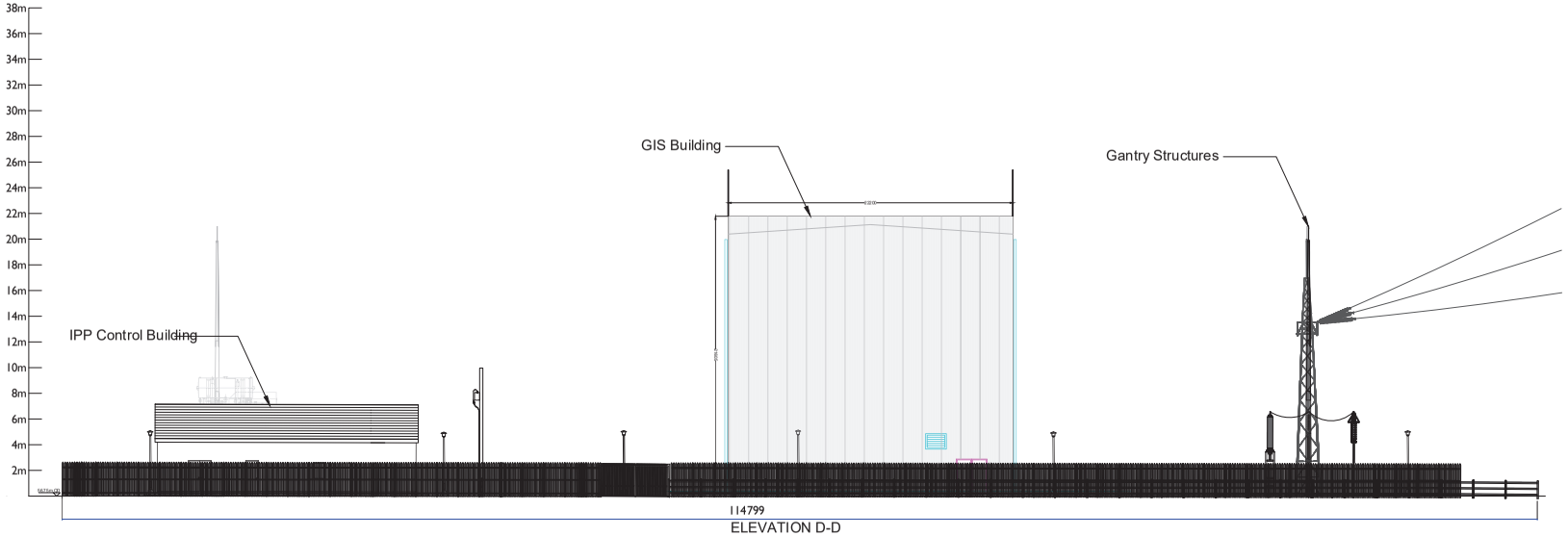


ELEVATION C-C



ELEVATION D-D

Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. BUILDING COLOURS WILL RANGE WITHIN A MUTED MID-DARK GRAY AND GREEN SPECTRUM. REFER TO EIAR VOL. II, APPENDIX 10A FOR INDICATIVE DETAIL
4. FINAL DETAIL OF BUILDING FINISHES TO BE AGREED WITH PLANNING AUTHORITY IN ADVANCE OF DEVELOPMENT COMMENCING

PROJECT TITLE:

Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:

220kV Substation Compound Elevations

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-22	1:200 @ A1

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
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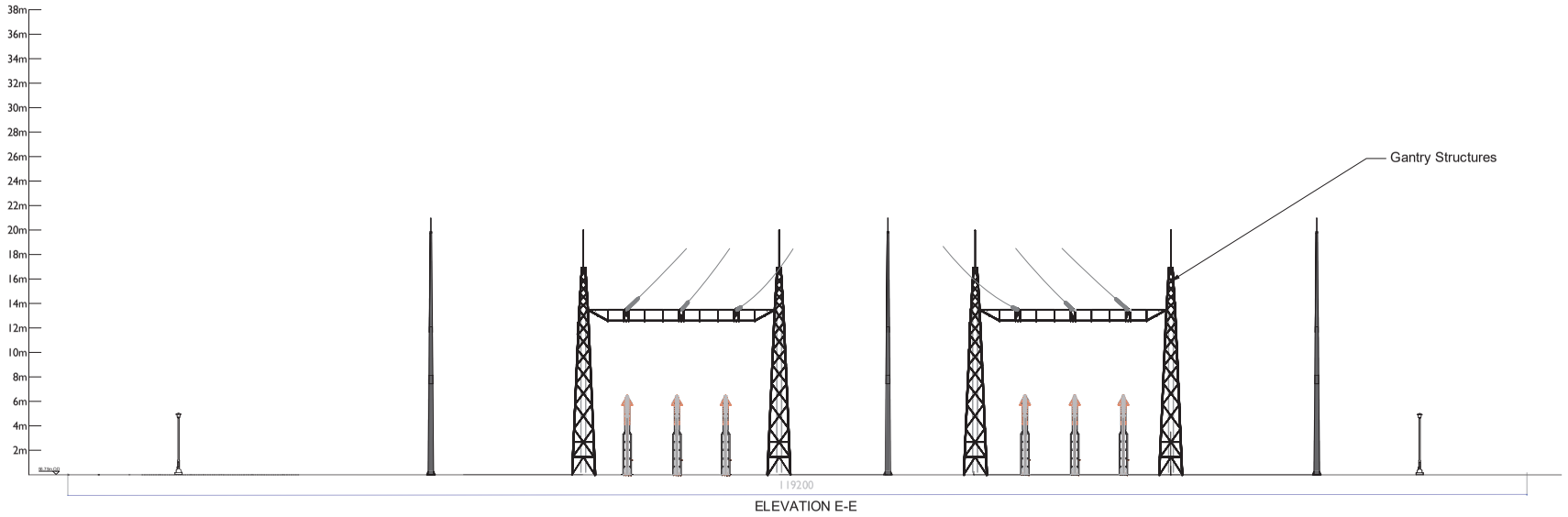
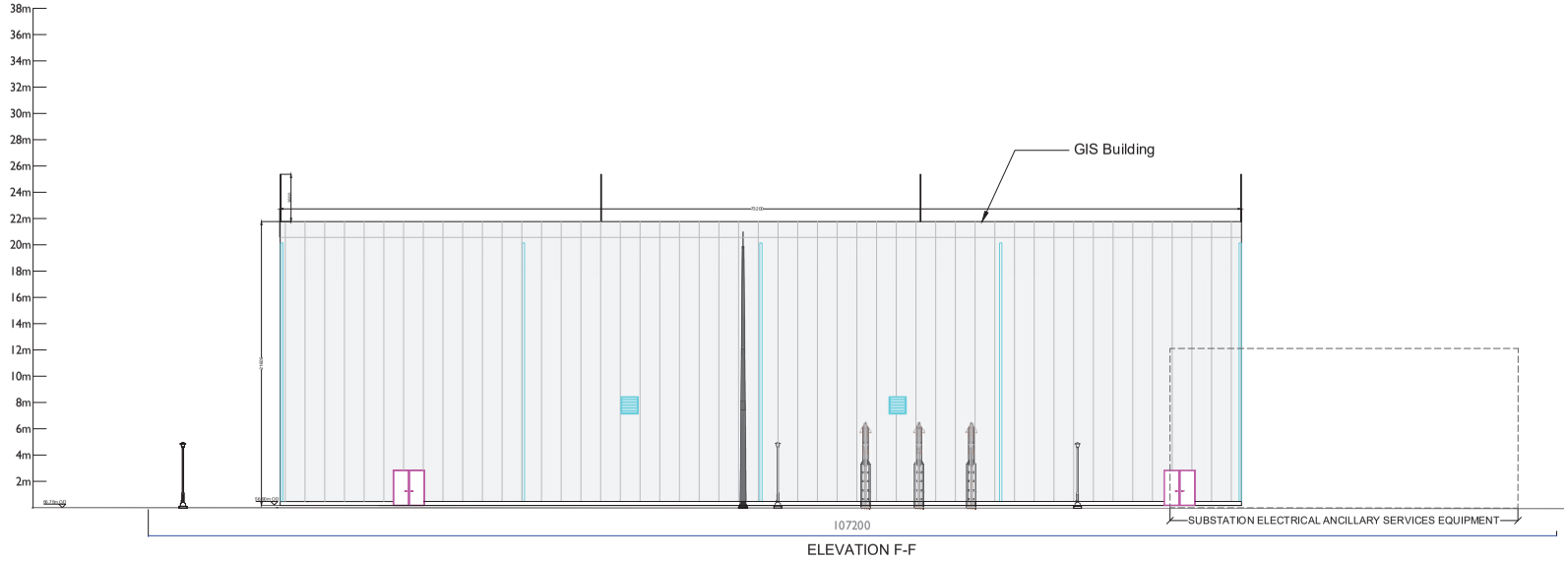
Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. BUILDING COLOURS WILL RANGE WITHIN A MUTED MID-DARK GRAY AND GREEN SPECTRUM. REFER TO EIAR VOL. II, APPENDIX 10A FOR INDICATIVE DETAIL
4. FINAL DETAIL OF BUILDING FINISHES TO BE AGREED WITH PLANNING AUTHORITY IN ADVANCE OF DEVELOPMENT COMMENCING



ELEVATION E-E



ELEVATION F-F

PROJECT TITLE: **Lemanaghan Wind Farm, Co. Offaly**			
DRAWING TITLE: **220kV Substation Compound Elevations**			
PROJECT No.: **200804**		DRAWING No.: **Figure 4-23**	SCALE: **1:200 @ A1**
DRAWN BY: **FB**	CHECKED BY: **GO**	DATE: **24.03.2026**	REVISION.: P01

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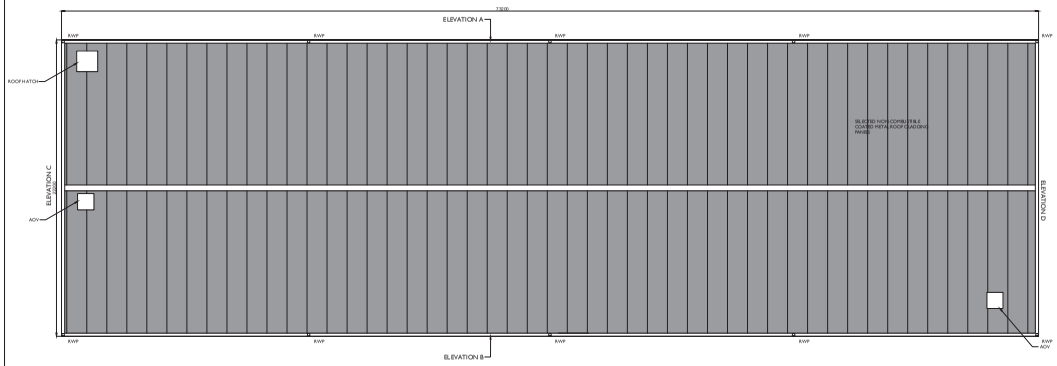
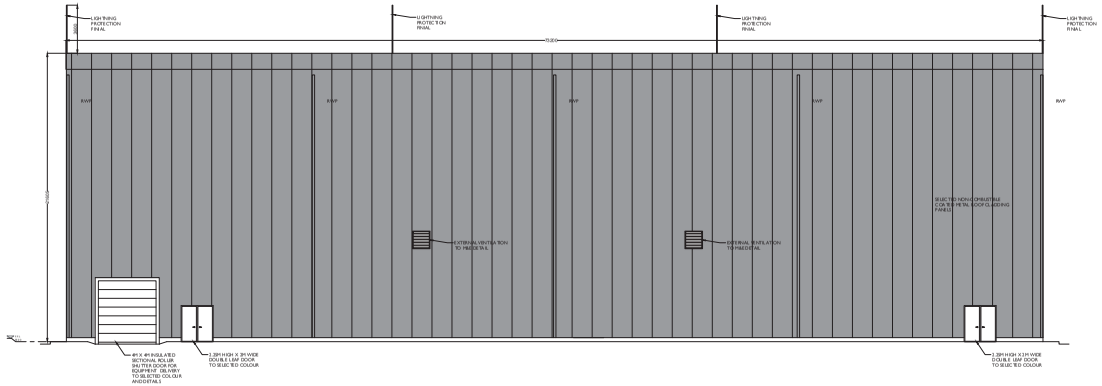
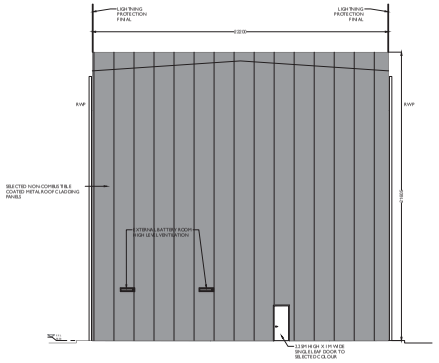


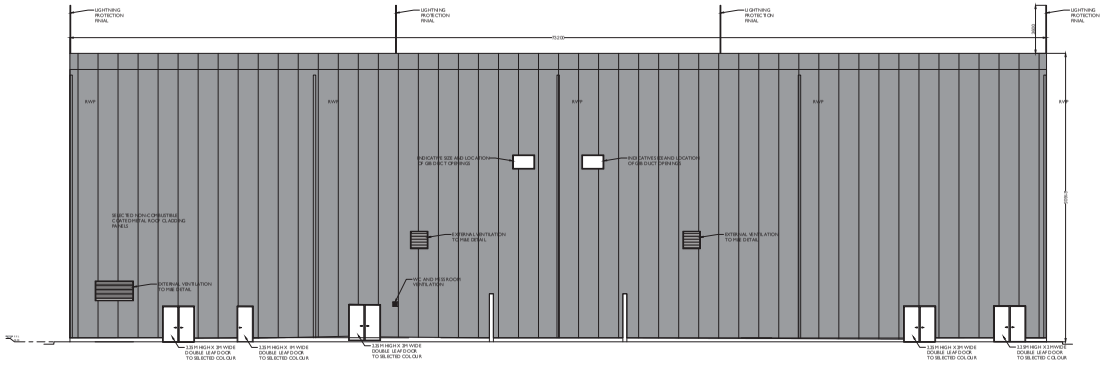
ROOF PLAN



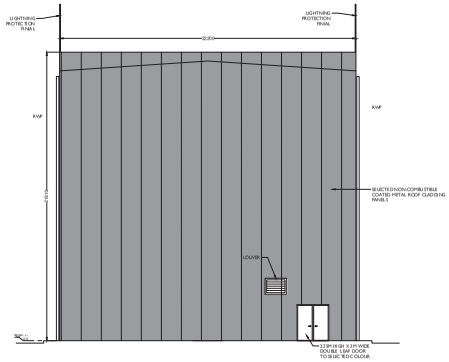
ELEVATION A



ELEVATION C



ELEVATION B



ELEVATION D

Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. FINAL DETAIL OF BUILDING FINISHES TO BE AGREED WITH PLANNING AUTHORITY IN ADVANCE OF DEVELOPMENT COMMENCING

PROJECT TITLE: **Lemanaghan Wind Farm, Co. Offaly**			
DRAWING TITLE: **GIS Building Floor Plan and Elevations**			
PROJECT No.: **200804**		DRAWING No.: **Figure 4-24**	SCALE: **1:200 @ A1**
DRAWN BY: **FB**	CHECKED BY: **GO**	DATE: **23.03.2026**	REVISION.: P01

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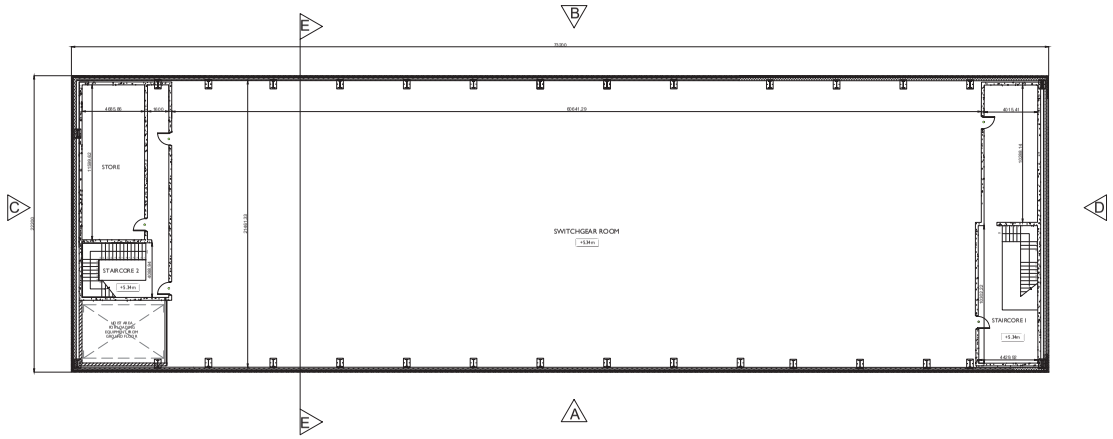
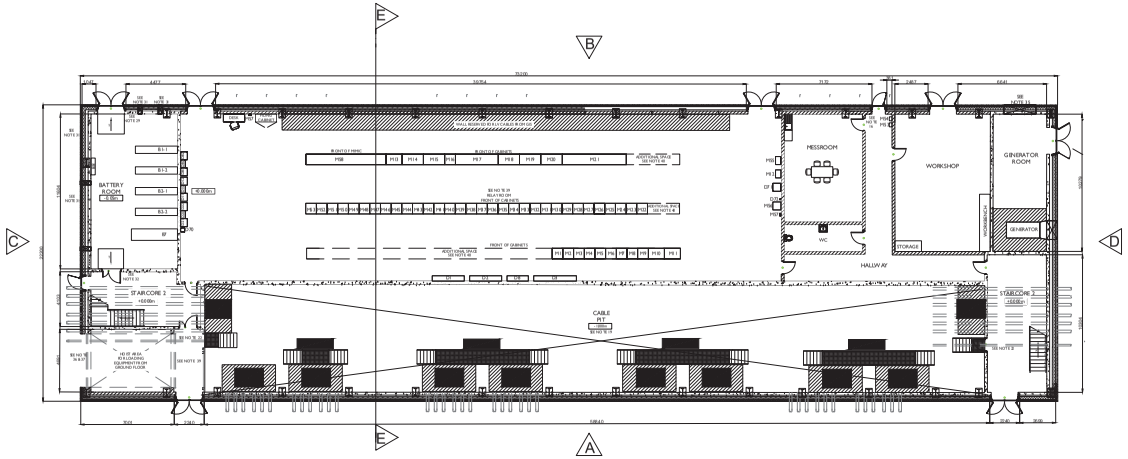


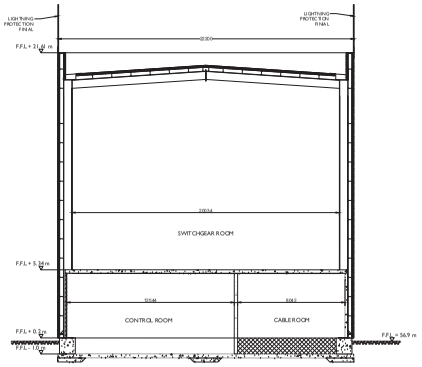
GIS BUILDING FIRST FLOOR PLAN

Scale 1:200



GIS BUILDING GROUND FLOOR PLAN

Scale 1:200



SECTION E-E'

Scale 1:200

Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. FINAL DETAIL OF BUILDING FINISHES TO BE AGREED WITH PLANNING AUTHORITY IN ADVANCE OF DEVELOPMENT COMMENCING

PROJECT TITLE: **Lemanaghan Wind Farm, Co. Offaly**			
DRAWING TITLE: **GIS Building Floor Plan and Section**			
PROJECT No.: **200804**		DRAWING No.: **Figure 4-25**	SCALE: **1:200 @ A1**
DRAWN BY: **FB**	CHECKED BY: **GO**	DATE: **25.03.2026**	REVISION.: P01

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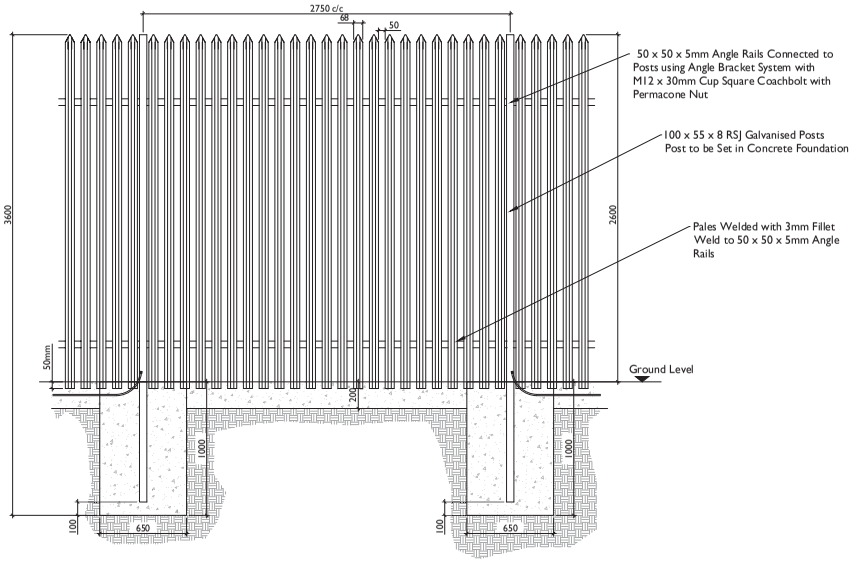
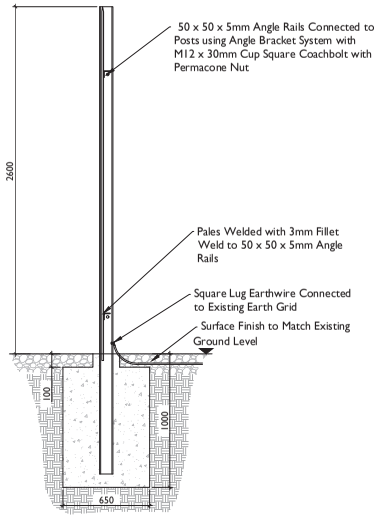
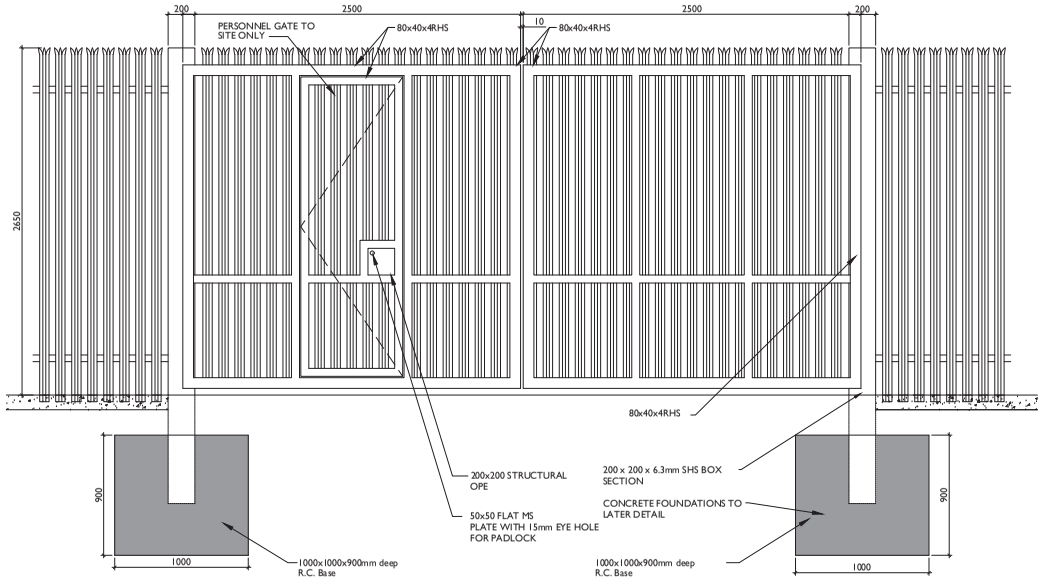


PALISADE FENCE - ELEVATION DETAIL



PALISADE FENCE - SECTION DETAIL



GATE DETAIL

Notes:

1. MEASUREMENTS SHOWN ARE IN MM, UNLESS INDICATED OTHERWISE
2. DRAWING FOR PLANNING PURPOSES ONLY
3. DRAWINGS ARE NOT TO BE SCALED. USE FIGURED DIMENSIONS ONLY
4. GROUND LEVELS VARY

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Palisade Fence and Gate details

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-26	1:20 @ A1

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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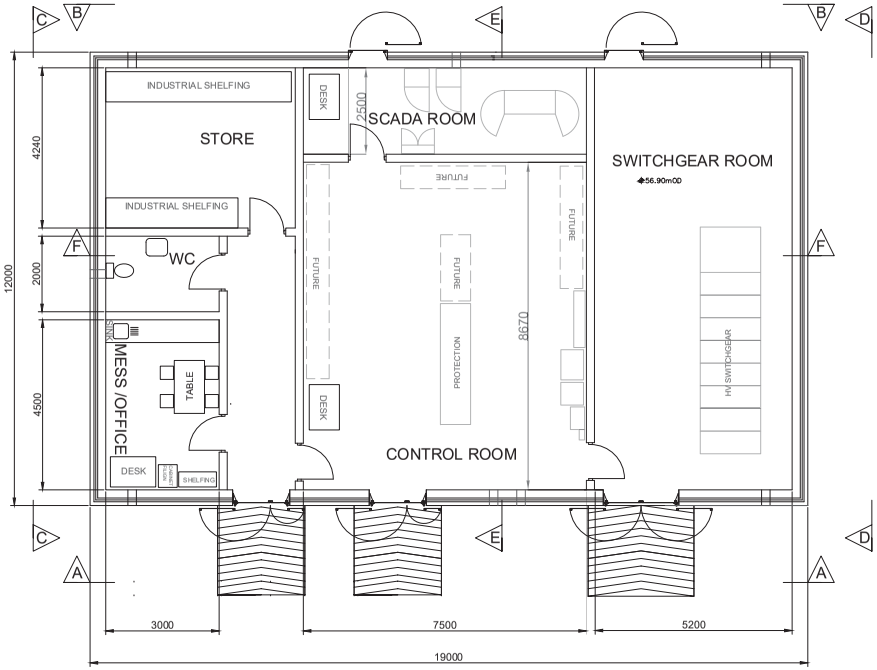
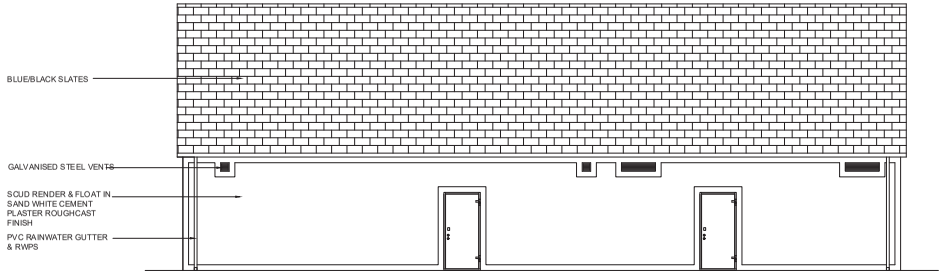
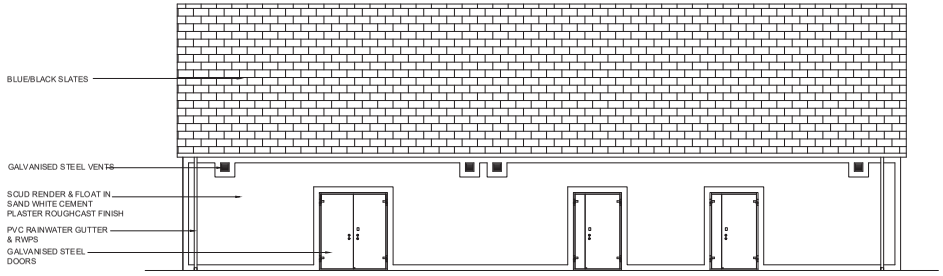
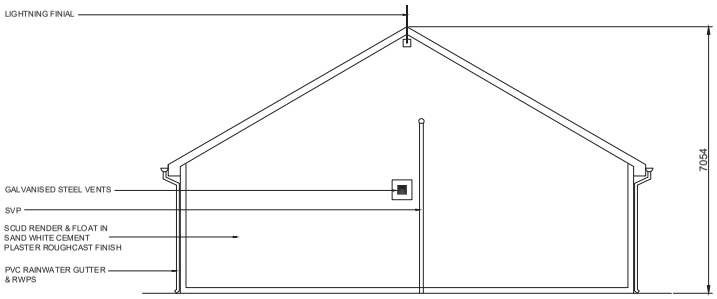




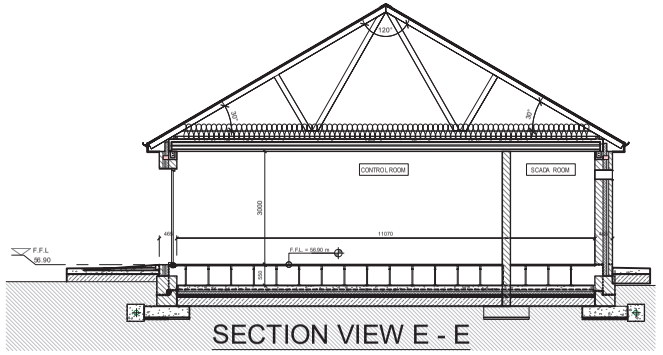
ELEVATION VIEW A - A



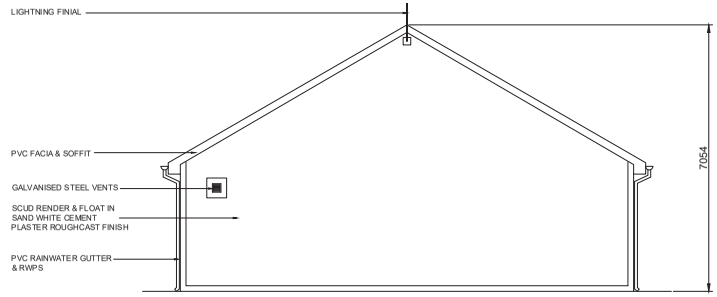
ELEVATION VIEW B - B



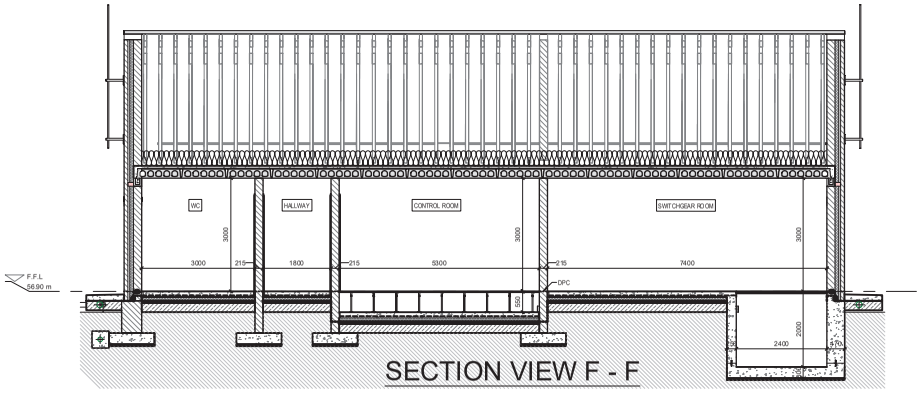
ELEVATION VIEW C - C



SECTION VIEW E - E



ELEVATION VIEW D - D



SECTION VIEW F - F

NOTES:

1. ALL DIMENSIONS NOTED ARE IN MM
2. DRAWING IS FOR PLANNING PURPOSES ONLY
3. PANEL LAYOUT & DIMENSIONS ARE INDICATIVE.
4. APPARATUS IN RED LINE DEPICTS FUTURE DEVELOPMENT
5. ALL BUILDING MATERIALS ARE TO BE APPROVED BY THE ASSIGNED CERTIFIER AND SHALL BE IN ACCORDANCE WITH REGULATION & SPECIFICATION REQUIREMENTS

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
IPP Control Building Plan and Elevations

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-27	1:100 @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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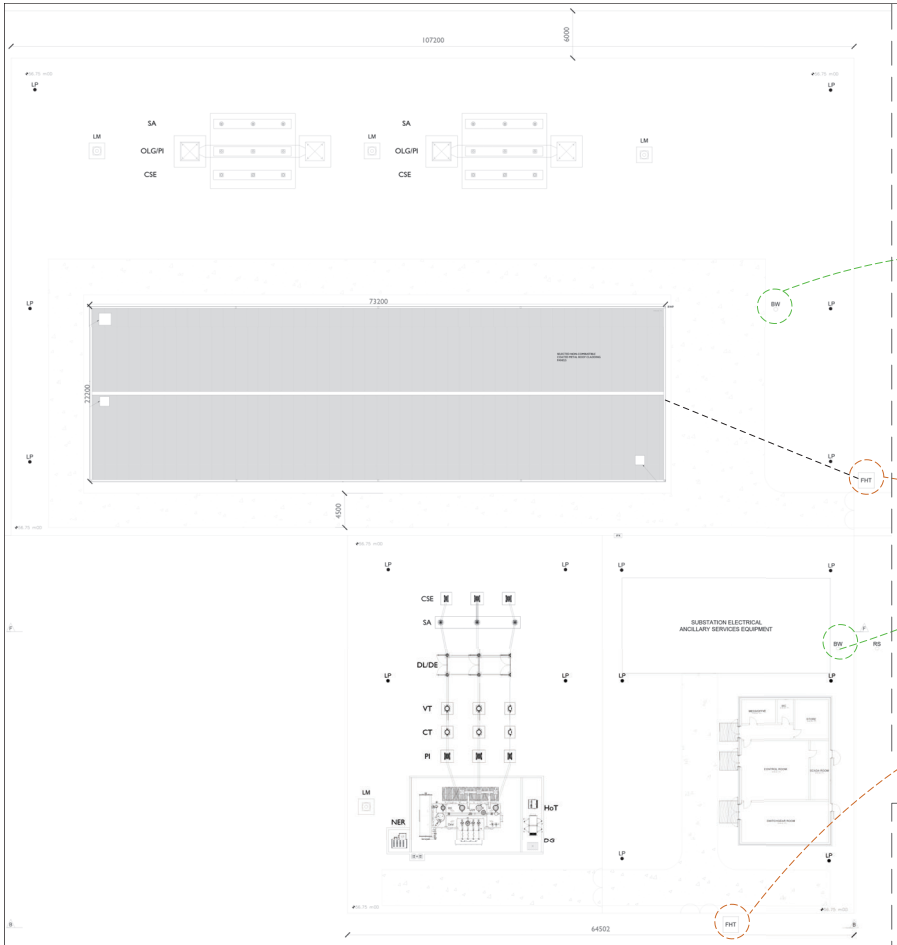
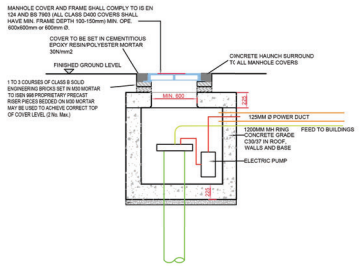
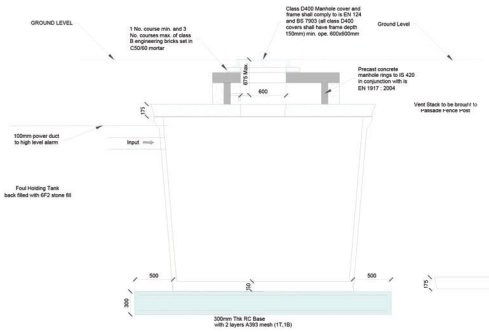


NTS



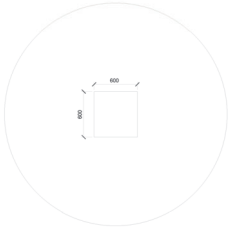
BORED WELL DETAIL
Scale: 1:50



TANK VERTICAL SECTION

LID SECTION

TANK TOP PLAN



LID TOP PLAN

FOUL SEWER HOLDING TANK
(Volume 5m³)
Scale: 1:50

Note:
All dimensions are in millimetres, unless noted otherwise.

All dimensions to be checked on site and any discrepancy to be reported to the engineer.

Figured dimensions only to be used, drawings not to be scaled. If in doubt ask.

For illustration purposes only. Exact size and appearance of unit subject to manufacturer selection.

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Foul Holding Tank & Bored Well Detail

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-28	As Shown @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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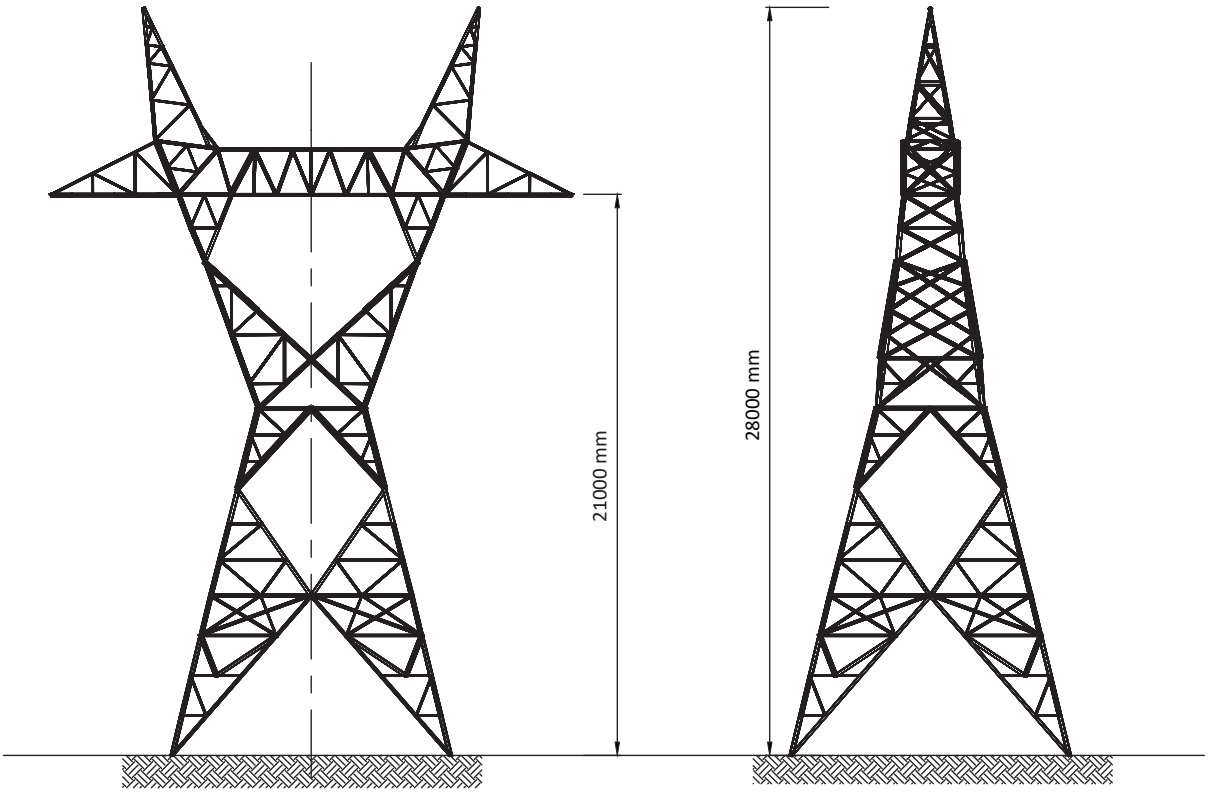
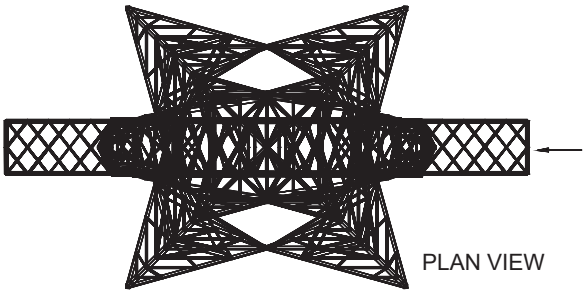
NOTES:

1. ALL DIMENSIONS NOTED ARE IN MM
2. DRAWING IS FOR PLANNING PURPOSES ONLY
3. TOWER INSULATOR ANGLE WILL VARY TO SUIT APPLICATION
4. EQUIPMENT/STRUCTURE DETAILS ARE INDICATIVE AND WILL BE FINALISED DURING DETAILED DESIGN
5. DETAILED DESIGN SHALL BE CARRIED OUT IN LINE WITH SYSTEM OPERATOR AND ASSET OWNER SPECIFICATIONS



FRONT ELEVATION

SIDE ELEVATION

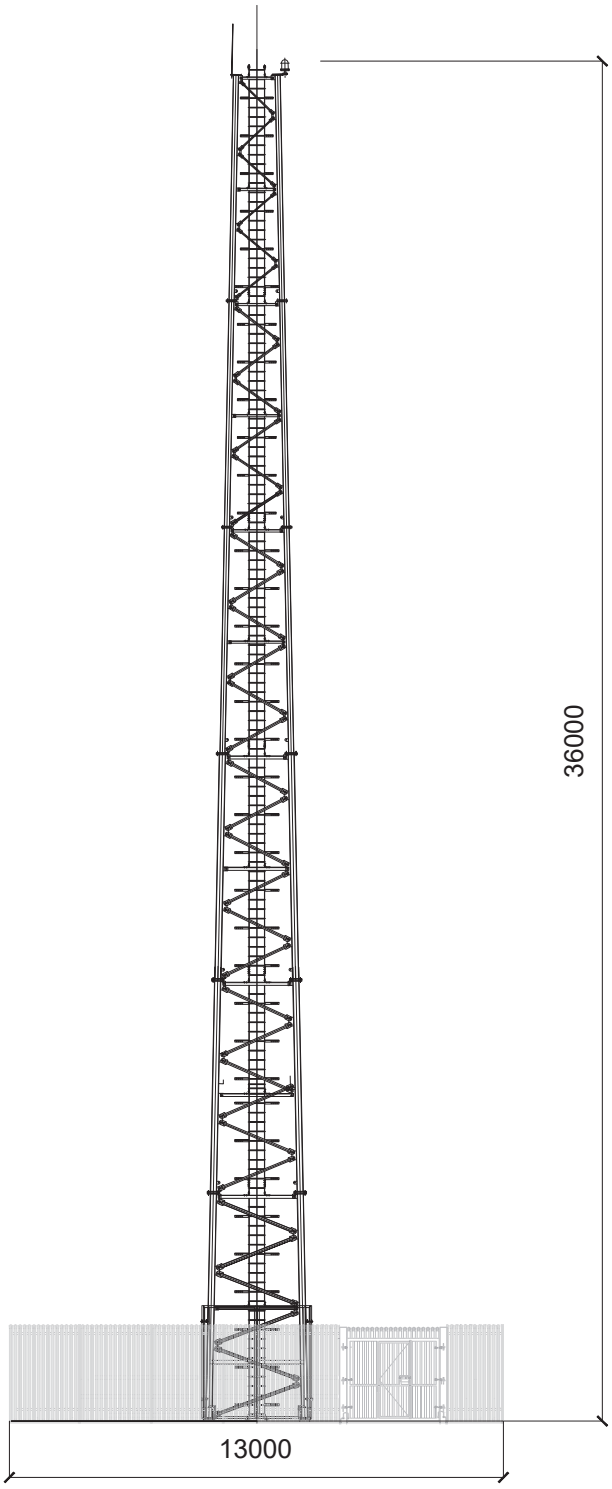


SIDE VIEW

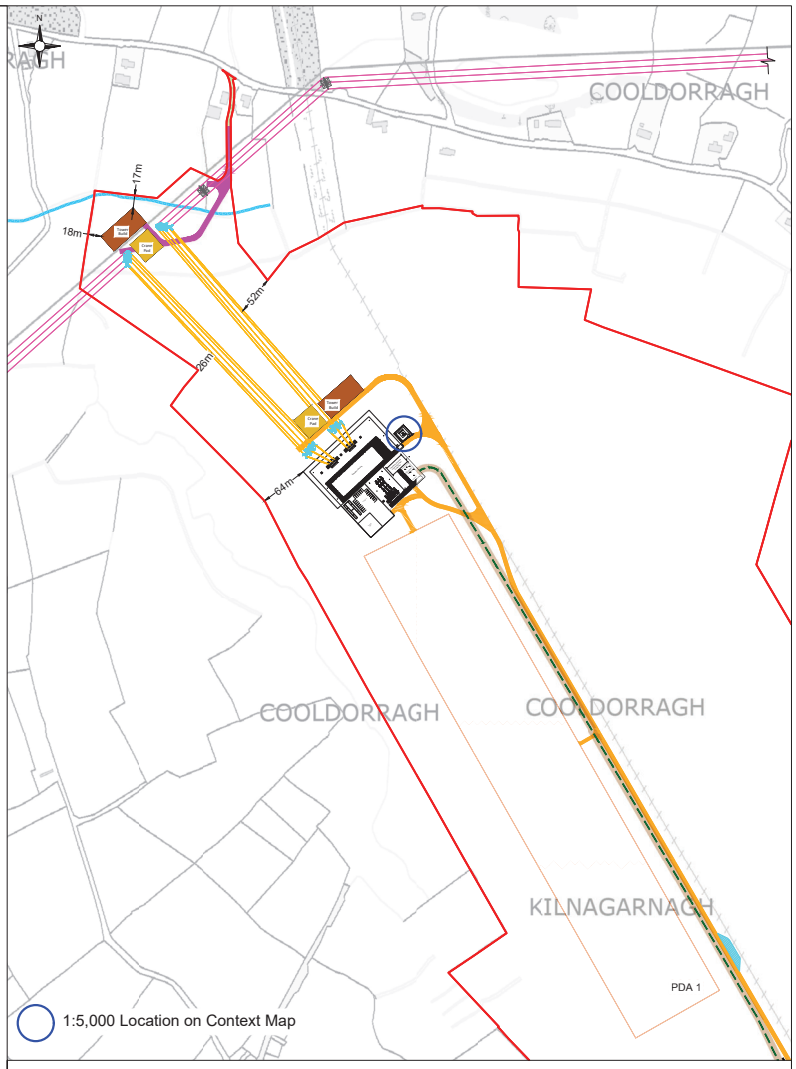
PLAN VIEW

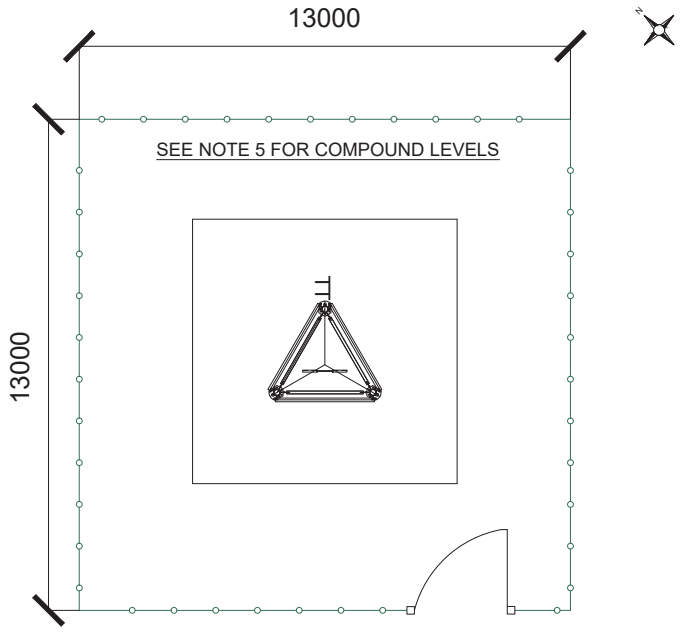
PROJECT TITLE: Lemanaghan Wind Farm, Co. Offaly			
DRAWING TITLE: 220 kV Overhead Line 28m Tower			
PROJECT No.: 200804		DRAWING No.: Figure 4-29	SCALE: 1:200 @ A3
DRAWN BY: FB	CHECKED BY: GO	DATE: 23.03.2026	REVISION.: P01

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



TELCOM TOWER STRUCTURE VIEW
Scale: 1:100





TELECOM TOWER COMPOUND
Scale: 1:100

NOTES:

1. ALL DIMENSIONS NOTED ARE IN MM
2. DRAWING IS FOR PLANNING PURPOSES ONLY
3. EQUIPMENT/STRUCTURE DETAILS ARE INDICATIVE AND WILL BE FINALISED DURING DETAILED DESIGN
4. DETAILED DESIGN SHALL BE CARRIED OUT IN LINE WITH SYSTEM OPERATOR AND ASSET OWNER SPECIFICATIONS
5. COMPOUND LEVELS AS FOLLOWS: (56.45mOD + 0.3m FREEBOARD)

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Telecom Tower

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-30	As shown @ A2

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
GO	RD	23.03.2026	D04

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

4.4.3 Peat and Spoil Management Plan

4.4.3.1 Quantities

The approximate quantity of peat and non-peat material (spoil) requiring management on the Proposed Project site has been calculated and is presented in Table 4-3 below. These quantities were calculated as part of the Peat and Spoil Management Plan in Appendix 4-3 of this EIAR.

Table 4-3 Approximate Peat and Spoil Volumes Requiring Management

Proposed Project Component	Peat Volume (m^3)	Spoil Volume (m^3)
15 no. Turbines and Hardstanding Areas	158,466	25,535
Internal Roads	9,790	37,456
Temporary Construction Compounds	0	0
Substation	12,170	3,651
Telecoms Tower	248	74
Steel Masts OHL (North of Substation)	3,390	282
Steel Masts OHL (under OHL)	753	2,636
Met Mast	2,063	248
Crane Pad for Steel Mast OHL (North of Substation)	990	297
Crane Pad for Steel Mast OHL (under OHL)	990	297
Tower Building (North of Substation)	1,540	462
Tower Building (under OHL)	1,540	462
Borrow Pits	15,587	159,522
Total	**207,527m^3**	**230,922m^3**
Total Peat and Spoil to be managed (m^3)		**438,449m^3**

Note, a factor of 10% (bulking factor of 5% and contingency factor of 5%) has been applied and is included in the excavated peat and spoil volumes above to allow for the expected increase in volume upon excavation and to allow for a variation in ground conditions across the site.

4.4.3.2 Peat Deposition Areas

It is proposed to manage any excess overburden generated through construction activities within the Proposed Project site, in 2 no. peat deposition areas, as shown in Figure 4-1, in linear berms along access roads where appropriate, and landscaping. A detailed breakdown of the capacity of the site to store peat and spoil is shown in Table 4-4 below, and is further detailed in the Peat and Spoil Management Plan (Appendix 4-3).

Table 4-4 Proposed Project site storage capacity

Location	Peat Volume (m^3)	Comment
Landscaping (2)	30,000	It is estimated that approximately 2,000m3of peat will be required for landscaping purposes at each of the 15 no. turbine locations.
Side Casting	10,710	See Drawings P20-216-0600-0023 to 0026 of the PSMP (Appendix 4-3) for further details. The side casting will be comprised of peat and spoil placed along the access roads.
Borrow Pits	608,600	The Borrow Pits will store both excavated peat and spoil upon reinstatement. See Drawings P20-216-0600-0019 to 0020 of the PSMP (Appendix 4-3) for further details.
Peat Deposition Areas	175,000	These areas will be for peat storage only. See Drawing P20-216- 0600-0021 to 0022 of the PSMP (Appendix 4-3) for further details.
Total Volume	**824,310m^3**	

As identified in Table 4-4, the total volume of peat requiring management on site is estimated at 207,5276m^3. Peat material will be excavated and deposited in the peat deposition areas, with a total capacity volume of 175,000m^3. Peat and spoil material will also be placed within the 4 no. proposed borrow pits (608,600m^3 storage capacity), sidecast along access roads with gentle gradients, and landscaped. As such, there is enough capacity within the site for the total volumes of peat requiring management for the Proposed Wind Farm as detailed in Table 4-4 above.

Measures outlined in the Peat and Spoil Management Plan in Appendix 4-3, particular recommendations/best practice guidelines for the placement of peat and spoil with respect to specific aspects of the Proposed Wind Farm will be considered and taken into account during construction.

The locations of the peat deposition areas (PDA) are outlined in Figure 4-29 below. The cross sections of each PDA is shown in the Site Layout Drawings in Appendix 4-1 and in Appendix 4-3 Peat and Spoil Management Plan

4.4.3.3 Borrow Pits

It is intended to obtain significant volumes of crushed stone that will be required for the construction of the Proposed Project from 4 no. proposed onsite borrow pits. The proposed borrow pits will be located in the townlands of Derrica More, Straduff, Kilnagoolny, and Tumbeagh within Co. Offaly and within the Proposed Project site.

Table 4-5 Proposed Onsite Borrow Pits

Borrow Pit No.	Townland	Total Area (ha)
1	Derrica More	0.29
2	Straduff	0.21
3	Kilnagoolny	1.93
4	Tumbeagh	3.55

Access to all 4 no. proposed borrow pits will be via internal access roads. Once the proposed borrow pits have been established, machinery and vehicle access to and from the proposed borrow pits during the construction phase (i.e., use and reinstatement) will be via internal roads only.

As part of the construction phase, the proposed borrow pits will be infilled with excavated peat (detailed in Section 4.11.1.7 below) after all required material for construction has been excavated. By the end of the construction phase the proposed borrow pits will be reinstated and either reseeded or left to revegetate naturally. Please see Figure 4-1 for proposed borrow pit locations and Figures 4-30 to Figure 4-33 for plan and cross section details of all proposed borrow pits.

The anticipated maximum volume to be extracted from the proposed borrow pits for the construction of the Proposed Project is 15,587m^3 of peat and 159,522m^3 of spoil. The figures presented are the anticipated maximum volumes; however, the actual volumes to be removed from the proposed borrow pits will be confirmed at the time of construction and following detailed pre-construction site investigation works.

In addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher quality, surfacing granular fill and sand will be sourced from local, authorised quarries. Please see Section 4.7.2 below for further details on the delivery of engineering fill and higher-quality, surfacing granular fill and stone and ready-mix concrete to the Proposed Project site.

Extraction from the 4 no. proposed borrow pits will be from above and below the water table. Where extraction is above the water table, refuelling areas may be provided within the pit to allow for ease of work. The refuelling area will consist of a concrete slab upon which the fuel bowser will sit. This slab is designed to retain any fuel spillage which would fall to the center of the slab. Drainage is via an interceptor. An oil spill kit will be stationed there also.

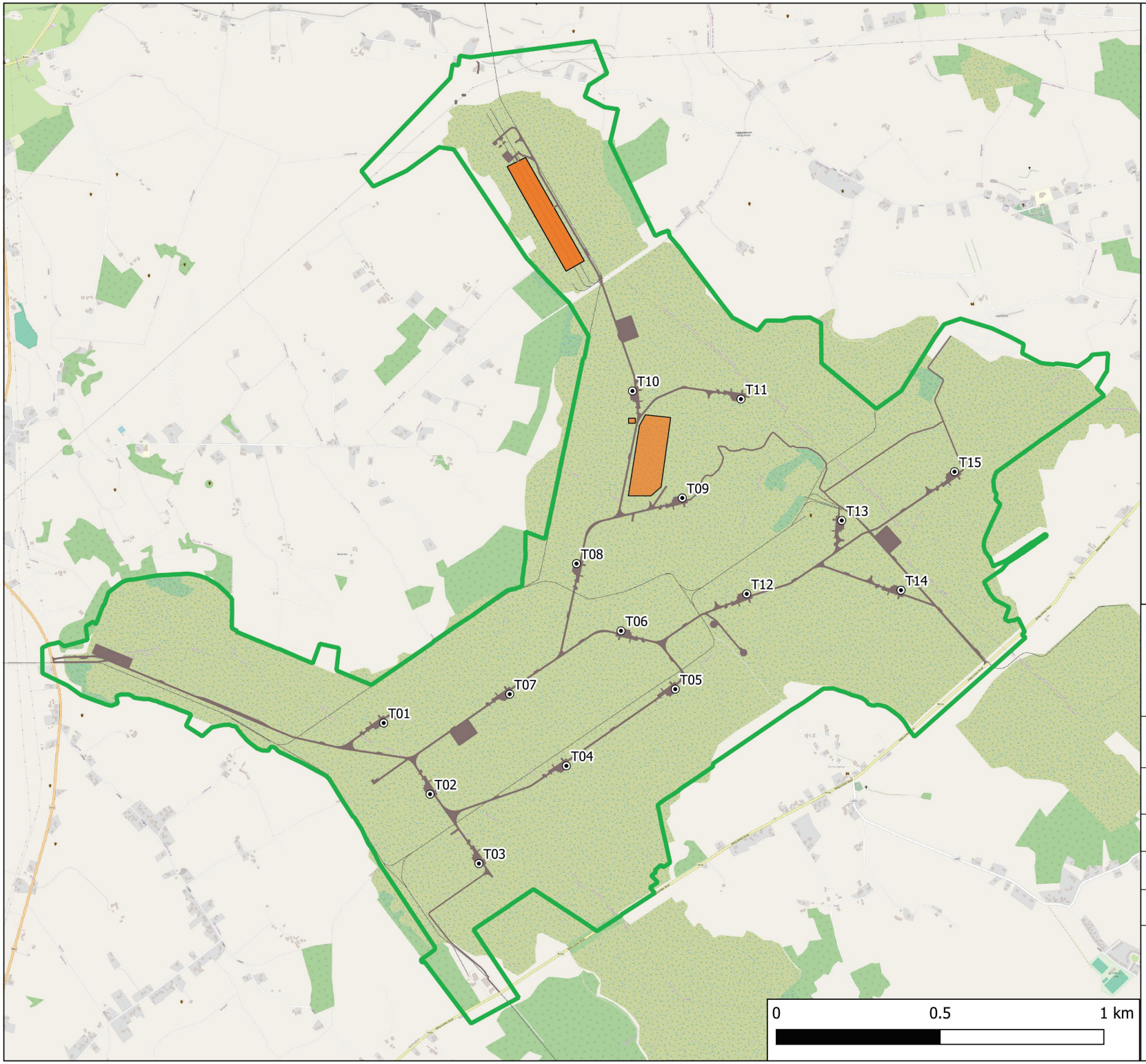
The construction of the proposed borrow pits will follow a standard sequence as follows:

1. *The rock within the proposed borrow pit footprints will be removed by breaking based on assessment of its excavatability, which has been determined from a ground investigation carried out at the proposed borrow pits.*
2. *It may be possible to excavate the rock from the borrow pits whilst leaving in place upstands/segments of intact rock which will retain the placed peat and spoil in individual cells. The upstands/segments of intact rock will essentially act as engineered rock buttresses within the borrow pits, forming a series of cells (up to 4 no.). The cells will be opened in sequence and filled as needed.*
3. *Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance.*
4. *Where it is not possible to leave upstands/segments of intact rock in place it will be necessary to construct rock buttresses founded on in-situ rock within the borrow pits to create individual cells.*
5. *The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells.*

6. *Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, leaving in place upstands/segments of intact rock which will help to retain the placed peat spoil and will allow the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely.*
7. *The rock buttresses shall be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress shall be constructed between 40 to 60 degrees.*
8. *A rock buttress will be required on the downslope side of the borrow pits to safely retain the infilled peat and spoil. The height of the berm constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil run-off. A berm up to 8m (max.) in height will be required.*
9. *A level surface in the underlying mineral soil or Weathered Bedrock will be prepared before placing and compacting the rock fill used to construct the berms.*
10. *The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings.*
11. *As the berms are slightly higher than the retained peat, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent.*
12. *A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits may be required.*
13. *The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits.*

As stated above, in addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher quality, surfacing granular fill and sand will be sourced from local, authorised quarries. For the purposes of assessment within the EIAR, 3 no. existing, authorised quarries, located within 20km of the Proposed Wind Farm have been selected and are shown in Figure 4-40. The proposed routes for heavy goods vehicles (HGVs) from each of the above identified quarries detailed in Section 4.7.2 below and shown on Figure 4-40.

It is also envisaged that construction traffic (including materials and staff) will travel to the site via the public road network to the relevant site entrance.



Map Legend

- EIAR Site Boundary
- Permanent Infrastructure Footprint
- Proposed Peat Deposition Areas

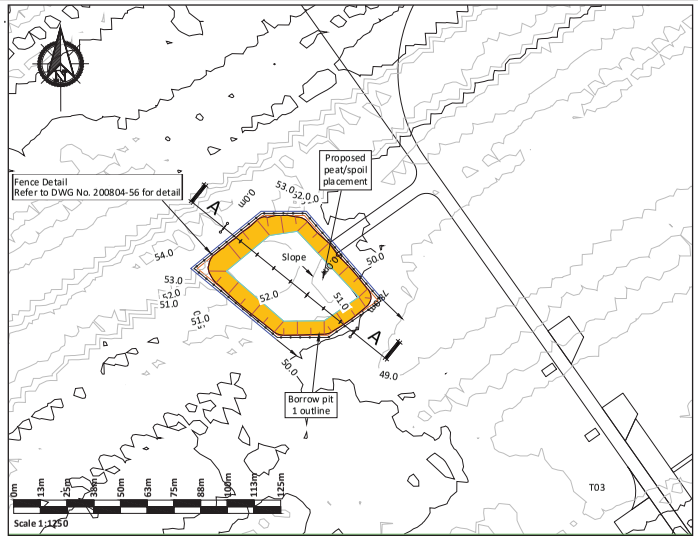
N

Drawing Title
Peat Deposition Areas within the Proposed Project site

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-31
Scale 1:22,500	Date 2026-02-10

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: www.mkoireland.ie



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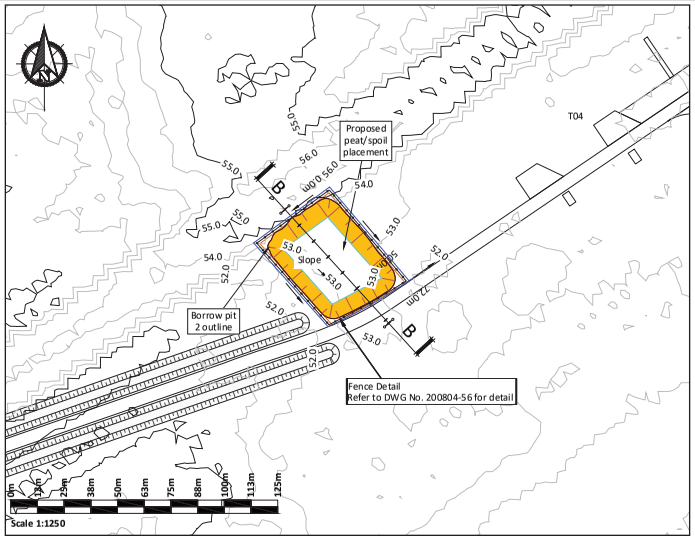

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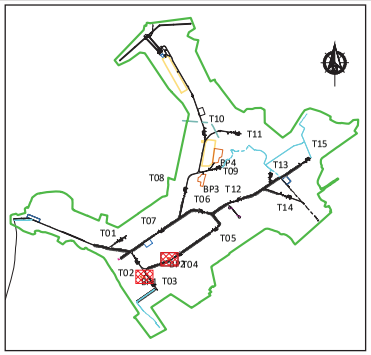


KEYPLAN
Scale 1:50000

Legend:

- EIAR Site Boundary
- Proposed Turbine & Hardstanding
- Proposed Internal Track
- Proposed Upgrade to Existing Internal Track
- Proposed New Amenity Track
- Existing Amenity Track
- Proposed Construction Compound
- Proposed Substation
- Proposed Met Mast
- Existing Pump Station
- Proposed Borrow Pit
- Proposed Peat Deposition Area
- Proposed Peat / Spoil Side Casting Berms
- Interceptor Drain
- Borrow Pit Perimeter Fence
- 50.0 Existing Ground Contour - Major
- 50.0 Existing Ground Contour - Minor
- Togher (Archeological Feature)

Volume Summary		
Name	2d Area (sq.m)	Cut (Cu. M.)
TotalExtractionVolume-BorrowPit-1	2,823.5	16,351.5
TotalExtractionVolume-BorrowPit-2	1,992.5	10,342.6

Borrow Pit Construction Notes:

(1) It is proposed to construct the borrow pit so that the base of the borrow pit is below the level of the adjacent section of access road.

(2) Slopes within the excavated rock formed around the perimeter of the borrow pit will be formed at stable inclinations to suit local in-situ rock conditions.

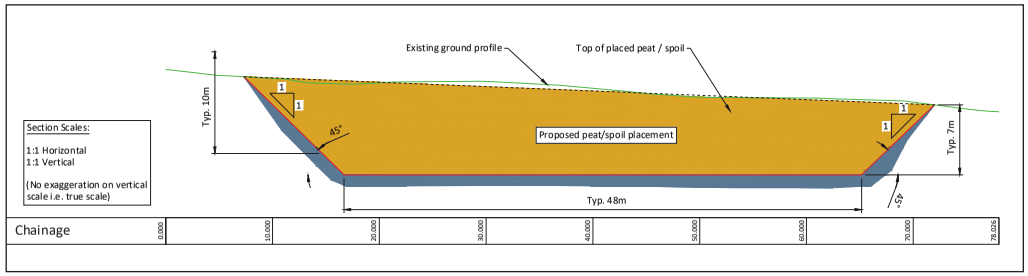
(3) Infilling of the peat & spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress.

(4) The Borrow Pits will only be partially backfilled to the required depth based on the peat and spoil generated during construction and will not be backfilled to the original ground surface.

(5) The surface of the placed peat & spoil will be shaped to allow efficient run-off of surface water from the placed arising's.

(6) Control of groundwater within the borrow pit may be required and measures will be determined as part of the ground investigation programme.

(7) All the above-mentioned general guidelines and requirements will be confirmed by the designer prior to construction.



BORROW PIT 1 SECTION A - A
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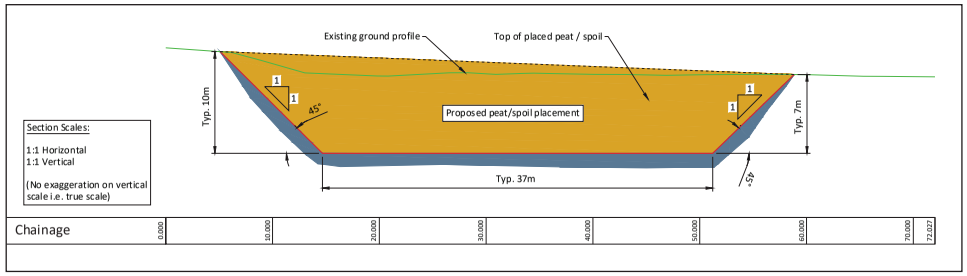

BORROW PIT 2 SECTION B - B
Scale 1:250

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Rev.	Description	App By	Date
B	FOR INFORMATION	BDH	17.04.25
C	FOR INFORMATION	BDH	22.05.25
D	FOR INFORMATION	BDH	30.05.25
E	FOR INFORMATION	BDH	27.06.25
F	FOR INFORMATION	BDH	22.07.25
G	FOR INFORMATION	BDH	22.01.26

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY

CLIENT: MKO

SHEET: BORROW PITS 1 AND 2

Date: 21.01.26
Project number: 200804
Scale (@ A1): As Shown
Drawn by: POR
Drawing Number: FIGURE 4-32
Rev: G
Checked by: AC

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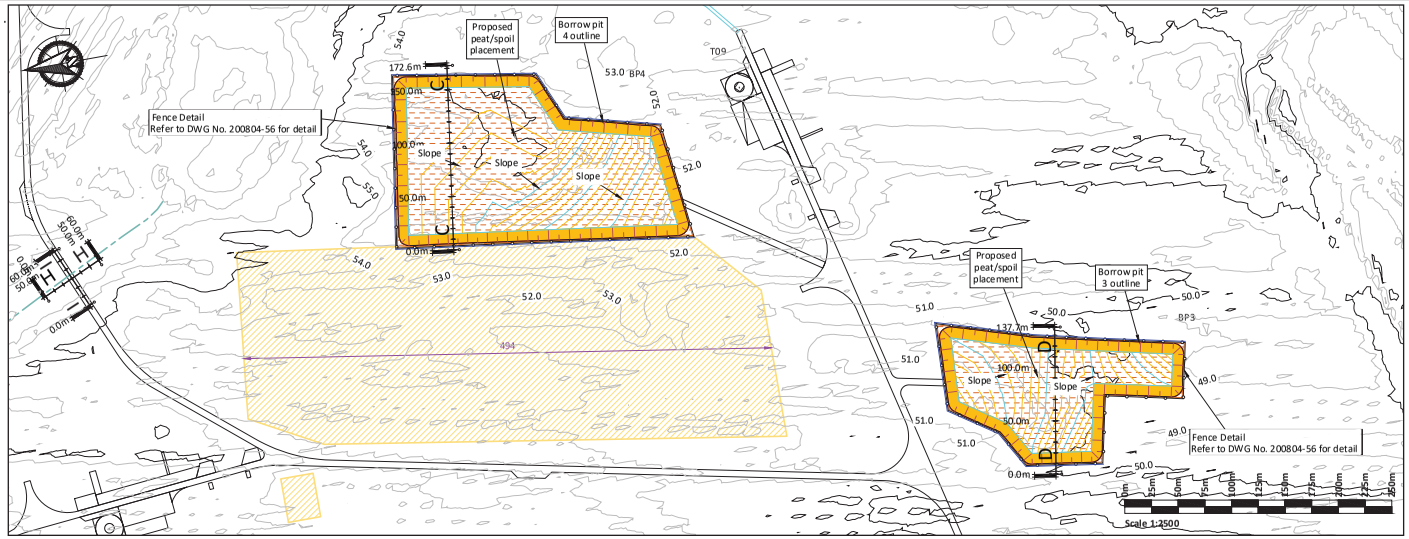
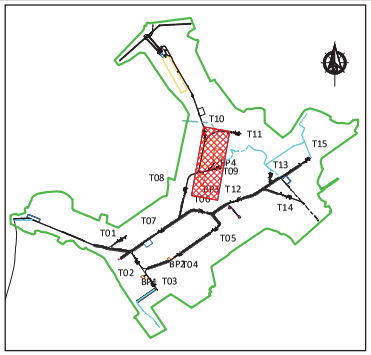
9 March 2026



PLAN

Scale 1:2500



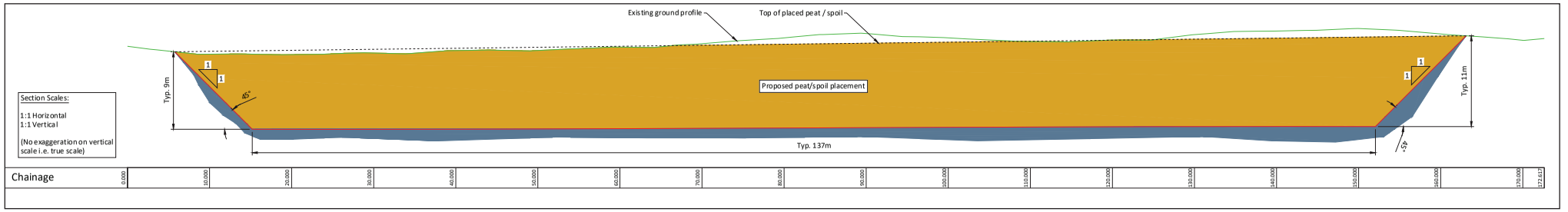
KEYPLAN

Scale 1:50000

Legend:

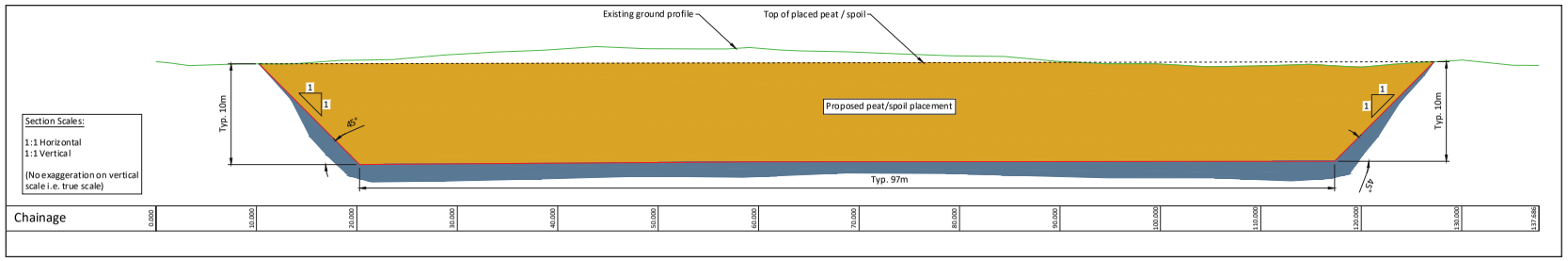
- EIAR Site Boundary
- Proposed Turbine & Hardstanding
- Proposed Internal Track
- Proposed Upgrade to Existing Internal Track
- Proposed New Amenity Track
- Existing Amenity Track
- Proposed Construction Compound
- Proposed Substation
- Proposed Met Mast
- Existing Pump Station
- Proposed Borrow Pit
- Proposed Peat Deposition Area
- Proposed Peat / Spoil Side Casting Berms
- Interceptor Drain
- Borrow Pit Perimeter Fence
- 50.0 Existing Ground Contour - Major
- 50.0 Existing Ground Contour - Minor
- Togher (Archeological Feature)

Volume Summary		
Name	2d Area (sq.m)	Cut (Cu. M.)
TotalExtractionVolume-BorrowPit-4	35,030.2	336,200.0
TotalExtractionVolume-BorrowPit-3	19,085.5	167,558.9



BORROW PIT 4 SECTION C - C

Scale 1:250



BORROW PIT 3 SECTION D - D

Scale 1:250

Borrow Pit Construction Notes:

(1) It is proposed to construct the borrow pit so that the base of the borrow pit is below the level of the adjacent section of access road.

(2) Slopes within the excavated rock formed around the perimeter of the borrow pit will be formed at stable inclinations to suit local in-situ rock conditions.

(3) Infilling of the peat & spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress.

(4) The Borrow Pits will only be partially backfilled to the required depth based on the peat and spoil generated during construction and will not be backfilled to the original ground surface.

(5) The surface of the placed peat & spoil will be shaped to allow efficient run-off of surface water from the placed arising's.

(6) Control of groundwater within the borrow pit may be required and measures will be determined as part of the ground investigation programme.

(7) All the above-mentioned general guidelines and requirements will be confirmed by the designer prior to construction.

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Rev.	Description	App By	Date
C	FOR INFORMATION	BDH	17.04.25
D	FOR INFORMATION	BDH	22.05.25
E	FOR INFORMATION	BDH	30.05.25
F	FOR INFORMATION	BDH	27.06.25
G	FOR INFORMATION	BDH	22.07.25
H	FOR INFORMATION	BDH	22.01.26

PROJECT: LEMANAGHAN WIND FARM, CO. OFFALY

CLIENT: MKO

SHEET: BORROW PITS 3 AND 4

Date: 22.01.26

Project number: 200804

Scale (@ A1): As Shown

Drawn by: POR

Checked by: AC

Drawing Number: FIGURE 4-33 (Sheet set subset 0800)

Rev: H

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9 March 2026

4.5 Site Activities

4.5.1 Environmental Management

All proposed activities on the Proposed Project site will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR.

The CEMP includes details of drainage, peat and spoil management, and waste management, and clearly outlines 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 that planning permission is granted for the Proposed Project, 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.

4.5.2 Refuelling

Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site in appropriately bunded containers.

On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double-skinned fuel bowser. The fuel bowser, a double-axle, custom-built refuelling trailer, will be re-filled off site and will be towed around the Proposed Project site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Project. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use.

Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all onsite refuelling operations.

4.5.3 Concrete Deliveries

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. 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 (in dedicated concrete washout areas only, as described below), 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 truck's chute will be directed into a temporary, lined, impermeable containment area. Where temporary lined impermeable containment areas are used, such containment areas will be built using straw bales and lined with an impermeable membrane. Two examples are shown in Plate 4-4 and Plate 4-5 below.

The areas will be covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas will 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 4-4 Concrete washout area

Plate 4-5 Concrete Wash Out Area

Alternatively, a Siltbuster-type concrete wash unit or equivalent[3] 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 will 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.
- Site roads will be constructed to the required standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers 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 agreed with suppliers before work starts, agreeing routes, prohibiting on-site washout and to agree emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating that the washout of concrete trucks is not permitted on the site.

[3] https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/

4.5.4 Concrete Pouring

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries may be required outside normal working hours 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 completed in a single day per turbine.

Given the scale of the turbine base concrete pours which form part of the Proposed Wind Farm, the pours will be planned approximately 1 week in advance. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These will 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 (including drains and ditches) while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available, and used, when necessary, 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 truck's chute will be directed into a temporary, lined, impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent.
- Surplus concrete after completion of a pour will be taken off-site and disposed of at an appropriately authorised facility.

4.5.5 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 Project 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.

4.5.6 Vehicle Washing

Wheels or vehicle underbodies will be washed before leaving sites to prevent the build-up of mud on public (and site) roads. Internal access roads will be constructed before other road-going trucks begin to make regular or frequent deliveries to the site (e.g., with steel or concrete). The internal access roads will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

However, in the interest of best practice, wheel wash facilities will be provided. Figure 4-34 includes details of a proposed self-contained wheel wash system for use during the construction phase of works. A wheel wash will be located at each of the construction and delivery entrances as shown on the site layout drawings included as Appendix 4-1.

The contractor will be responsible for ensuring that all vehicles egressing the site have used the wheel wash facilities. However, a road sweeper will be made available by the contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project.

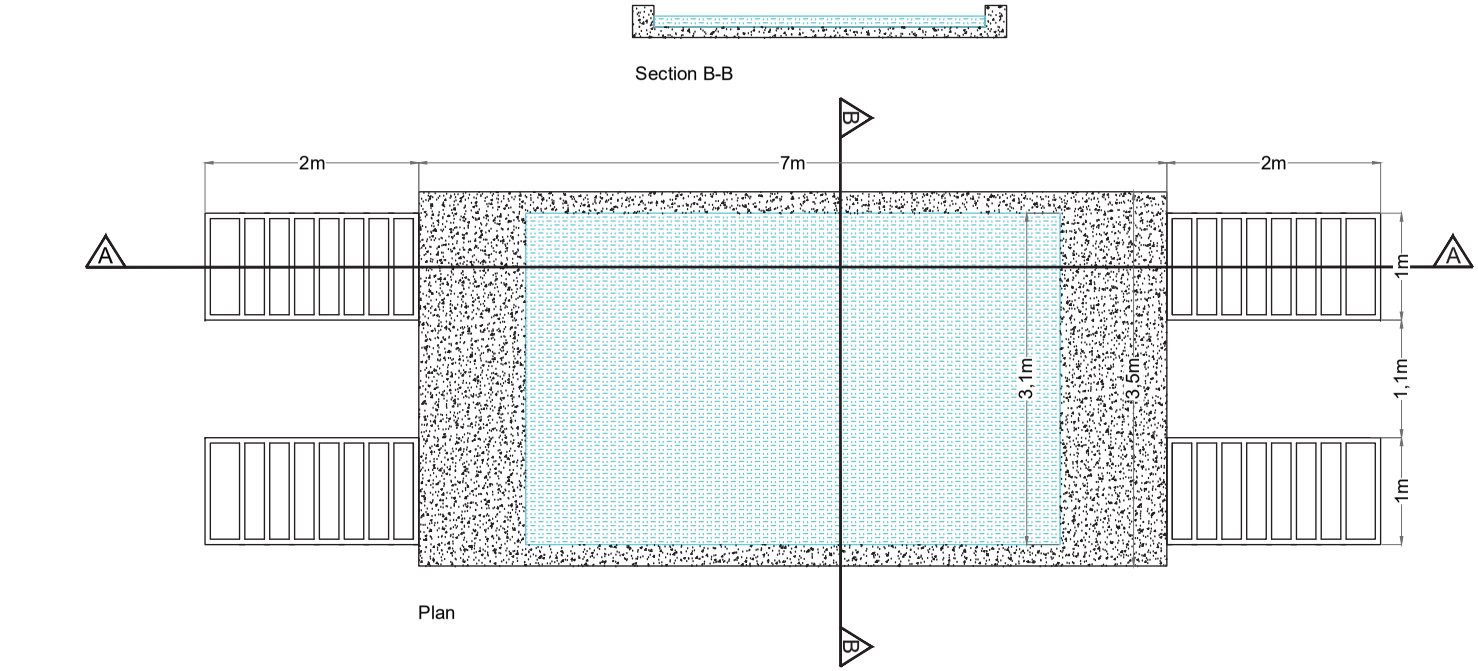
Note:

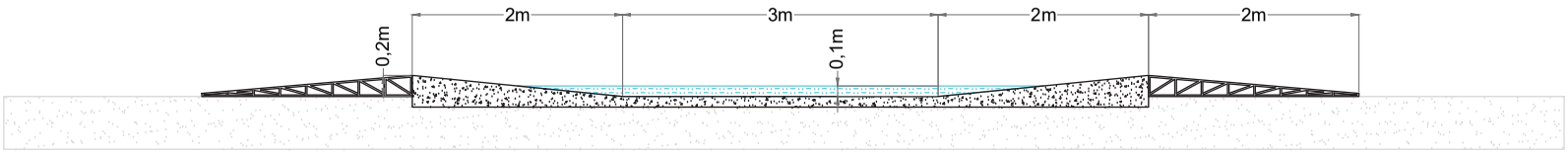
All dimensions are in meters, unless noted otherwise.

All dimensions to be checked on site and any discrepancy to be reported to the engineer.

Figured dimensions only to be used, drawings not to be scaled. If in doubt ask.

For illustration purposes only. Exact size and appearance of unit subject to manufacturer selection.





PROJECT TITLE:

Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:

Wheel Wash Detail

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-34	1:50 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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4.5.7 Waste Management

The Construction Environmental Management Plan (CEMP), Appendix 4-4 of this EIAR, provides a resource waste management plan (RWMP) which outlines the best practice procedures during the excavation, construction and decommissioning phases of the Proposed Project. The RWMP has been produced in line with the following guidance *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* (EPA, 2021)[4]. Disposal of waste will be a last resort. The RWMP has been prepared to outline the main objectives that will be adhered to for the preparation of a more detailed RWMP to be completed prior to the construction phase of the Proposed Project. The RWMP will be in place throughout the construction and decommissioning phase and will be in line with all relevant legislation detailed in Section 3.8 in Appendix 4-4.

The Waste Management Act 1996 (the Act) 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 Proposed Project site 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 authority so that they can ensure everyone working on the development adheres to the management plan.

The RWMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. The system will describe the waste types expected to be produced during the project and identify the waste management action proposed (please refer to Section 3.8 in Appendix 4-4). Estimates of the quantities to be produced will be inserted into a detailed waste management spreadsheet and the data will be updated as the work progresses, and information is available and performance against the estimates will be monitored. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The RWMP can then be adapted with changes that are observed through record keeping.

4.6 EPA IPC Licence Activities

Current activities onsite include site management and environmental monitoring as required under Integrated Pollution Control (IPC) Licence P0500-01[5] from the Environmental Protection Agency (EPA). Industrial scale peat extraction was permanently ceased by BnM in Lemanaghan Bog in June 2020. From June 2020 until the end of 2024, all remaining stockpiled peat was systematically removed from the Lemanaghan Bog. BnM's statutory duties to discharge the conditions of its Integrated Pollution Control Licence (IPC) Licence (Ref. P0500-01; hereafter "IPC Licence"), from the Environmental Protection Agency (EPA) for the Boora Bog Group, which encompasses Lemanaghan Bog also remain on-going. These ongoing duties, such as environmental monitoring, do not facilitate the continuation of peat extraction, but rather ensure compliance with BnM's extant IPC Licence.

[4] *EPA 2021 Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects. Available at: https://www.epa.ie/publications/circular economy/resources/CDWasteGuidelines.pdf*
[5] *Integrated Pollution Control License PO-500-01 issued by the EPA for the Boora Bog Group. Available at: https://epawebapp.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=P0500-01*

The IPC Licence is subject to 14. No. conditions pertaining to the ongoing monitoring and maintenance to ensure any emissions from site activities will comply with and not contravene, any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992. Conditions 1-4 of the licence outlined the Scope, Management, Interpretation and Notification procedures required by the BnM, respectively. Conditions 11 to 14 detail the Monitoring (equipment use), Recording and Reporting, Emergency Response and Financial Provisions duties of BnM. Conditions 5 to 10 pertain to environmental monitoring and management.

Irrespective of the consenting or construction of the Proposed Project, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing.

4.6.1 Peatland Rehabilitation Plan

It is also a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that following the decommissioning of use of all or part of their bogs, BnM, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Rehabilitation Plan. BnM have produced a Draft Rehabilitation Plan for Lemanaghan Bog, and it is the intention of BnM to rehabilitate the bog in a phased approach under IPC Licence. The Draft Rehabilitation Plan is included as Appendix 2-4 and is described below.

Rehabilitation work will commence immediately following the decommissioning of the Proposed Project. The Draft Rehabilitation Plan included provides a description of the Proposed Wind Farm and its ecology. It also provides a framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the Draft Rehabilitation Plan will be implemented.

Irrespective of the consenting or construction of the Proposed Project, the measures outlined in the Draft Rehabilitation Plan (Appendix 2-4) will be implemented by BnM in agreement with the EPA, per BnM's IPC Licence Obligations.

Table 4-7 outlines a high-level overview of the actions proposed and Table 4-8 gives a programme overview of when these works will be undertaken.

Table 4-7 Types of and areas for rehabilitation measures at Lemanaghan Bog

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	365
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	252
Wetland cutaway	WLT1	Modifying outfalls and managing water levels with overflow pipes	104
Marginal land	MLT1	No work required	102
Constrained area	Constraint	Constraint – windfarm infrastructure & active turbary	291
Total Area			**1,114**

**Note that the types of rehabilitation and areas of rehabilitation may change in response to stakeholder consultation and refinement of the rehabilitation measures.*

Table 4-8 Lemanaghan Bog Rehabilitation Programme. Please see Appendix 2-4 for more details.

Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
› The majority of the site is still bare peat. Bare peat areas within the older cutaway areas are reducing due to natural re-colonisation of the cutaway. A small part of the site has already re-vegetated, with pioneer vegetation developing a mosaic of typical cutaway peatland habitats including scrub and Birch woodland	› Seek formal approval of the rehabilitation plan from the EPA. › Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Lemanaghan Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies). › A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. › A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. › A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. › A review of remaining milled peat stocks is to be carried out. › An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. › Ensure all activities comply with the environmental protection requirements of the IPC Licence. › Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site. › Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan	› Carry out proposed measures as per the detailed site plan. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III to Appendix 2-4). › Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. › Carry out the proposed monitoring, as outlined in Section 9 in Appendix 2-4. › Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.	› Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary. › Delivery of a monitoring, aftercare and maintenance programme (See section 9.1 in Appendix 2-4). › Decommissioning of silt-ponds will be assessed and carried out, where required. › Reporting to the EPA will continue until the IPC License is surrendered.

4.7 Access and Transportation

4.7.1 Site Entrances

The Proposed Project site is currently served by a number of existing tracks and access roads due to its previous use of industrial peat etxraction. As part of the Proposed Project, it is proposed to upgrade 3 no. existing entrances and facilitate 2 no. new site entrances. These site entrances will be used throughout the construction, operation, and decommissioning phases of the Proposed Project to enable delivery of materials and turbine components (construction phase), amenity access and maintenance and monitoring use (operational phase), and removal of Proposed Project infrastructure (decommissioning phase).

Due to the nature of the Proposed Project, all proposed works will be local to the Proposed Project site and as such, the construction phase will utilise 4 no. site entrance locations. Of the 4 no. site entrance locations, 3 no. are existing site entrances that will be upgraded, and 1 no. is a proposed new entrance on the northern side of the L7002 local road. An existing agricultural site entrance off the L7001 local road network will also be upgraded to facilitate construction phase access to the Proposed Grid Connection infrastructure located under the existing Shannonbridge-Maynooth 220kV OHL. Use of existing road (which will be upgraded) and temporary construction track will be established from the existing entrance off the L7001 local road to the Proposed Grid Connection infrastructure located under the existing OHL. Following the construction of this infrastructure, this temporary track will be covered with a layer of topsoil and reseeded and the existing road and entrance will continue to facilitate agricultural activities. Please see Table 4-9 below for further detail.

The operational phase will utilise 4 no. site entrance locations to facilitate maintenance and monitoring activity and amenity access. Of the 4 no. locations, 3 no. are the same as the identified construction phase entrances and 1 no. is a new site entrance that will facilitate amenity access only. Please see Table 4-9 below for further detail.

All proposed site entrances were subject to a swept path analysis assessment to identify the turning areas required, as described in Section 15.1 of the Traffic and Transport Assessment. Appropriate sightlines will be established for the safe access and egress of traffic, please see Section 15.1 of Chapter 15: Material Assets for further information.

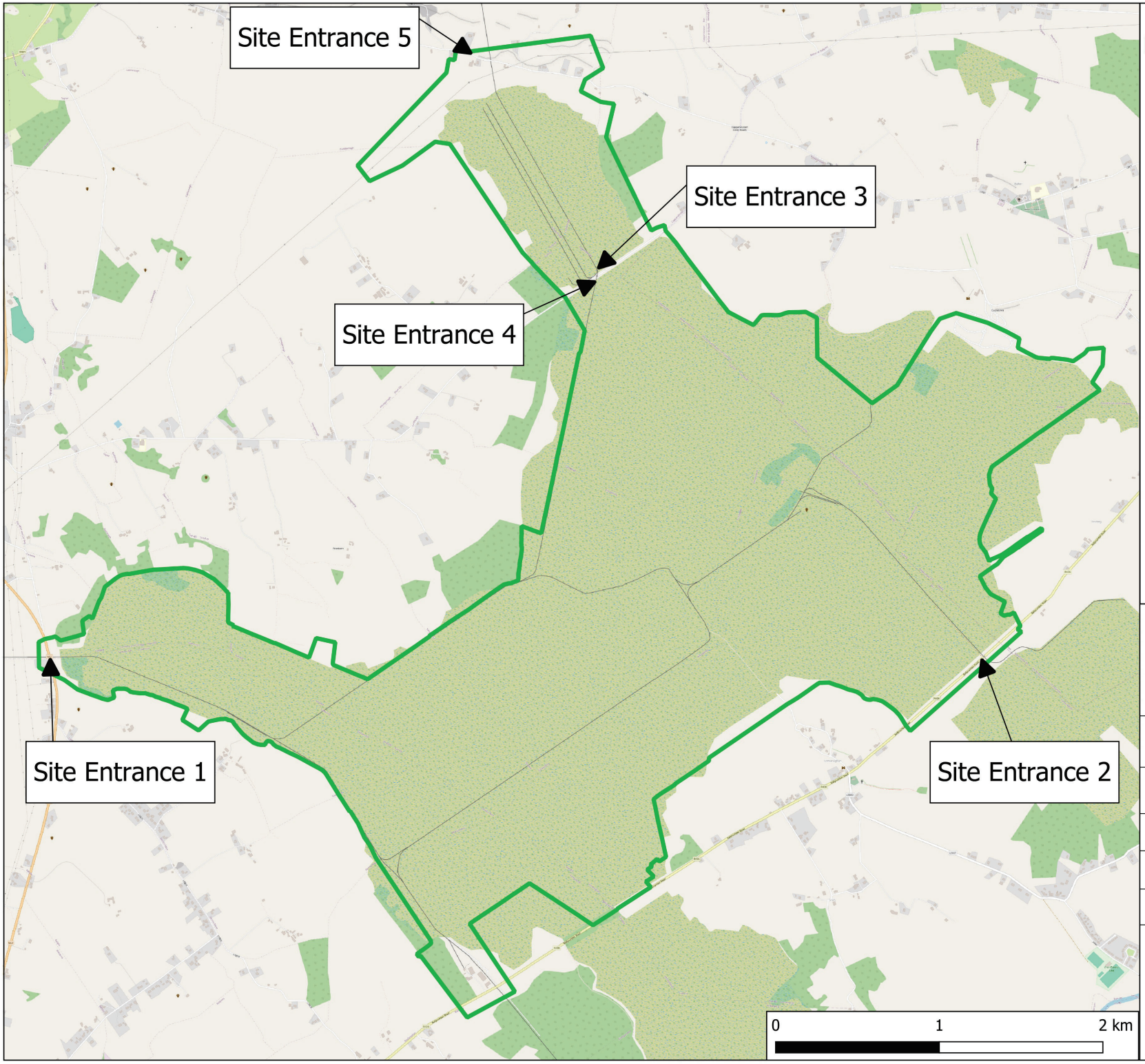
As stated above in Section 4.4.3.3, in addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher-quality, surfacing granular fill and sand will be sourced from local, authorised quarries. Please see Section 4.7.2 below for further details on the construction haul routes of these materials and the corresponding construction phase site entrance that would be utilised by HGVs from each relevant quarry for access to the Proposed Project site. Please see Figure 4-40 for all proposed construction haul routes for local, authorised quarries.

Please see Table 4-9 below for details on the locations of these entrances and their proposed use.

Table 4-9 Proposed Construction and Operational Phase Site Entrances

Site Entrance No.	Description	Used for Turbine Delivery	Used during Construction Phase	Used During Operational Phase (maintenance and monitoring)	Used During Operational Phase (amenity)	Existing Entrance	New Entrance	Security Compound and Gate
1	Located along the N62 national road on the western boundary of the Proposed Wind Farm. This is the main site entrance of the Proposed Project.	✓	✓	✓	✓	✓		✓
2	Located along the R436 regional road running south of the Proposed Wind Farm and is located approximately 3.6km northeast of the Lemanaghan Works.[6]		✓	✓	✓	✓		✓
3	Located along the L7002 local road running through the northern portion of the Proposed Project site (on northern side of the junction).		✓	✓			✓	✓
4	Located along the L7002 local road running through the northern portion of the Proposed Project site (on southern side of the junction).				✓		✓	✓
5	Located along the L7001 local road running north of the Proposed Grid Connection.		✓			✓		

[6] *The Lemanaghan Works comprises the former peat processing plant, storage facilities, canteen and welfare facilities, tippler, bulk loading facility and former workshop is located adjacent to the Proposed Project site boundary.*



Map Legend

EIAR Site Boundary

N

Drawing Title
Proposed Site Entrances

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-35
Scale 1:22,500	Date 2026-02-10

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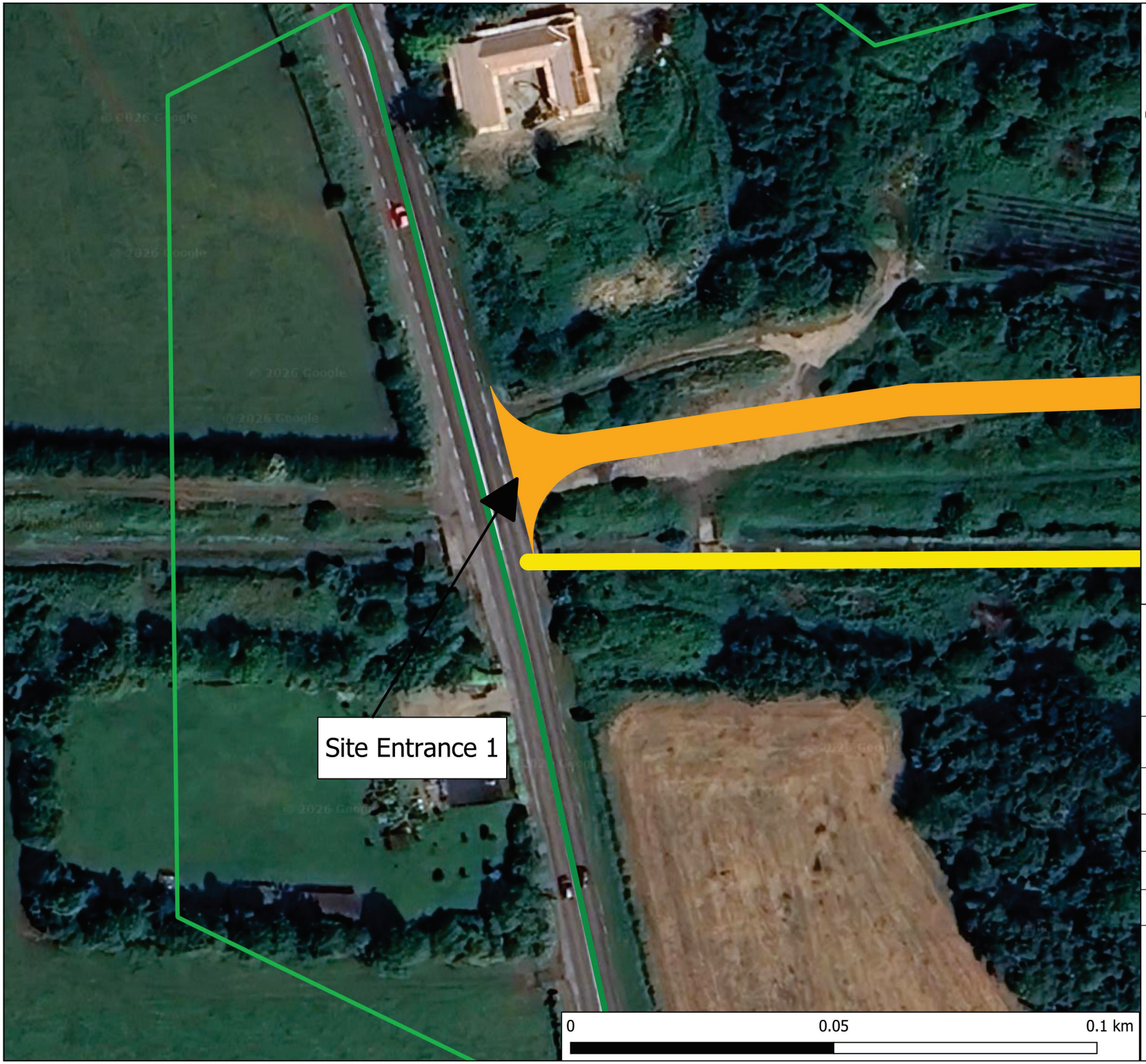

Map Legend

- EIAR Site Boundary
- Proposed New Amenity Track

Roads

- N62 National Road

N

Drawing Title
Proposed Site Entrance 1

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-36
Scale 1:700	Date 2026-03-20

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Map Legend

- EIAR Site Boundary
- Proposed Upgrades to Existing Roads
- Proposed Gates
- Proposed Security Hut

Roads

- R436 Regional Road

N

Drawing Title
Proposed Site Entrance 2

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-37
Scale 1:700	Date 2026-02-10

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Map Legend

- Proposed New Roads
- Proposed Security Hut
- Proposed Gates
- Proposed Cable Trench
- Proposed Temporary Works Areas

Roads

- L7002 Local Road

N

Drawing Title
Proposed Site Entrance 3 and Site Entrance 4

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-38
Scale 1:700	Date 2026-02-10

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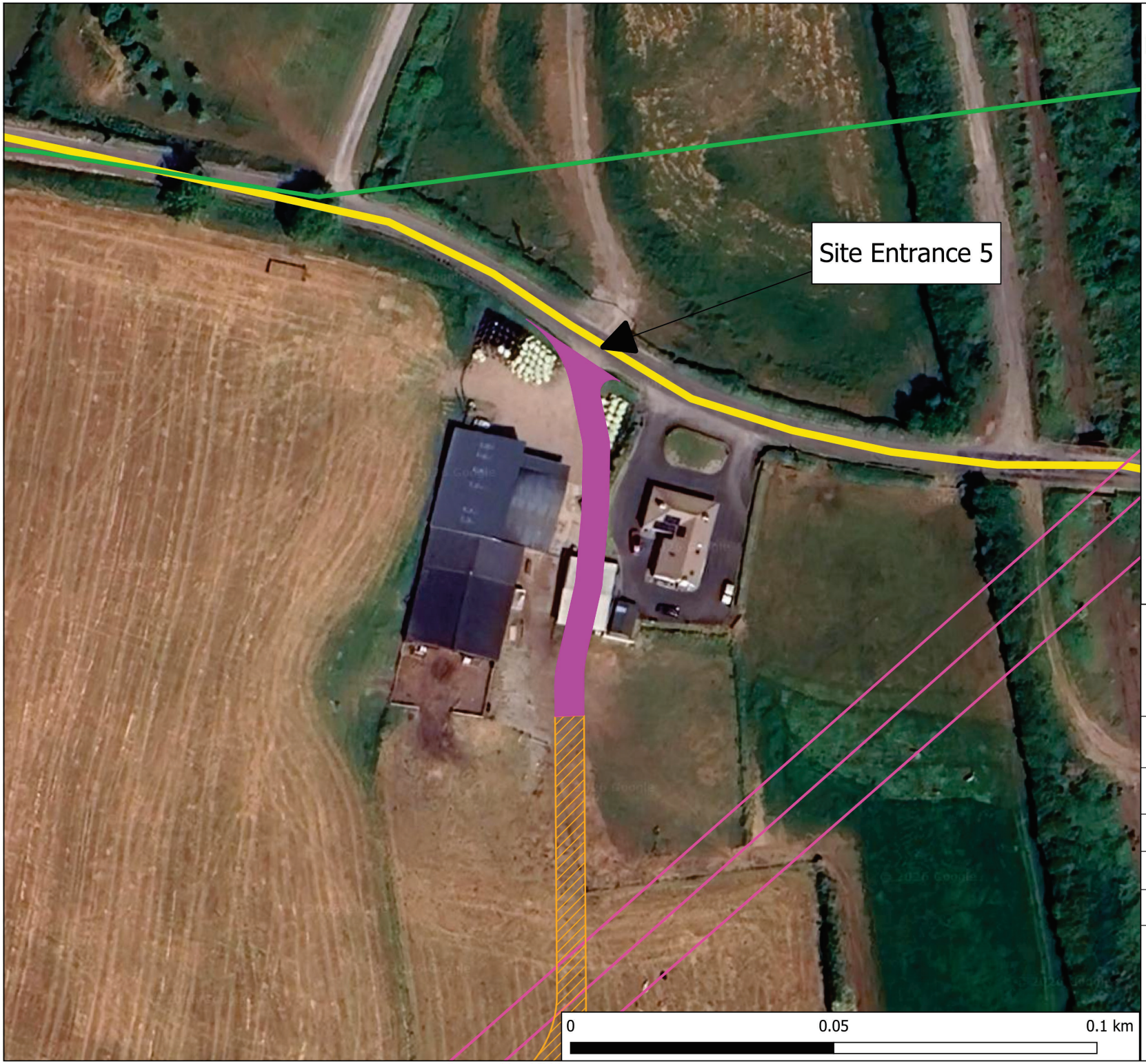

Map Legend

- EIAR Site Boundary
- Proposed Upgrades to Existing Roads
- Proposed Temporary Access Track
- Existing OHL
- L7001 Local Road

Drawing Title
Proposed Site Entrance 5

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-39
Scale 1:700	Date 2026-02-18

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4.7.2 Deliveries of Stone and Ready-Mix Concrete from Quarries

In addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher-quality, surfacing granular fill and sand will be sourced from local, authorised quarries. Please see Section 4.4.3.3 above for further details on material to be sourced from the 4 no. proposed onsite borrow pits for the construction of the Proposed Project.

For the purposes of assessment within the EIAR, 3 no. existing, authorised quarries, located within 30km of the Proposed Project site have been selected and are shown in Figure 4-41.

It is envisaged that construction traffic (including materials and staff) will travel to the site via the public road network to the relevant construction site access points, detailed above. Please note, delivery of stone and ready-mix concrete to the Proposed Project site will utilise the local roads, regional roads, and national roads. Due to the nature of the Proposed Project, all proposed works will be local to the Proposed Project site and as such, the delivery of stone and ready-mix concrete from quarries will primarily utilise 2 no. site entrance locations, Site Entrance 1 and Site Entrance 2 to access the site during the construction phase. The construction traffic will also utilise Site Entrance 3 and 5 to access the northern section of the site. Site Entrance 3 will facilitate access to the proposed onsite 220kV substation, and associated roads and peat deposition area, the L7002 local road will only be utilised by construction traffic for these works. Site Entrance 5 will facilitate access for the specific Proposed Grid Connection infrastructure located under the existing OHL only, and the L7001 local road will only be utilised by construction traffic for these works. Please refer to Table 4-9 above for further information on site entrances.

The proposed route for HGVs from each identified quarry to the closest relevant site entrance location is provided below. Deliveries of stone and ready-mix concrete for use in construction of the Proposed Project, are discussed in further detail in Chapter 15 of this EIAR.

Kilsaran Quarry, Tullamore Co. Offaly

HGVs will depart from Kilsaran Quarry in the townland of Bunaterin, Co. Offaly and turn right onto the N52 national road. They will travel for approximately 650m before turning right onto the R357 regional road. The HGVs will travel in a northwest direction for 5.9km before turning right onto L6027 for 1.9km then left onto the L6051 local road. After travelling north along the L6051 local road for 6.5km the HGVs will turn right onto the R436 regional road and travel 1.1km to Site Entrance 2 where they will turn left to enter the Proposed Wind Farm.

McKeon's Sand and Gravel, Culliaghbeg, Co, Roscommon

HGVs will depart from McKeon's Sand and Gravel in the townland of Culliaghbeg, Co. Roscommon and turn right onto the R357 regional road. After travelling southeast for 15.7km, the HGVs will turn left onto the L3004 local road and travel east for approximately 8.3km. The HGVs will than turn left onto the N62 national road and travel north for 3.1km to Site Entrance 1 where they will turn right to enter the Proposed Wind Farm.

John Gannon Concrete, Kilbeggan Co. Westmeath

HGVs will depart from John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and, to access the site via Site Entrance 2, they will turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 18km the HGVs will reach Site Entrance 2 and turn right into the Proposed Wind Farm.

To access the site via Site Entrance 3, HGVs will depart John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 14.5km on the R436 the HGVs will travel turn right and travel northwest for 3.9km on the L7001 local road before turning left onto the L7002 local road. After travelling southeast for 1.3km on the L7002 the HGVs will reach Site Entrance 3 and turn right into the site.

To access the site via Site Entrance 5, HGVs will depart John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 14.5km on the R436 the HGVs will turn right and travel northwest for 5.6km on the L7001 local road until they reach Site Entrance 5 and turn left into the site.

4.7.3 Turbine Component Transport Route

There are a number of ports on the island of Ireland that have proven capability to accept and store large wind turbine components. These ports include Cork, Shannon Foynes, Galway and Dublin ports. Furthermore, subsequent access to the national motorway network during transportation from these ports has been demonstrated. The facilities within the ports and access to and from the ports is continually being upgraded as part of general improvements. It is on this basis that it is not foreseen that the Proposed Project will result in any material change to the port selected should it be consented and enter into the construction phase.

For the purposes of this EIAR, the Port of Galway has been selected and assessed to facilitate turbine delivery to the site.

Turbine infrastructure being imported to Galway Port will be delivered to site via north from the Galway Port through Galway City via the Lough Atalia Road, the R339 Wellpark Road, northwest onto the R336 Tuam Road, before turning west onto the N6 National Road for approximately 3.7km where the N6 joins the M6. The transport vehicles will merge onto the M6 and head east towards to the Proposed Wind Farm.

It is proposed that the large wind turbine plant will be delivered via the M6 before turning south onto the N52 at Junction 5 (Tullamore/Kilbeggan). The route follows the N52 south, bypassing Tullamore to the east and passing through the settlements of Blue Ball, Kilcormac and Five Alley. Deliveries will turn right onto the N62 (at the junction known as Kennedys Cross) and will proceed northwards towards Ferbane for approximately 22km to Site Entrance 1. Please see Section 4.11.1.4 and Section 4.11.1.5 below for further detail on proposed construction methodologies at Site Entrance 1 to facilitate turbine delivery into the Proposed Wind Farm. The proposed route is shown on Figure 4-40 and Figure 4-41. All deliveries of turbine components to the site will only be by way of the proposed transport route outlined in the aforementioned figures.

All other construction materials will be delivered to the site via the proposed haul routes shown on Figure 4-40 and will access the site using the appropriate site access location based on the source of the construction material which will be included in the TMP for the Proposed Project, included as Appendix 15-2 to the EIAR. Traffic movements generated by the Proposed Project are discussed in in Section 15.1 of Chapter 15.

4.7.4 Turbine Delivery Accommodation Works

Road and junction widening are sometimes required along proposed turbine transport routes to accommodate the large vehicles used to transport turbine components to proposed project sites. The proposed transport route for the Proposed Project 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. Accommodation works will be required at various locations on the national and regional road network between the port of arrival in Galway and the Proposed Wind Farm. These will be limited to temporary measures including temporary local road widening, overruns of roundabout island and temporary relocation of some signs and street furniture; please note, a temporary bypass road will be required at Kennedys Cross junction in Co, Offaly. Please see Location 12 below and Section 15.1.9 for further information.

Location 1 & 2 – M6 Slip Road / N52 Roundabout

Drawing Nos SK00 and SK00A (Appendix 4-7 Pell Frischmann TDR Report)

The abnormally sized loads will undertake a contraflow flow movement through the first roundabout and continued south through the centre island of the southern roundabout.

A temporary load bearing surface will be required on the southern verge of the entry arm of the first roundabout in order to provide for an over-run area. The existing over-run area at the southern roundabout will require to be extended in order to accommodate the abnormally sized loads driving south through the roundabout. Temporary removal of traffic signs, lighting columns will also be required at both roundabouts.

Location 3 – Ardan Roundabout

Drawing Nos SK01, SK01A and SK01B (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the eastern verge on the approach to the roundabout and will overrun and oversail the roundabout centre island where the existing load bearing surface should be utilised and extended. The temporary removal of traffic signs will be required at this location.

Location 4 – Cappancur Roundabout

Drawing Nos SK02 and SK02A (Appendix 4-7)

The abnormally sized loads will require to travel contraflow through this roundabout. The autotrack assessment shows that over-run and oversail of the roundabout centre island will be required at this location with the over-run area requiring to be lowered to existing carriageway level.

Location 5 – Cloncollog Roundabout

Drawing Nos SK03 and SK03A (Appendix 4-7)

Again, the abnormally sized loads will require to travel contraflow through this roundabout. The autotrack assessment shows that over-run and oversail of the roundabout centre island will be required at this location with the over-run area requiring to be lowered to existing carriageway level. The temporary removal of 2 traffic signs will be required at this location.

Location 6 – Clonminch Roundabout

Drawing Nos SK04 and SK04A (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the southern verge when accessing the roundabout. Oversail and overrun of the central island will be required and a temporary load bearing surface, lowered to existing carriageway levels will require to be provided at this location. Vegetation will also require to be trimmed / removed. On exiting the roundabout, a temporary load bearing overrun area will be required on the southern verge. The temporary removal of 2 traffic signs will be required at this location.

Location 7 – Distillery Roundabout

Drawing Nos SK05 and SK05A (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the southern verge when accessing the roundabout. Oversail and overrun of the central island will be required and a temporary load bearing surface, will require to be provided extended at this location. The temporary removal of 2 traffic signs will be required at this location.

Location 8 – Ballard Roundabout

Drawing Nos SK06 and SK06A (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the safety barrier on southern verge when accessing the roundabout. Oversail and overrun of the central island will be required and the existing overrun area will be required to be extended at this location. The temporary removal of 2 traffic signs will be required at this location. On exiting the roundabout a temporary load bearing overrun area will be required on the southern verge. The temporary removal of 2 traffic signs will be required at this location. The blade will overhang/oversail both verges when exiting the roundabout where 1 traffic sign and 2 bollards will require to be temporarily removed.

Location 9 – Charleville Roundabout

Collett Drawing Nos SK07, SK07A and SK07B (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the southern verge of when accessing the roundabout with the temporary removal of 2 traffic signs required. Oversail and overrun of the central island will be required and a temporary load bearing surface will require to be provided at this location. On exiting the roundabout the blade will oversail the southern verge although no further works will be required.

Location 10 – Mucklagh Roundabout

Drawing Nos SK08 and SK08A (Appendix 4-7)

The autotrack assessment shows that the blade will oversail the southern verge of when accessing the roundabout although no works will be required. Oversail and overrun of the central island will be required and a temporary load bearing surface lowered to the level of the existing road, will require to be provided at this location. On exiting the roundabout the blade will oversail the southern verge although no further works will be required.

Location 11 – N52 Kilcormac

Drawing Nos SK09 and SK09A (Appendix 4-7)

While oversail of the blade will be required, there will be no works required on this section of the N52. Local parking restrictions will be required on the nights that the abnormally sized loads are delivered to site.

Location 12 – N52 / N62 and N62 north of junction

Drawing Nos SK10, SK10A, SK11 and SK11A (Appendix 4-7)

The swept path assessment indicates that loads will oversail the verge of the bypass track where two trees should be removed. Loads will oversail both verges of the N62 on exit from the junction and through the following right bend.

A temporary access road for the facilitation of abnormal load deliveries will be required at Kennedys Cross, located in the townland of Ballindown, Co. Offaly (junction of the N52 and N62 National Secondary Roads). These works will comprise the re-establishment of a temporary junction bypass road to facilitate the delivery of turbine components and other abnormal loads. The proposed temporary road will measure approximately 160 metres in length and have a 6-metre running width.

The locations of these works and an overview of the proposed accommodation works are shown in Figure 4-42 and on the layout drawings in Appendix 4-1 of this EIAR. An existing roadway installed during the construction phase of Derrinlough Wind Farm (Pl Ref. PA19.306706), at Kennedys Cross will be utilised for the delivery of turbine components to the Proposed Wind Farm. The road utilised for the construction phase of Derrinlough Wind Farm has been covered with topsoil and reseeded after the successful delivery of abnormal loads and completion of the project's construction phase. As part of the Proposed Wind Farm, clearance works will be carried out to remove the topsoil and any reseeded vegetation and re-establish the road and gates for turbine delivery for the Proposed Project. It is noted that the standard road markings and visibility splays are not required at Kennedys Cross as the temporary access road will only be used for the transportation of abnormally sized loads, which will be delivered with a Garda escort and transient traffic management vehicles operated by the haulage company. This road will not be available for any other traffic and will be closed off and opened only for the delivery of the abnormally sized loads; i.e., gates will be locked between scheduled turbine deliveries.

Following the completion of the construction phase of the Proposed Project the gates will be removed and the boundary will be reinstated to its original condition with hedgerow. The temporary turbine delivery access road will be closed, covered with a layer of topsoil and reseeded. It would only be used again in the event that an oversized delivery was required for wind turbine maintenance purposes; appropriate planning would be secured prior to the commencement of these works should they be required.

Location 13 – N62 south of BnM Briquette Factory

Drawing Nos SK12 and SK12A (Appendix 4-7)

The autotrack assessment shows that all abnormally sized vehicles will be accommodated at this location.

Location 14 – N62 Briquette Factory

Drawing No SK14 (Appendix 4-7)

The autotrack assessment shows that all abnormally sized vehicles will be accommodated at this location.

Location 15 – N62 Cloghan

Drawing Nos SK15 and SK15A (Appendix 4-7)

The swept path assessment indicates that loads will oversail the western footway on approach to the junction where two road signs and one lighting column should be removed. Loads will overrun and oversail the footway on the inside of the turn where a load bearing surface should be laid and one road sign and the traffic bollards should be removed. Loads will overrun and oversail the northwestern footway where a load bearing surface should be laid and two road signs and one lighting column should be removed. It is noted that clearances are highly constrained at this location.

Locations 16, 17 & 18 – N62 Ferbane

Drawing Nos SK16, SK16A, SK17, SK17A, SK18 and SK18A (Appendix 4-7)

To facilitate turbine delivery, the existing construction access will be widened to the south and an extension of the existing underpass will be constructed (please see Figure 4-42 below).

Location 16 – The autotrack assessment indicated that the blade will overhang the inside (west) verge, while no works are required.

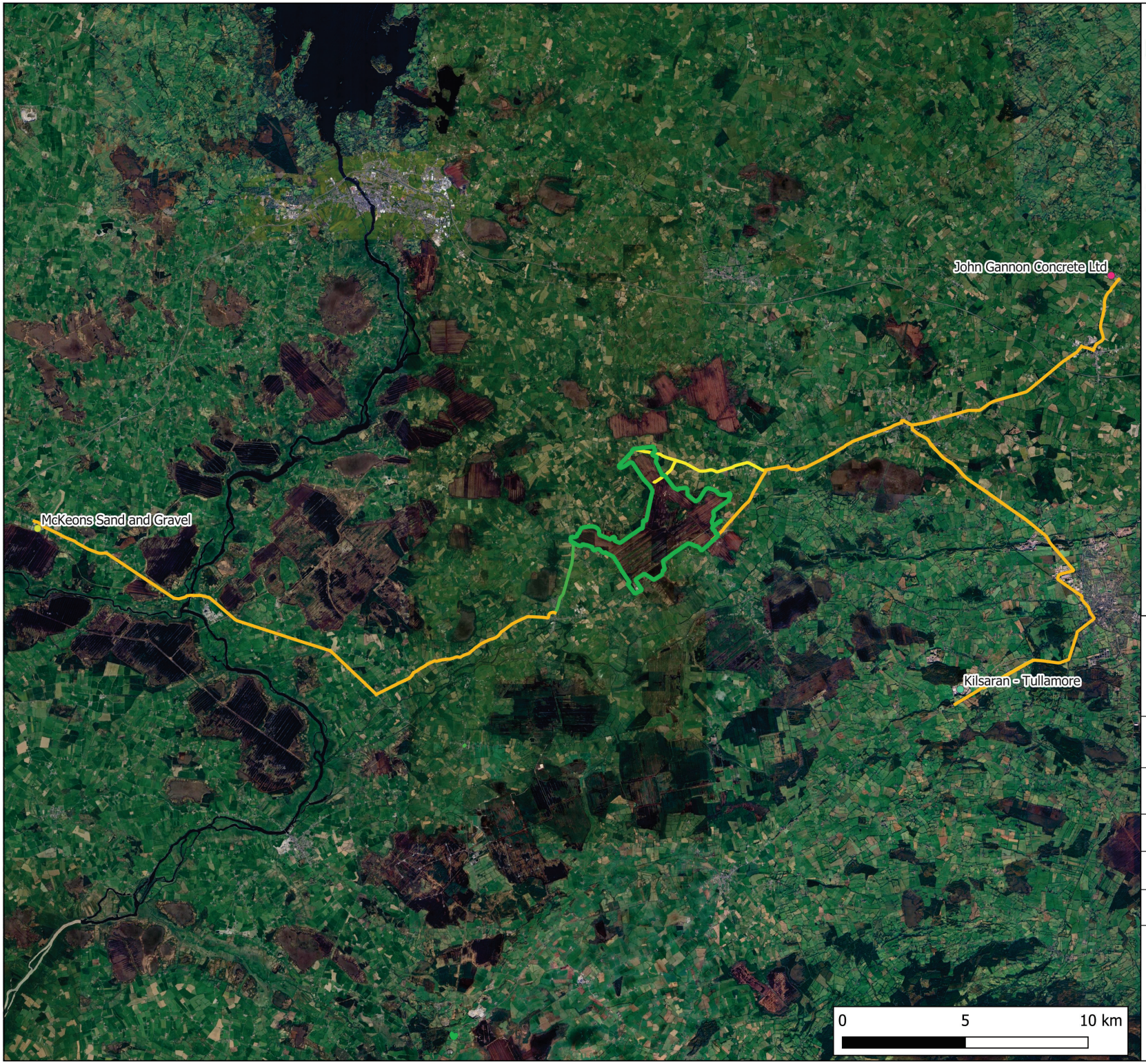
Location 17 – The autotrack assessment indicated that the blade will oversail the western verge where parking should be suspended on delivery nights and one road sign should be removed. The blade will overhang into the bus stop area on the eastern side of the road and its use should be suspended, or that the deliveries are made during nighttime hours, as proposed.

Location 18 – The autotrack assessment indicated that the blade will overhang / oversail footpaths on both sides of the road and 1 traffic sign will require to be removed temporarily.

The majority of construction works on the proposed underpass extension will be expected to take place beneath the existing underpass, from the existing BnM railway line east of the existing underpass, or from areas to the north and south of the proposed underpass extension off the public road. Please see Section 4.11.1.4 below for further information on the construction methodology of this proposed underpass extension. Upon the completion of the construction phase the existing underpass will be permanently upgraded and will facilitate access to the amenity track proposed.

Following the completion of the construction phase of the Proposed Project the boundaries of the N62 will be reinstated and the widened area over the extended underpass will be covered with a layer of topsoil and reseeded. It would only be used again in the event that an oversized delivery was required for wind turbine maintenance purposes; appropriate planning would be secured prior to the commencement of these works should they be required.

Please see Section 15.1.9 for further detail on traffic effects and management proposals associated with turbine delivery.



Map Legend

- EIAR Site Boundary

Quarries

- John Gannon Concrete Ltd
- Kilsaran - Tullamore
- McKeons Sand and Gravel

- Local Road Construction Haul Routes
- Regional Road Construction Haul Routes
- National Road Construction Haul Routes

N

Drawing Title

Location of Local Quarries and Proposed Construction Haul Routes

Project Title

Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-40
Scale 1:150,000	Date 2026-02-10

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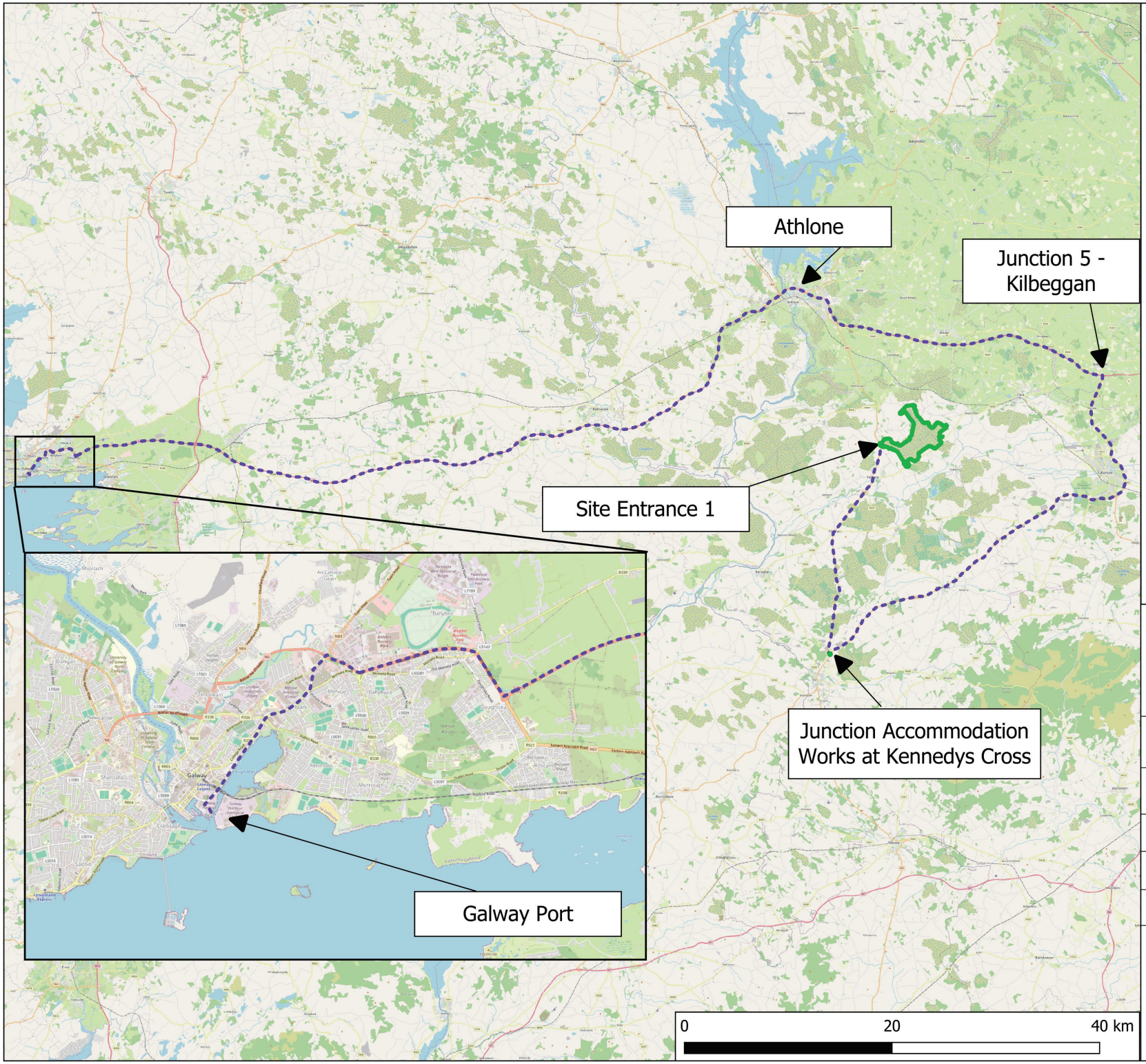

Map Legend

- EIAR Site Boundary
- Proposed TDR from Galway Port

N

Drawing Title
Proposed Turbine Blade Transport Route from Galway port

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-41
Scale 1:355,000	Date 2026-02-10

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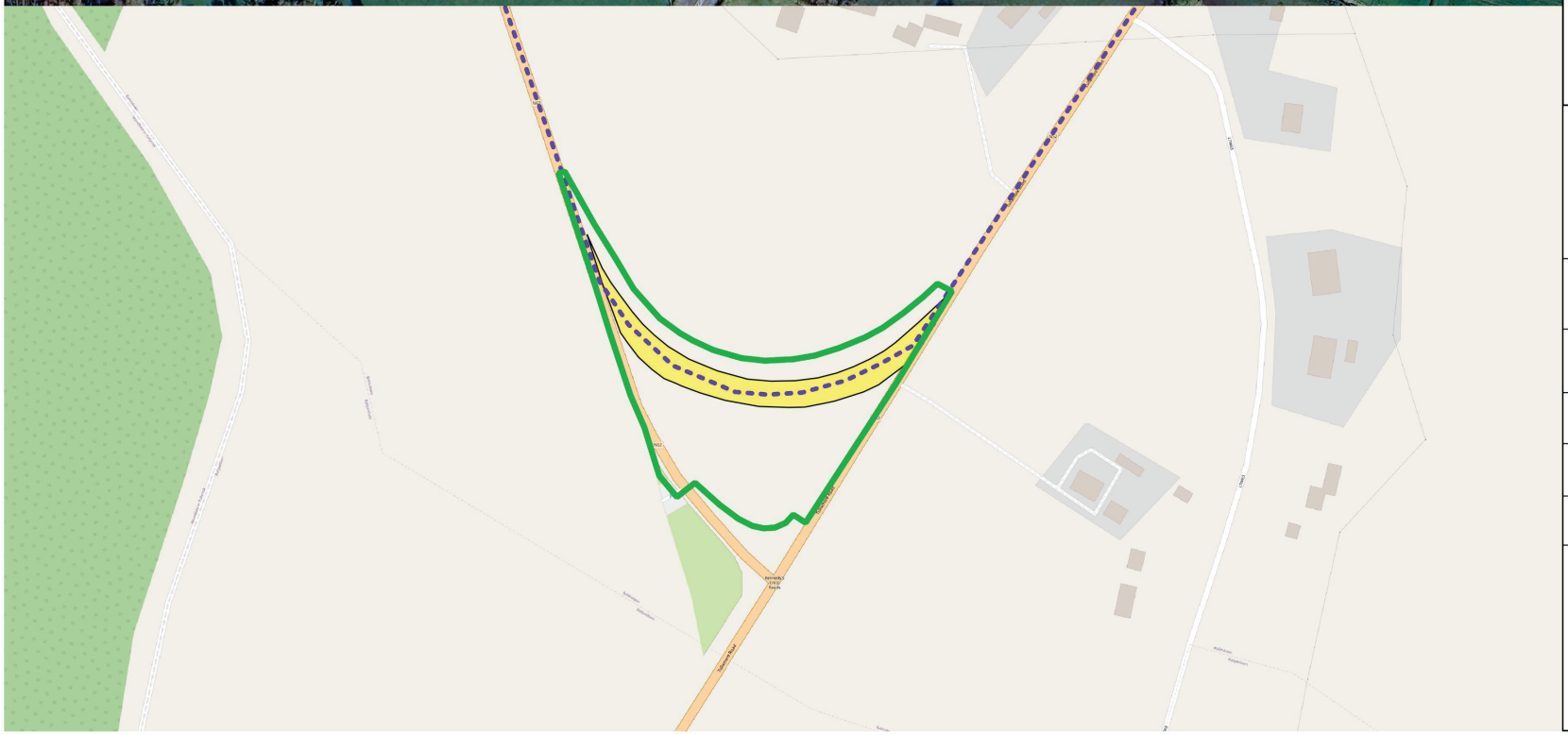

Map Legend

- EIAR Site Boundary
- Proposed TDR
- Proposed TDR SPA Works

N

Drawing Title
Proposed Turbine Accommodation Works

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 4-42
Scale 1:2,500	Date 2026-02-19

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4.7.4.2 Traffic Management

A turbine with a maximum blade segment length of 85m has been used in assessing the traffic impact of turbine delivery for the Proposed Wind Farm. Please note, the largest proposed blade to be used on the Proposed Wind Farm is 75m. The blade transporter for such a turbine blade would have a total vehicle length of 80m, including the blade which overhangs the back of the vehicle. The total length of the tower transporter is 58m 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 will be smaller than the design test vehicles.

The vehicles used to transport the nacelles will be similar to the tower transporter. All other vehicles requiring access to the Proposed Wind Farm will be smaller than the design test vehicles. The turbine delivery vehicles have been modelled accurately in the swept path analysis assessments for the Proposed Wind Farm 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 Project. However, 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 on the island of Ireland (Ireland and Northern Ireland combined, per latest available figures on www.windenergyireland.com), transport challenges are an issue for which the wind energy industry and specialist transport sector has become particularly adept in finding solutions.

As an alternative solution for transport of turbine blades, alternative delivery systems are available. For example, delivery vehicles fitted with blade adaptors 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 4-6 below shows an example of a blade adaptor.

Plate 4-6 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 Wind Farm are proposed to 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 local diversions will be put in place where required subject to consultation with the relevant local authority / road authority. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, at night, to avoid disruption to work- and school-related traffic.

Prior to the Traffic Management Plan (TMP) 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 TMP for agreement with the relevant authorities. All turbine deliveries will be provided for in a TMP 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 will be 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. Please see Appendix 15-2 for details of this traffic management plan.

4.8 Community Benefit Proposals

4.8.1 Community Fund

In addition to employment during the construction and operational phases of the proposed development and annual rates that will be paid to the local authority by the Developer, additional benefits will be provided to the local community through the provision of a Community Benefit Fund. Both BnM and SSE have a long history of delivering local community funds, and have supported a number of strategic initiatives, including scholarships and major projects. The value of the Community Benefit Fund will be linked to the productivity of the wind farm and is calculated based on €2/MWh of the overall total generated by the wind farm. It is estimated that the proposed Fund could be in the region of circa €8 million over the first 15 years of the operation of the Proposed Wind Farm, on the basis of an annual generation of 275,940 MWh.

In 2021, The Department of the Environment, Climate and Communications, published the Renewable Energy Support Scheme Good Practice Principle Handbook, outlining how community funds should be managed, operated, and distributed to wind and solar projects that are successful in the Renewable Energy Support Scheme (RESS) Auctions. This was further updated to a revised rulebook in May 2025 (*which may be subject to change at the Department's discretion*).

A key criterion of the Department's Community Benefit Rulebook, as updated in 2025, is that the projects and initiatives will benefit the communities surrounding the wind farm. As part of this, a Fund Committee will be established and will consist of a number of volunteer community representatives, the Project Developer and Administrator (if applicable). The Fund Committee should aim to represent the widest cross-section of the community possible. The Fund Committee will then develop a strategy for the Community Fund.

Under the current Rulebook – Community Benefit Funds must be distributed as follows:

- Near Neighbour:
  - The payment to all households within 1 km of a turbine is set out as a mandated fixed annual payment of €1,000 and shall be paid by the end of the first year of commercial operation.
  - Households located further than 1 km from the RESS Project but within a distance of 2 km from such RESS Project shall receive an annual payment of

an amount lower than €1,000 but higher than €500. The amount of this payment shall be calculated using the following formula, and rounded to the nearest euro: Amount in Euro = 1500 - (0.5 x [Distance in metres])
    - The total amounts allocated to direct payments to households shall be limited to 50% of the total annual contributions from the Community Benefit Fund
- Administration:
    - Up to 10% of the value of the Fund over the entire period (20% in Year 1) in which the RESS Project is required to maintain the Community Benefit Fund may be used to cover administration costs.
- Community Projects:
    - A minimum of 40% of Funds to initiatives where the primary focus is the promotion of the delivery of the UN Sustainable Development Goals ("SDGs") successful in an open application process, as proposed by enterprises, clubs and societies, and similar not for-profit community enterprises (including scholarships).
    - A particular emphasis on Goals 4, 7, 11 and 13 - Quality Education, Affordable and Clean Energy, Sustainable Cities and Communities and Climate Action. However, projects are eligible for funding if they promote at least one of the United Nations Sustsinable Development Goals.

A detailed description of the Community Benefit Proposal is outlined in the Lemanaghan Wind Farm Community Engagement Report which is contained in Appendix 2-2.

4.9 Site Drainage

4.9.1 Introduction

The drainage design for the Proposed Project has been prepared by Hydro Environmental Services (HES). The drainage design has been informed by the experience of the project team on other wind farm sites in peat-dominated environments, and the best practice guidance documents referred to in the References section of the EIAR.

The protection of the groundwater and surface water within and surrounding the site, and downstream catchments that they feed is a critical aspect in establishing the most appropriate drainage proposals for the Proposed Project. There is an existing drainage system and surface water discharges from Lemanaghan Bog that is regulated by the EPA (Licence Ref. P0500-01). The drainage design for the Proposed Project has been planned with the intention of having no negative impact on the water quality of the site and its associated watercourses, 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 Project is included in Chapter 9: Water.

The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses where possible; however, 1 no. watercourse is present within the Proposed Wind Farm that will be crossed by proposed new roads at 2 no. locations. Please see Section 4.11.1.6 below for details on the crossing methodologies to be deployed at each crossing location. Furthermore, a proposed temporary culvert will be constructed along the temporary construction access road to the Proposed Grid Connection infrastructure under the existing OHL; this culvert will be temporary and will be decommissioned as part of the removal of the temporary road during the construction phase. Please see Section 4.11.1.6.1 below for further information.

There will be no direct discharges to any natural watercourses, 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. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project.

4.9.2 Existing Drainage Features

The surface of the cutover bog is drained by a network of parallel field drains that are typically spaced every 15 - 20m. The field drains are approximately 0.5 - 1.5m deep and in most areas, they intercept the mineral subsoil underlying the peat. These field drains mostly feed into larger main drains which drain the bogs towards the outfall locations. There are a number of shorter cross drains (sometimes piped below ground in lower lying areas) which intersect the small field drains. There are various outfalls on the bog boundaries. Within Lemanaghan Bog, there are 2 no. existing pumps in place. These will continued to be used throughout the construction and operational phase of the Proposed Project when appropriate. Surface water draining from the site is routed via settlement ponds (in accordance with the IPC licence (Section 4.6 above) requirements) prior to discharge into off-site drainage channels, streams and rivers.

4.9.3 Drainage Design Principles

The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project 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/recharge to ground.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.
- There is no direct hydraulic connectivity from proposed construction areas to natural watercourses or drains connecting to downstream watercourses.
- Maintain the existing hydrology/hydrogeology of the site.
- Re-routing existing local drainage pathways as required.
- Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works (EnvCoW) 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.

Drainage water from any works areas of the Proposed Project site will not be directed to natural watercourses. Two distinct methods will be employed to manage drainage water within the Proposed Project 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 via recharge.

The drainage design is intended to maximise erosion control, which is a more effective system 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 must be managed. Discoloured run-off from any construction area will be isolated from natural clean run-off.

A schematic line drawing of the proposed drainage design is presented in Figure 4-43 below.

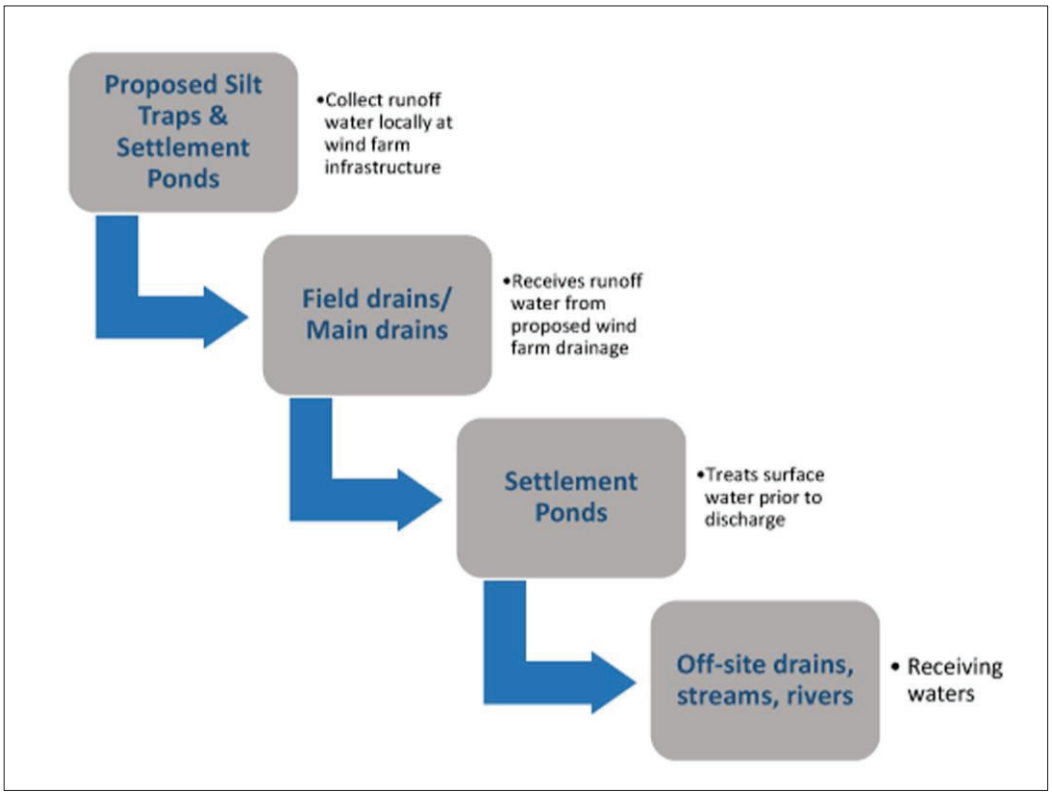


Figure 4-43 Proposed Project Drainage Process Flow

During the construction phase, all runoff from works areas (i.e., dirty water) will be attenuated and treated prior to being released within the Proposed Project site. All drainage outfall from the Proposed Wind Farm, not including proposed turbine delivery accommodation works, is routed through existing settlement ponds that remain in situ from the previous site use.

4.9.4 Drainage Design

A preliminary drainage design for the Proposed Project, incorporating all principles and measures outlined in this drainage design description, has been prepared, and is included in the drainage figures included in Appendix 4-1 to this EIAR. The drainage design employs the various measures further described below and complies with the following guidance documents:

- Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Environmental Protection Agency (2022): Guidelines on the information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- DoE/NIEA (2015): Wind farms and groundwater impacts - A guide to EIA and Planning considerations";
- OPW (2009) The Planning System and Flood Risk Management;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Energy Development Guidelines for Planning Authorities, 2006 (the DoEHLG 2006 Guidelines) and the Draft Revised Wind Energy Development Guidelines (Draft DoHPLG 2019 Guidelines);
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);

- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006);
- Wind Farms and Groundwater Impacts: A guide to EIA and Planning considerations (DoE/NIEA, April 2015);
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001;
- Land Types for Afforestation (Forest Service, 2016b):
- Forest Protection Guidelines (Forest Service, 2002);
- Forest Operations and Water Protection Guidelines (Coillte, 2013);
- Forestry and Water Quality Guidelines (Forest Service, 2000b); and,
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plant 2018-2021 (DAFM, 2018).

Please note, drainage drawings are included as part of Appendix 4-1. The detailed drainage will be finalised following a pre-construction confirmatory survey by the Appointed Contractor with input from the Project Hydrologist to confirm the baseline hydrological condition of the site at the time of construction.

4.9.4.1 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 collected 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 create 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 will 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 to 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 4-44 below shows an illustrative drawing of an interceptor drain.

The velocity of flow in the interceptor will be controlled by check dams (see Section 4.9.4.4 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 settlement pond/field drain. 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.

4.9.4.2 Collector Drains

Collector drains (or swales) are shallow drains that will be used to intercept and collect runoff from the main construction areas of the site during the construction phase (i.e., from turbine base/hardstand areas, construction compounds, and the substation). Drainage swales (i.e., collector drains) will remain in place to collect runoff from roads and hardstanding areas of the Proposed Project during the operational phase. A collector drain 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. Collector drains are proven to be most effective when a dike is installed on the downhill side. They are similar in design to the interceptor drains described above.

Collector drains will be installed downgradient of the main works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and collected 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. Collected water will travel along the collector drains to areas downgradient of the main works areas, where the drain will terminate at a settlement pond and outfall to a field drain (see Section 4.9.4.9).

Collector drains 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.

4.9.4.3 Over-The-Edge Drainage

As stated above, drainage management with the proposed site will be based on risk. Within the Proposed Project site layout there are sections of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain (dirty water system as described above) may be used during construction stage, otherwise over-the-edge (OTE) drainage will occur. OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations). Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these measures will provide attenuation and treatment of any arising dirty water. In addition, all drainage water from the bogs will travel along field drains, and main drains, and then into existing settlement ponds prior to outfall from the proposed site into surrounding receiving waters.

4.9.4.4 Check Dams

Drainage gradients within the site are generally low, and as such the use of and spacing between check dams is less frequent than on hillside sites.

The velocity of flow in the interceptor drains and collector drains will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the drain is non-erosive. Check dams will also be installed in some existing artificial drainage channels that will receive waters from works areas of the site.

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 field drains on the proposed site, downstream of where drainage swales connect in. Locations of and requirements for check dams will be confirmed during the finalisation of detailed drainage design following a pre-construction survey by the appointed contractor.

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- to 6-inch stone layers 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.

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 (field drains) and interceptor/collector 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 during construction. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

4.9.4.5 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 also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains.

Dewatering silt bags can also be used as an additional filtration measure downgradient of stilling ponds, 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 peaty silt into any field drain/main drain.

The dewatering silt bag that will be used will be approximately 3m in width by 4.5m (see Plate 4-7 and Plate 4-8 below) in length and will be capable of trapping approximately 4 tonnes of silt. The dewatering silt bag, when full, will be removed from site by a waste contractor with the necessary waste collection permit/license, who will then transport the silt bag to an appropriately licensed waste facility.

Plate 4-7 Silt Bag with water being pumped through

Plate 4-8 Silt bag under inspection

4.9.4.6 Sedimats

Sediment entrapment mats, 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.

4.9.4.7 Culverts

All new proposed culverts 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 Project, particularly where the waters must be taken from one side of an existing roadway to the other for discharge. Locations of and requirements for culverts will be confirmed during the finalisation of detailed drainage design following a pre-construction survey by the appointed contractor.

The size of culverts will be influenced by the depth of the track or road sub-base. In some cases, 2 no. 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.

4.9.4.8 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 50m buffer zone of a stream. Installation locations will be confirmed during the finalisation of detailed drainage design following a pre-construction survey by the appointed contractor.

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 CIRIA (No. C648, 2006).

Silt fence material will comprise Terrastop™ Premium material, and silt fences will be installed per the manufacturer's guidelines. Silt fences will be inspected on a regular basis to ensure that they are operating effectively.

4.9.4.9 Peat Ditch Silt Traps

Silt traps will be installed in field drains downstream of drainage outfalls from works areas. The purpose of the silt traps is to capture silt by means of slowing water flow within the field drains. The existing field drains have a low gradient already, and with the installation of local silt traps drainage water from the wind farm works will be filtered and treated on its onward journey towards the existing settlement ponds.

The peat ditch silt traps will be constructed using stacked timber logs, or marine plywood. These can also be covered in geotextile to enhance filtration. The majority of peat ditch silt traps will be left in situ following the construction phase.

4.9.4.10 Settlement Ponds

Settlement ponds will be used to attenuate runoff from main works areas (i.e., from turbine base/hardstand areas, construction compounds, and the substation) of the site during the construction phase. The purpose of the settlement 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 discharged to field drains/main drain within the Proposed Project site.

Settlement ponds will be located towards the end of collector drains, close to where the treated water will be discharged to field drains/main drains.

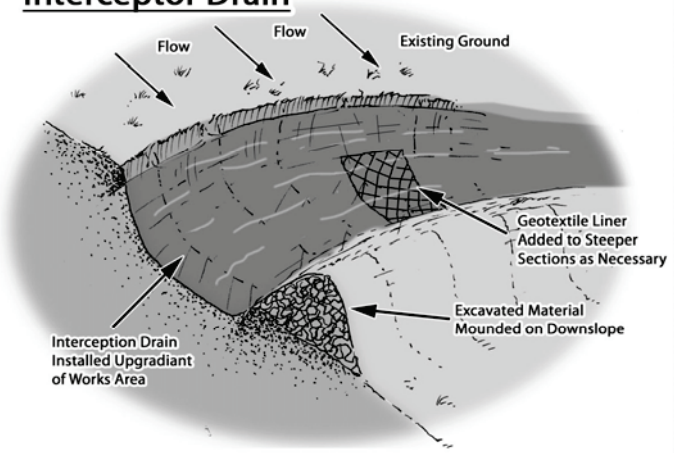
During the construction phase, a water level indicator such as a staff gauge will be installed in each settlement ponds with marks to identify when sediment is at 10% of the settlement ponds capacity. Sediment will be cleaned out of the still pond if it exceeds 10% of pond capacity. Settlement ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and other issues that might interfere with flows.

Settlement ponds (at main works areas) will be removed at the end of the construction phase. They will not be needed beyond that point, as there is an existing drainage system, and boundary settlement ponds already located within each bog.

During the operational phase all drainage water leaving the proposed site will drain via field drains, main drains, and be treated in the existing settlement ponds prior to outfall.

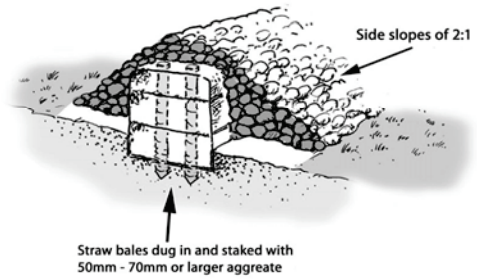
Drainage Design Measures

Interceptor Drain

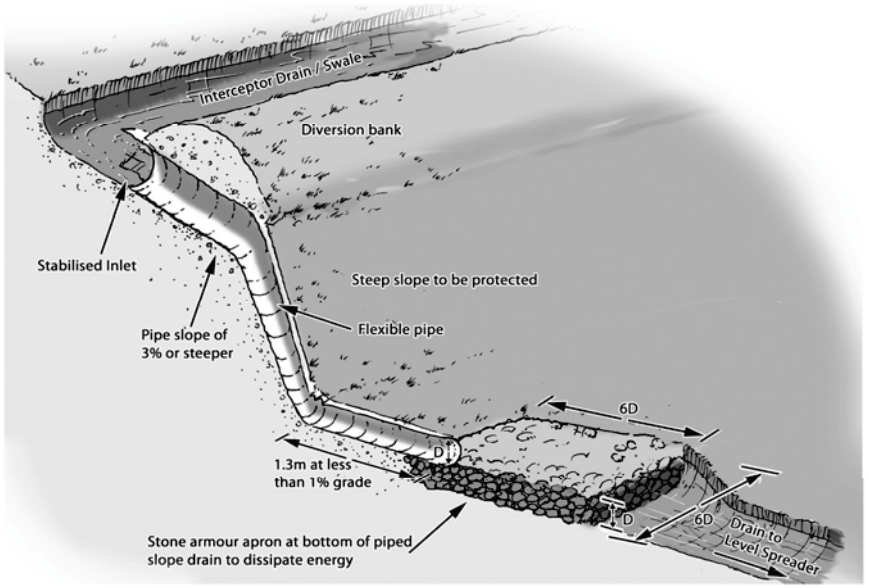


Check Dam (Stone Dam in Drain)

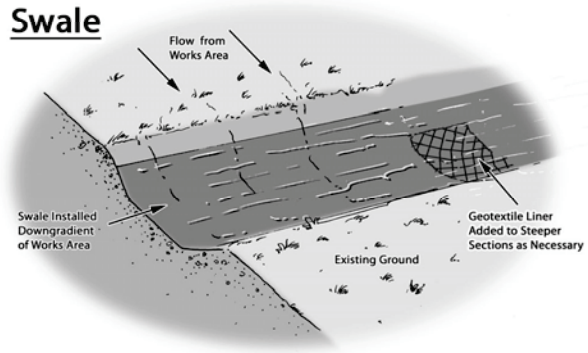
Check Dam
(Straw Bale & Stone Dam - Cross Section)



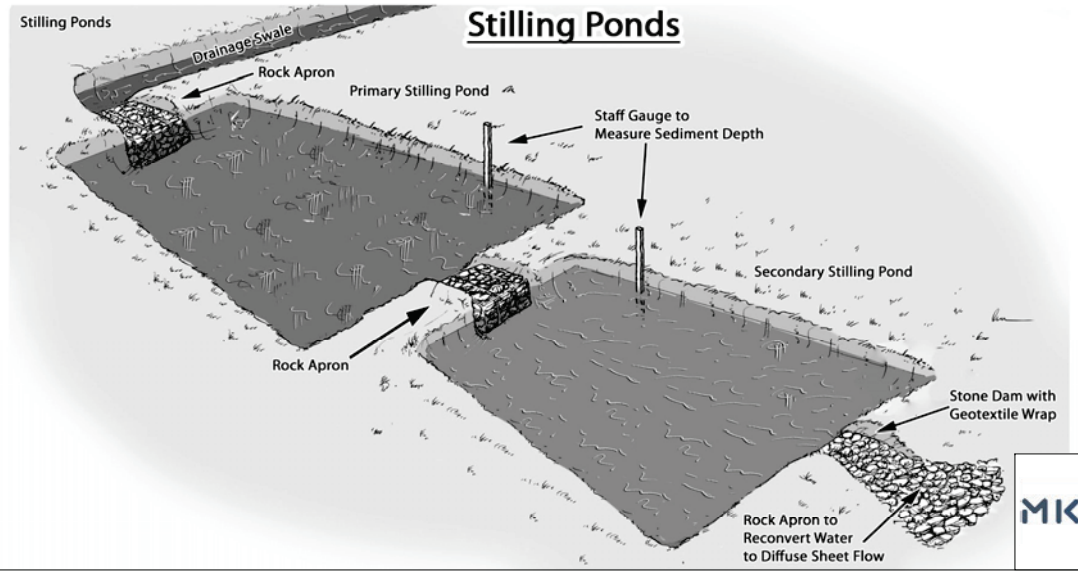
Slope Pipe Drain



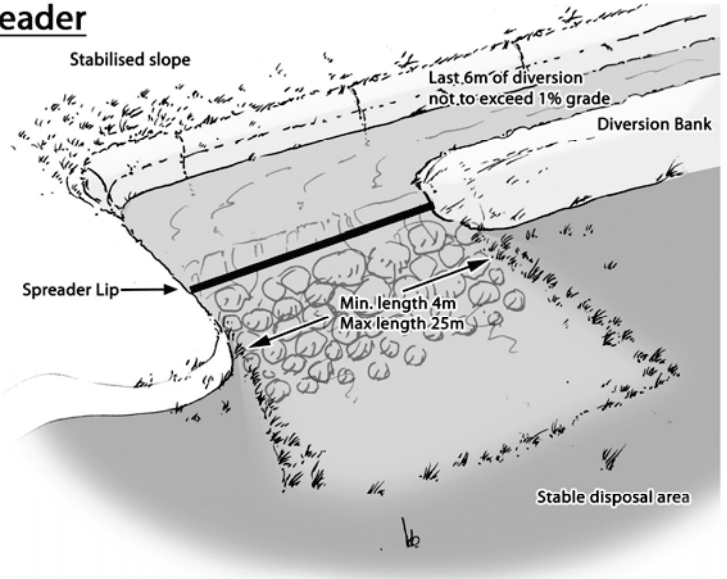
Swale



Stilling Ponds



Level Spreader



MAP TITLE: **Drainage Design Illustrations**		MAP NO.: **Figure 4-44**	SCALE: **NTS**
PROJECT TITLE: **Lemanaghan Wind Farm, Co. Offaly**			DATE: **10.02.2026**
DRAWING BY: **Edel Mulholland**	CHECKED BY: **Ellen Costello**	ISSUE NO.: **200804 - 2026.02.10 - F**	

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4.9.5 Cable Trench Drainage

Cable trenches are proposed to be constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. This operation normally occurs over a period of 2-4 hours.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite.

On steeper slopes, silt fences, as detailed in Section 4.9.4.8, above, will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

4.9.6 Site and Drainage Management

4.9.6.1 Preparative Site Drainage Management

All materials and equipment necessary to implement the drainage measures detailed above, will be brought onsite in phases as they are required during the construction phase. A sufficient number of straw bales, clean drainage stone, terram, stakes, etc., will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain.

4.9.6.2 Pre-emptive Site Drainage Management

The works programme for the groundworks part of the construction phase of the Proposed Project will also take account of weather forecasts, and predicted rainfall in particular, working under a schedule of works operation system (SOWOR) system as proposed in the planning application; further detail is provided in Appendix 4-7 Surface Water Management Plan (SWMP). Large excavations, large movements of overburden or large-scale overburden or soil 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.

4.9.6.3 Reactive Site Drainage Management

The final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the Ecological Clerk of Works (ECoW) or supervising hydrologist on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.

In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.

4.9.7 Drainage Maintenance

An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage features will be carried out, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the ECoW or the Project Hydrologist. Please see Section 9.4.1 of Chapter 9 and Appendix 4-4 CEMP for further information.

If necessary, any excess sediment build up behind check dams will be removed. For this reason, check dams will be inspected and maintained weekly during the construction phase of the Proposed Project to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

Check dams will also be inspected weekly during the construction phase of the Proposed Project and following rainfall events to ensure the structure of the dam is still effective in controlling flow. Any scouring around the edges of the check dams or overtopping of the dam in normal flow conditions will be rectified be reinforcement of the check dam.

Drainage swales will be regularly inspected for evidence of erosion along the length of the swale. If any evidence of erosion is detected, additional check dams will be installed to limit the velocity of flow in the channel and reduce the likelihood of erosion occurring in the future.

Peat ditch silt traps will be inspected weekly during the construction phase of the Proposed Project and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.

A water level indicator such as a staff gauge or level marker will be installed in each temporary stilling ponds with marks to identify when sediment is at 10% of the pond's capacity. Sediment will be cleaned out of the stilling pond when it exceeds 10% of pond capacity. Stilling ponds will be inspected weekly during the construction phase of the project and following rainfall events. Inlet and outlets will be checked for sediment accumulation and impediments to flow. Any excess sediment build-up behind inlets and outlets will be removed.

The frequency of drainage system inspections will be reduced following completion of the construction phase of the Proposed Project. The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. An annual drainage inspection will be completed during the operational phase.

Please see Section 9.4.1, Section 9.5.3 and Section 9.5.4 of Chapter 9 for further detail on drainage systems during the operational and decommissioning phase of the Proposed Project.

4.10 Construction Management

4.10.1 Construction Timing

It is estimated that the construction phase will take approximately 24 to 30 months from the commencement of works to the commissioning of the wind farm. The commencement of works where the removal of vegetation is required, or where works take place in sensitive breeding habitats (such as

birch scrub and emergent wetland vegetation), will be scheduled to occur outside the bird breeding season (1st of March to 31st of August) to avoid any potentially significant effects on nesting birds. Construction may commence from September to March so that construction activities are ongoing by the time the next bird breeding season comes around and can continue throughout that bird breeding season. Immature woodland removal and vegetation clearance will not be carried out during the bird breeding season as these works will take place at the beginning of the construction phase and therefore no overlap between vegetation removal and the breeding bird season is envisioned.

Construction activities will be carried out during normal daytime working hours (i.e., weekdays 0700 – 1900hrs and Saturdays 0700 – 1400hrs). However, to ensure that optimal use is made of good weather period or at critical periods within the programme (i.e., concrete pours) or to accommodate delivery of large turbine component along public routes it could be necessary on occasion to work outside of these hours. Any such out-of-hours working will be agreed in advance with the Local Authorities.

4.10.2 Construction Sequencing

The construction phase is estimated to take approximately 24 to 30 months, and the works can be broken down into three main overlapping phases, 1) civil engineering works: 18 months, 2) electrical works: 18 months, and 3) turbine erection and commissioning: 9 months. The main task items under each phase are outlined below.

Civil Engineering Works

- Erect all necessary safety signage.
- Create new entrance(s) and hardcore existing entrances (where required).
- Clear and hardcore area for temporary construction compounds, including material storage, site welfare facilities, and site offices.
- Construct turbine hard-standings and crane pads.
- Construct new internal site roads, drainage ditches and culverts. The internal roads will be a mixture of permanent (construction/operational and amenity) roads and amenity tracks.
- Construct drainage ditches, culverts, etc., integral to road construction.
- Construct access roads to borrow pit locations and open borrow pits.
- Construct the substation, control buildings and groundworks for the substation compound and associated drainage ditches and culverts
- Construct substation compound.
- Construct electrical apparatus bases/plinths and bund for transformer.
- Excavate/pile as required for turbine bases. Sidecast or store soil/peat locally for backfilling and re-use, if deemed feasible.
- Place blinding concrete to turbine bases using either a piled solution or on competent strata. 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.
- Backfill tower foundations and cover with previously stored granular material.
- Excavate cable trenches and install electrical ducting.
- Complete site works and reinstate site.
- Remove temporary site offices. Provide any gates, landscaping, signs, etc., which may be required.
- Install amenity links and associated amenity car parks.
- Provide any gates, landscaping, signs, etc., which may be required.

Electrical Works

- Construct bases/plinths for transformer.

- Excavate trenches for site cables, lay cables and backfill. Provide ducts at road crossings.
- Delivery and installation of all High-Voltage Equipment.
- Wiring and cabling of High-Voltage / Low-Voltage Equipment, protection and control circuit.
- Install external electrical equipment at substations.
- Install transformer at substation compound.
- Erect stock proof and palisade fencing around substation area.
- Install internal collector network and communication cabling.
- Establish traffic management.
- Construct grid connection.

Turbine Erection and Commissioning

- Backfill tower foundations and cover with suitable material.
- Set up erection crane(s) and deliver components to hardstands.
- Erect towers, nacelles, rotors and blades.
- Complete electrical installation.
- Decommission existing 100m high met mast.
- Install new permanent meteorological mast.
- Commission and test turbines.
- Complete site works and 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 Table 4-10 below, where the 1st of January has been selected for illustrative purposes as a start date for construction activities.

Table 4-10 Indicative Construction Schedule

ID	Task Name	Task Description	Month 1-3	Month 3-6	Month 6-9	Month 9-12	Month 12-15	Month 15-18	Month 18-24	Month 24-30
1	Site Health and Safety									
2	Grid Connection	Construct Proposed Grid Connection to Shannonbridge-Maynooth 220kV overhead line								
3	Site Compounds	Site compounds, site access, fencing, gates								
4.	Borrow Pits	Access/site roads to borrow pits, borrow pit excavation, landscaping, fencing								
5	Site Roads	Construction/upgrade of roads, construct underpasses, install drainage measures, install water protection measures								
6	Turbine Hardstands	Excavate/pile for turbine bases where required								
7	Turbine Foundations	Fix reinforcing steel and anchorage systems, erect shuttering, concrete pour								
8	Substation and Electrical Works	Construct substation, and underground cabling between turbines								
9	Backfilling and Landscaping									
10	Turbine Delivery and Erection									
11	Substation Commissioning									
12	Turbine Commissioning									

4.10.3 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 will be audited by the ECoW on behalf of the Project Developer, in an objective manner. The basis for auditing is presented in Section 10.2 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 must 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 Project and is included in Appendix 4-4 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 Project, 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 (provided in Chapter 18: Schedule of Mittigation and Monioting Measures) and compiled in Section 8 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.

4.11 Construction Methodologies

4.11.1 Proposed Wind Farm

4.11.1.1 Turbine and Met Mast Foundations

Foundations for wind turbines and the met mast may be of the gravity or bored piled type. Trial pitting and peat probing has been carried out at each of the turbine base locations to determine the approximate depth of excavation and fill required (refer to Section 4.4.3). The geotechnical investigations to date indicate that the majority of the foundations at the proposed wind farm site will be piled with some turbines able to utilise gravity foundations. Piling depths will depend on site conditions. These will be established by detailed post-consent geotechnical investigations. Pre-construction final design will be carried out after post-consent geotechnical investigations have been completed. Additional geotechnical investigations will be undertaken at each turbine location with associated sampling and laboratory testing.

Please see Table 4-11 below for predicted foundation types at each turbine location.

Table 4-11 Proposed Turbine Foundation Height and Type

Turbine ID	Ground Level (taken from Bore Hole, Trial Pit, and LiDAR Data) (mOD)	Height above ground level (m)	Proposed Top of Foundation (mOD)	Anticipated Foundation Type
T01	50.52	1.0	51.5	Piling
T02	50.9	1.0	51.9	Piling
T03	49.6	1.0	50.6	Piling
T04	51.7	1.0	52.7	Piling
T05	47.1	1.0	48.1	Piling
T06	48.5	1.5	50.0	Piling
T07	50.3	1.0	51.3	Piling
T08	49.6	1.0	50.6	Piling
T09	51.3	1.0	52.3	Piling
T10	52.7	1.0	53.7	Piling
T11	54.7	1.0	55.7	Piling
T12	47.0	1.5	48.5	Excavate/ Replace
T13	50.8	1.0	51.8	Piling
T14	47.9	1.0	48.9	Piling
T15	51.2	1.0	52.2	Excavate/ Replace

Each of the turbines to be erected on the Proposed Wind Farm will have a reinforced concrete base that is installed below the finished ground level. The turbine foundation may be formed using piling methods or 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 methods will be utilised. A methodology for reinforced concrete foundations and piled foundations is included in Section 2.3.3.1 of the CEMP, Appendix 4-4 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 5m-wide working area will be put in place around each turbine base, 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 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 runoff does not occur.

The soil at sub-formation level will have to be approved by a suitably qualified 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 (crushed rock) or similar hardcore material, compacted in 250mm 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 outfall out at the lowest point level spreader or settlement pond.

An embankment approximately 600mm high will be constructed around the perimeter of each turbine 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 100mm of blinding concrete laid on the formation material positioned using concrete skip and 360° excavator to protect ground formation and provide a safe working platform.

The turbine anchor cage components are delivered to the Proposed Wind Farm and assembled in situ. An approved and certified mobile telescopic crane or teleporter of suitable size will be used to unload reinforcing steel to required areas. The turbine anchor cage will be assembled and lifted into position using a crane and approved lifting appliances, prior to fixing the bottom mat of steel, reinforcing steel will be positioned around the anchor cage in accordance with the turbine suppliers' requirements. 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 prior to the concrete pour.

Formwork for concrete bases will be propped/supported. Concrete for bases will be poured using a concrete pump. Each base will be poured in three stages:

- Stage 1: the concrete is poured and vibrated in the centre of the anchor cage to bring the concrete up to the required level inside the cage.
- Stage 2: the centre of the steel foundation is poured and vibrated to the required level.
- Stage 3: the remaining concrete is poured around the steel foundation to the required finished level. After the concrete has set sufficiently the top surface of the concrete surface is finished with a power float.

Once the base has sufficient curing time it will be backfilled with suitable fill up to the finished ground level and finished with the original material that was excavated.

4.11.1.2 Site Roads and Crane Pad Areas

The construction methodologies for the road types and crane pad areas described below. Straight sections of proposed roadways will require a running width of approximately 6m to accommodate the transportation of large turbine components. Corners and junctions will be locally wider to allow the vehicles to manoeuvre around bends. The proposed new roadways will include passing bays to facilitate traffic passing around the site. The site access roads will be battered to safe permanent side slopes of 1V:2H. All site access roads will comply with the turbine supplier's requirements. Where BnM rail is in place, the proposed internal wind farm roads and amenity track will be floated over them to preserve them in situ.

4.11.1.2.1 *Construction of New Floating Roads*

Floating access roads are the predominant road construction type proposed for the site. The use of new floated access tracks will be limited on site to areas of flatter terrain with slopes typically less than 5 degrees.

The construction methodology for floating roads, as presented in the Peat and Spoil Management Plan in Appendix 4-3, is as follows:

1. *Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 2m.*
2. *Base geogrid to be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider's requirements.*
3. *Construction of road to be in accordance with appropriate design from the designer.*
4. *The typical make-up of the new floated internal road is up to 1,000mm [CJ1.1][AC1.2][CJ1.3]of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a geotextile separator (drawing P20-216-0600- 0017).*
5. *Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works, Series 600 (2013).*
6. *Following the detailed design of the floated internal roads it may be deemed necessary to include pressure berms either side of the internal road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the internal road will reduce the likelihood of potential bearing failures beneath the internal road.*
7. *The finished road width will be approximately 5.5m (5.0m running width), with wider sections on bends and corners.*
8. *Stone delivered to the floating road construction shall be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat shall not be carried out.*
9. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road shall be tipped over at least a 10m length of constructed floating road.*
10. *Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road shall carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.*
11. *Following end-tipping a suitable bulldozer shall be employed to spread and place the tipped stone over the base geogrid along the line of the road.*
12. *A final surface layer shall be placed over the full width of the floating road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic*

The construction methodology for floating roads over an archaeological feature (i.e., a togher), as presented in the Peat and Spoil Management Plan in Appendix 4-3, is summarised below

1. *Geotextile layer to be placed on the surface of the peat, extending 5m either side of the toghers. The extent of the togher will be confirmed on site by an archaeological specialist.*
2. *A layer of clean sand, 0.5m in thickness, will be placed on top of the geotextile to act as a buffer between the togher and the access road. The top of the clean sand layer will be dead rolled, without vibration.*
3. *Base geogrid to be laid on top of the sand layer along the line of the road in accordance with geogrid provider's requirements. Geogrid to be laid across the full width of the road, including the widened area for the cable trench.*
4. *Construction of road to be in accordance with appropriate design from the designer.*
5. *The typical make-up of the new floated internal road is up to 1,000mm of selected granular fill with 2 no. layers of geogrid (drawing P20-216-0600-0025).*
6. *Granular fill for the road construction to be placed and compacted in layers in accordance with the TII Specification for Road Works, Series 600 (2013).*
7. *The access road at these locations is to be widened to accommodate the cable trench (as per drawing P20-216-0600-0025. A minimum of 2m horizontal space is required between the edge of the access road and the edge of the cable trench.*

4.11.1.2.2 Construction of New Excavated Roads

The construction methodology for the construction of excavated roads, as presented in the Peat and Spoil Management Plan (Appendix 4-3), is summarised below and illustrated in in Plate 4-9 and Plate 4-10 below.

1. *Prior to commencing the construction of the excavated roads movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m.*
2. *Interceptor drains will be installed upslope of the internal road alignment to divert any surface water away from the construction area.*
3. *Excavation of roads will be to the line and level given in the design requirements. Excavation will take place to a competent stratum beneath the peat.*
4. *Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of internal road should be excavated without re-placement with stone fill.*
5. *Excavation of materials with respect to control of peat stability:*
    a. *Acrotelm (where present) or the upper layer of peat (to about 0.3 to 0.4m of peat) is generally required for landscaping and will be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping will be undertaken prior to main excavations.*
    b. *Where possible, the acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation.*
    c. *All catotelm peat or lower layers of peat (peat below about 0.3 to 0.4m depth) shall be transported immediately on excavation to the designated peat deposition areas.*
6. *Once excavated, non-catotelm peat will be temporarily stored in localised areas adjacent to excavations, where appropriate, for roads and hardstands before being placed into the permanent peat storage areas within the borrow pits and designated peat deposition areas. All peat placement areas will be upslope of founded roads/hardstands and will be inspected by the Project Geotechnical Engineer before material is stored in the area. Alternatively, peat will be side- cast local to the excavation or along adjacent internal roads.*
7. *Side slopes in peat shall be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required. Battering of the side slopes of the excavations will be carried out as the excavation progresses.*
8. *End-tipping of stone onto the road during the construction/upgrading of the internal road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the adjacent peat, is limited.*
9. *The excavated internal road will be constructed with a minimum of 800mm of selected granular fill. Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works.*
10. *Internal roads to be finished with a layer of capping across the full width of the road.*
11. *A layer of geogrid/geotextile may be required at the surface of the competent stratum.*
12. *At transitions between floating and excavated roads a length of road of about 10m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded so that the road surface transitions smoothly from floating to excavated road.*
13. *Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e. greater than 1.5m) and where it is proposed to construct the internal road perpendicular to the slope contours it is best practice to start construction at the bottom of the slope and work towards the top, where possible. This method avoids any unnecessary loading to the adjacent peat and greatly reduces any risk of peat instability.*
14. *A final surface layer shall be placed over the excavated road and graded to accommodate wind turbine construction and delivery traffic.*
15. *The construction and upgrading of internal roads in areas of deep peat (greater than 2m) will be inspected on a routine basis (by the Site manager/Ecological Clerk of Works/Project Geotechnical Engineer) during the works, particularly before/following trafficking by heavy vehicular loads.*

Plate 4-9 Internal roads under construction using the excavate and replace method. Source BnM.

Plate 4-10 Internal Road under construction demonstrating laying of geogrid/geotextile. Source BnM.

4.11.1.2.3 Decommissioning of Temporary Access Road

The Proposed Project will include the decommissioning of the temporary road facilitating access to Proposed Grid Connection infrastructure under the existing OHL. Once construction is completed this road will be closed, covered with a layer of topsoil and left to revegetate naturally.

4.11.1.2.4 Upgrading of Existing Road

Approximately 1.1km of the existing roads will require upgrading which will comprise widening of the roadway to a total running width of approximately 6m, 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:

1. *Internal road construction shall be to the line and level requirements as per design/planning conditions.*

2. *For upgrading of existing excavated internal roads (Type A) the following guidelines apply:*
    a. *Excavation of the widened section of internal road should take place to a competent stratum beneath the peat (as agreed with the designer) and backfilled with suitable granular fill.*
    b. *Benching of the excavation may be required between the existing section of internal road and the widened section of internal road depending on the depth of excavation required.*
    c. *The surface of the existing internal road should be overlaid with up to 500mm of selected granular fill.*
    d. *Internal roads to be finished with a layer of capping across the full width of the track.*
    e. *A layer of geogrid/geotextile may be required at the surface of the existing internal road and at the base of the widened section of internal road (to be confirmed by the designer).*
    f. *For excavations in peat, side slopes shall be not greater than 1 (v): 3 (h). This slope inclination should be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required to ensure stability.*
3. *The finished road width will have a running width of 5m, with wider sections on bends and corners.*
4. *On side long sloping ground any road widening works required will be done on the upslope side of the existing internal road, where possible.*
5. *At transitions between new floating and existing excavated roads a length of about 10 to 20m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded to accommodate wind turbine construction and delivery traffic*

4.11.1.3 Crane Hardstands

All crane pads 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 (Section 4.11.1.2.2 above) and will measure in accordance with the turbine manufacturer's requirements. Where an excavated crane hardstand cannot be used due to the depth of peat, the hardstand will be supported by using reinforced concrete piles per the methodology outlined for piled foundations discussed in Section 4.11.1.1 above. Please see Figure 4-1 for crane hardstand locations.

4.11.1.4 Underpass Extension at Site Entrance 1

To facilitate delivery of turbine components to the Proposed Wind Farm it is proposed to extend the existing underpass located along the N62 national road.

The proposed underpass extension will be carried out at an existing underpass which traverses beneath the N62 in order to facilitate the delivery of abnormal loads. To ensure turbine components safely enter the Proposed Project site, it is intended to construct the underpass extension in an eastwards direction to establish a temporary access junction for turbine delivery vehicles to allow access to the Proposed Project site.

The construction methodology for the underpass extension, is summarised below.

1. *Remove overgrowth on the eastern side of the underpass for the full extent of the proposed extension.*
2. *Confirm locations of watermain and other services and provide protection to same as required.*
3. *Remove wing wall at eastern side of underpass and store for possible reuse.*
4. *Excavate and construct blinding layer recast arch system.*
5. *Install segmental precast concrete arch to match existing.*
6. *Install precast concrete wing walls.*

7. *Remove existing fence at the southeast corner of the underpass.*
8. *Backfill around underpass extension to form new bell mouth area taking care to balance the backfill levels on each side of the arch.*
9. *Extend 450mm diameter drainage pipes to the end of the extension.*

4.11.1.5 Proposed Watercourse Crossings

It is proposed to construct a clear-span watercourse crossing along the site access roads at 2 no. locations using a clear-span bridge. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 of this EIAR.

Clear-Span Watercourse Crossing 1 is located at ITM X615354, Y728152 and Clear-Span Watercourse Crossing 2 is located at ITM X616121, Y728023. Both watercourse crossings will be installed using the methodology outlined below. Please note, an existing clear-span bridge is present at Clear-Span Watercourse Crossing 2, this will be decommissioned prior to the construction of the new proposed clear-span crossing. The decommissioning methodology is the same as that for the decommissioning of culverts and is outlined in Section 4.11.1.6.1 below.

The standard construction methodology for the installation of a clear-span bridge watercourse crossing is as follows:

1. *Silt fencing is to be erected at run-off areas adjacent to the works area.*
2. *Oil booms are to be established both upstream and downstream of the works. Spill kits are required on both banks of the stream and are to include oil-only absorbent booms.*
3. *Area to be Cable-Avoidance Tool (CAT) scanned for any potential existing services. Any possible services are to be marked and identified.*
4. *The culvert location will be set out by the Site Engineer.*
5. *Life Buoys and spill kits will be positioned at prominent locations adjacent the works.*
6. *Excavation will commence using an excavator, reducing ground levels at the existing crossing to expose the existing pipe. Spoil arising from the works will be sidecast and/or transported to the peat deposition area.*
7. *Flows will be plugged temporarily to allow installation of clay bunds and removal and replacement of the pipe. Dependent on flows, over-pumping may be necessary for a time to allow temporary bunding of the works area both upstream and downstream and directing of flows towards the pipe.*
8. *Where over-pumping is necessary, a 4" pump will be utilized using a shallow sump to discharge downstream. The downstream end is to discharge on a plywood sheet or similar placed at an angle on the embankment to prevent scour to the river bed and utilize the vegetation to dissipate flows.*
9. *Clay bunds will be formed across the stream, both upstream and downstream beyond the extent of the required foundations. Channels will be excavated across the stream with any river bed gravels set aside for future reinstatement of the culvert bed. Clay bunds will then be constructed, integrating the pipe both upstream and downstream.*
10. *The pipe will extend beyond the bund and graded out to both inlet and outlet utilizing any available gravel as a temporary bed in proximity to the pipe.*
11. *The bunds both upstream and downstream will extend to the embankments on either side enclosing the works area. Rock armour will be installed if necessary both upstream and downstream to protect the pipe from undermining.*
12. *Excavation will proceed adjacent to the existing pipe benching down to formation whilst maintaining the existing pipe in place. Inspections and testing if required will be carried out to confirm suitable bearing capacity.*
13. *Sumps consisting of vertical pipes surrounded with clean stone will be installed within the excavations to direct any water ingress and allow dewatering of the works area.*
14. *Water will be pumped through hoses to a settlement tank to discharge through a silt sock prior to reaching the existing field drainage system.*
15. *Over-pumping arrangements will be put in place with flows directed downstream.*

16. *The existing pipes will be removed whilst maintaining the bunds.*
17. *Existing stream bed will be maintained.*
18. *New drainage pipes will be laid at the existing fall. New drainage stone Cl. 505 or similar will be used as a surround around the new pipes.*
19. *Excavation will be backed filled and compacted in layers up to the required level.*
20. *All areas adjacent to the works will be reinstated.*

A standard design drawing of a pre-cast concrete, clear-span crossing is shown in Figure 4-45.

The clear-span watercourse crossing methodologies presented will ensure that no instream works are necessary.

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 watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Appointed Contractor with input from the Project Hydrologist prior to the construction of the crossing.

4.11.1.6 Culvert Crossings

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 must 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 900mm 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.

4.11.1.6.1 *Decommissioning of Culvert Crossing*

A proposed temporary culvert (constructed in line with the methodology in Section 4.11.1.6) will be removed after the construction phase is completed. The temporary culvert to be removed is located at ITM X614742, Y731224. Please note, an existing crossing is also in place at Watercourse Crossing 2 (detailed above). This existing crossing will be removed in line with the below.

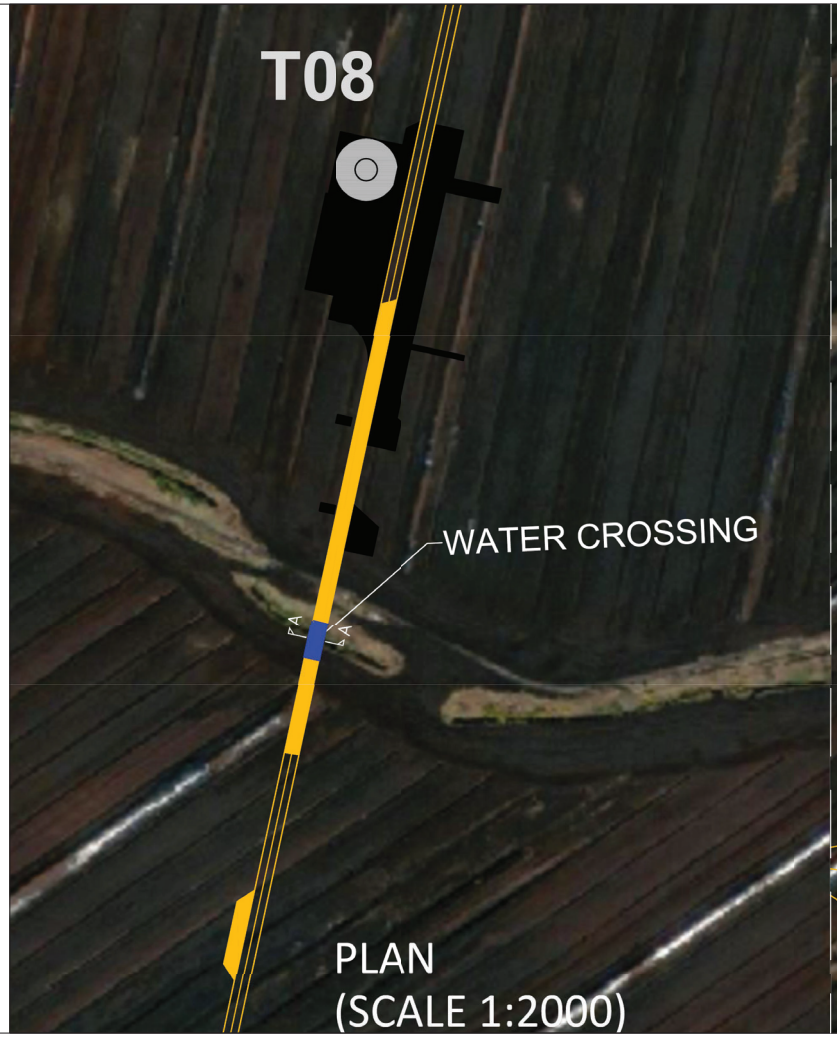
The standard construction methodology for the removal of a culvert/watercourse crossing is as follows:

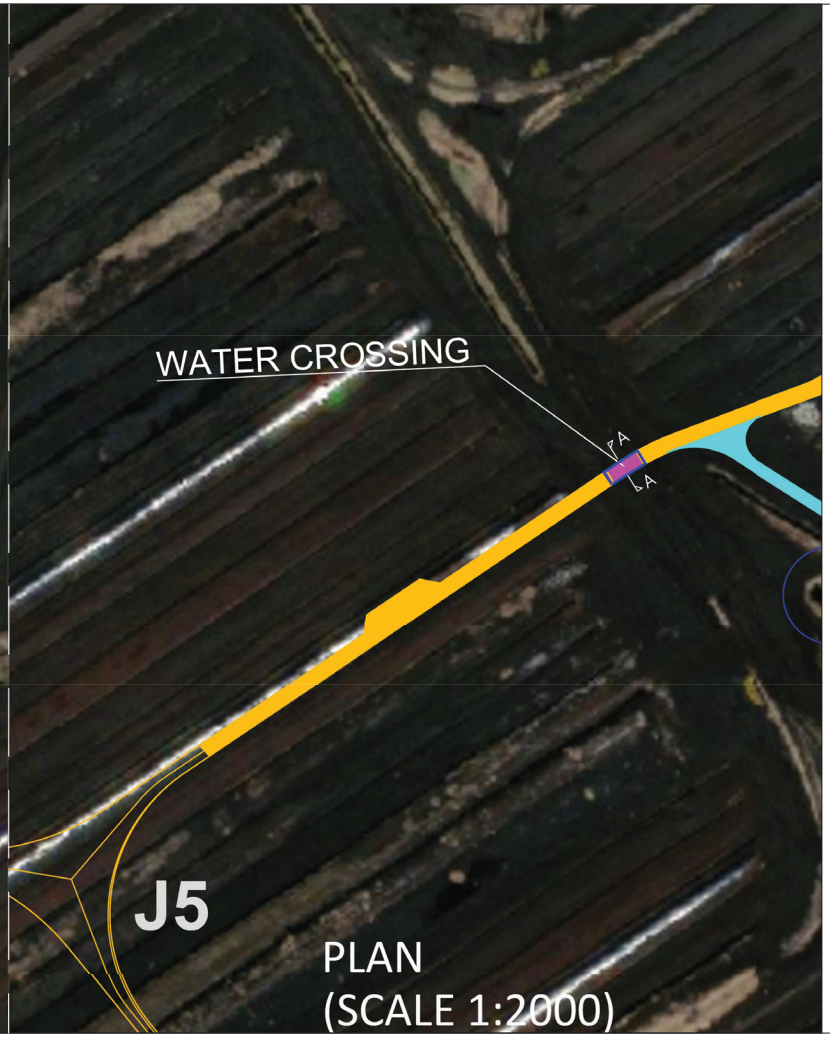
1. *Prior to any works commencing, Inland Fisheries Ireland (IFI) will be consulted to inform detailed design of the temporary culvert removal.*
2. *These works will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", i.e.,*

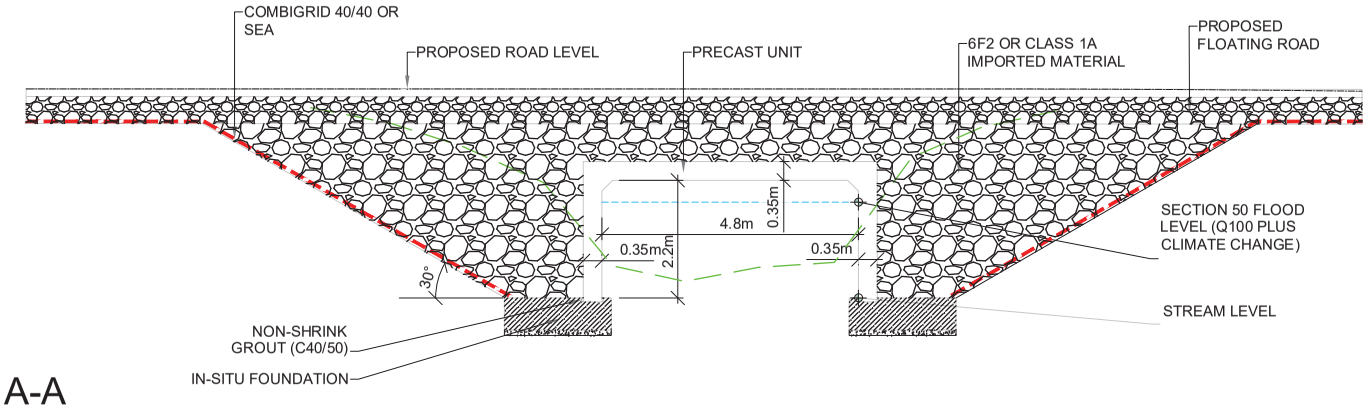
July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);

3. *Timing of these works will be planned based on expected weather within the optimum period of July to September, ground conditions and current flow in the drainage ditch, to minimise construction period and disturbance to any potential downstream aquatic environment. It was noted during site work carried out in February 2025 that the identified drainage channel was dry, this would indicate that the channel is dry throughout the year but to ensure no downstream impacts, works will be carried out in the identified optimum period by the IFI Guidance.*
4. *The Project Engineer will set out the works area and silt fencing will out erected at run-off areas adjacent to the works area.*
5. *The works area will be fenced off with post and rope to demarcate the works area. Prior to any works taking place, the area will be CAT scanned to identify any potential unknown underground services.*
6. *Oil booms will be established both upstream and downstream of the works and spill kits, inclusive of oil-only absorbent booms, will be required on both banks of the stream*
7. *The centre line of the new culvert will be set out by the engineer on both upstream and downstream sides*
8. *The topography and ground conditions will be reviewed at the location. Safe access will be provided for all operatives. This may involve the creation of ramps, temporary walkways, etc.*
9. *Pumping equipment will be set up at the upstream end of the works area. The hose will have a suction head fitted which will reduce the possibility of any aquatic species that may be present being sucked into the pump. Additionally, the hose will be positioned to one side of the channel and surrounded by clean stone offering further protection. The delivery hose shall be laid out across the road, which shall discharge, re-entering the watercourse downstream of the works area on the opposite side of the road.*
10. *The delivery line may need to be undergrounded across the access track to allow site traffic to access the works area.*
11. *A dam will be constructed at the upstream end by an excavator placing impermeable 1m^3 sandbags within the drainage channel. These can be supplemented with smaller sandbags to plug any gaps.*
12. *Water will be allowed to partially self-empty from the isolated section. If the drainage channel is deemed to be fisheries sensitive, a smaller dam will then be placed at the downstream end before the section completely empties out and further consultation with IFI in relation to electrofishing and determining the presence of fish will be carried out. Once the presence of fish has been ruled out, the section can be fully dewatered. A pump may be used to aid this if necessary.*
13. *Water will be over pumped and discharged to an approved location downstream.*
14. *Clean stone may be used at the discharge point to protect the drainage channel against scouring. It will also act to filter silty water arising from dam installation and removal afterwards.*
15. *A suitable sized excavator will then commence the initial excavation down to the top of the temporary 225/300mm pipe.*
16. *The excavation of the temporary culvert works will continue by excavating out the temporary 225/300mm piped culvert to the existing formation.*
17. *The excavated culvert and associated structure will be loaded into a dumper and transported to a suitable disposal area.*
18. *Any suitable materials from the drainage channel bed will be removed and stockpiled for reinstatement in the new bed upon completion of the construction works.*

The new bed will be reinstated with stone backfill; backfill will be placed and compacted up to the required level above the bottom of the watercourse and the proposed temporary access roads will be reinstated as per agreed design.







SECTION A-A
SCALE 1: 100

Drawing Notes

1. **Drawing Status**: *Planning Stage Only* - This drawing is intended for concept development and preliminary review and does not represent final or detailed design specifications.

PROJECT TITLE:
Lemanaghan Wind Farm, Co. Offaly

DRAWING TITLE:
Clear Span Water Crossing Detail

PROJECT No.:	DRAWING No.:	SCALE:
200804	Figure 4-45	1:100 @ A3

DRAWN BY:	CHECKED BY:	DATE:	REVISION.:
FB	GO	23.03.2026	P01

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

4.11.1.7 Borrow Pits

The estimated volume to be extracted from the 4 no. proposed borrow pits for the construction of the Proposed Project is approximately 15,587m^3 of peat and 159,522m^3 of spoil. This figure presented are the anticipated maximum volumes; however, the actual volumes to be removed from the 4 no. borrow pits will be confirmed at the time of construction and following detailed pre-construction site investigation works. The 4 no. borrow pits will be excavated and backfilled as follows:

1. *The rock within the proposed borrow pit footprints will be removed by breaking based on assessment of its excavatability, which has been determined from a ground investigation carried out at the proposed borrow pits.*
2. *It is proposed to construct the borrow pits so that the base of the borrow pits are below the level of the adjacent section of internal road. As excavation progresses into the back edge of the borrow pits, localised deepening of the borrow pit floors may be required depending on extraction operations.*
3. *It may be possible to excavate the rock from the borrow pits whilst leaving in place upstands/segments of intact rock which will retain the placed peat and spoil in individual cells. The upstands/segments of intact rock will essentially act as engineered rock buttresses within the borrow pits, forming a series of cells (up to 4 no.). The cells will be opened in sequence and filled as needed.*
4. *Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance.*
5. *Where it is not possible to leave upstands/segments of intact rock in place it will be necessary to construct rock buttresses founded on in-situ rock within the borrow pits to create individual cells. The rock buttresses will be constructed of rock fill from the borrow pit excavation, placed and compacted in layers. The founding stratum for each rock buttress will be inspected and approved by The Project Geotechnical Engineer.*
6. *The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells. The buttress shall be constructed of selected rock fill and placed and compacted in suitable layers to form a buttress of sufficient stability to retain the placed peat and spoil.*
7. *Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, leaving in place upstands/segments of intact rock which will help to retain the placed peat spoil and will allow the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely.*
8. *A number of rock buttresses to form cells within the borrow pits will be required to ensure access for trucks and excavators can be achieved.*
9. *The rock buttresses shall be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress shall be constructed between 40 to 60 degrees.*
10. *A rock buttress will be required on the downslope side of the borrow pits to safely retain the infilled peat and spoil. The height of the berm constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil run-off. A berm up to 8m (max.) in height will be required.*
11. *The rock buttress will be founded on mineral soil or bedrock i.e. competent strata. The founding stratum for the rock buttress will be inspected and approved by the Project Geotechnical Engineer.*
12. *A level surface in the underlying mineral soil or Weathered Bedrock will be prepared before placing and compacting the rock fill used to construct the berms.*

13. *The use of temporary access ramps and long reach excavators during the placement of the excavated peat and spoil is likely to be required.*
14. *The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings.*
15. *As the berms are slightly higher than the retained peat, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent.*
16. *A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits may be required.*
17. *The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits.*
18. *Supervision by the Project Geotechnical Engineer is required for the development of the borrow pits.*
19. *All the above-mentioned general guidelines and requirements will be implemented by the Contractor during construction.*

4.11.1.7.1 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 large and in the 40-60 tonne weight 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 weight 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.

4.11.1.8 Cable Trenching

The transformer in each proposed turbine will be connected to the proposed onsite 220kV substation through a network of buried electrical cables. 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 previously excavated 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 cables and the surface (see Plate 4-11 below illustrating an example of a single cable trench). On completion, the ground will be reinstated as previously described above. The route of the cable ducts will follow the access tracks as illustrated on the Proposed Project site layout drawings included as Appendix 4-1 of the EIAR. The cabling may be located on either side of the road and/or within the road footprint.

Any underground services encountered along the internal cabling trench where it is located within he public road corridor (i.e the L7002 crossing) will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300 mm will be required

between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.

Plate 4-11 Typical Cable Trench View left, reinstated trench, right. Source: BnM.

4.11.1.9 Temporary Construction Compounds

As part of the Proposed Project, 5 no. temporary construction compounds are proposed as part of the Proposed Project as discussed in Section 4.4.1.5 above. The construction compounds will be constructed using excavate and replace methods but may be floated or partially floated pending the results of the detailed ground investigations.

- 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 (refer to Section 4.9 above);
- The compound will be established using a similar technique as the construction of new roads as discussed below;
- Where required, a layer of geogrid will be installed, 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;
- Areas within the compound will be constructed as site roads and used as vehicle hard standings 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;
- If necessary the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged;

- During the construction phase, a temporary toilet block unit will located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and;
- The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required
- Upon completion of the construction phase of Proposed Project, the 5 no. proposed temporary construction compounds will be removed, with the areas associated with Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 being utilised for amenity car parks during the operational phase.
    - The areas associated with Temporary Construction Compound 2 and Temporary Construction Compound 5 will be reinstated with previously excavated peat and spoil, and either be reseeded or left to revegetate naturally. Please see section 4.4.1.5 above for further details on the temporary construction compound.

Further information on the amenity car parks is provided above in Section 4.4.1.9 above.

4.11.1.10 Decommissioning of Existing Anemometry Mast

The Proposed Project will include the decommissioning of the existing 100m-high met mast on the site. This work will include the following steps:

1. *Mobilise on site with 1 no. tractor and trailer and 1 no. 13+ tonne excavator. Excavated soil will be appropriately tested and transported off site by a licensed waste transfer hauler as required.*
2. *Establish safe working area around mast.*
3. *Climb mast and remove instruments and logger box.*
4. *On one side of the mast, transfer guy ropes from ground anchors to the 13+ tonne excavator.*
5. *Cut guy rope attached to 13+ tonne excavator to allow mast to fall.*
6. *Excavate mast anchors and anchor bases making good the ground.*
7. *Dismantle and remove mast components and accessories from site using trailer.*
8. *Demobilise from the site.*

4.11.1.11 Amenity Pathways

The amenity pathways and additional connections are discussed and shown in the Lemanaghan Amenity Plan which is contained in Appendix 4-2 and are illustrated in Figure 4-1. The additional connections will be 3m in width and will be constructed using a similar methodology as outlined in Section 4.11.1.2.1 above.

Seating areas and detailed site signage are included as part of this planning application and will be present throughout the Proposed Wind Farm, please see Appendix 4-2 for further detail.

4.11.2 Proposed Grid Connection

The Proposed Grid Connection will connect to the national electricity grid via a proposed 220kV substation which will be sited in the northern part of the Proposed Project site. The Proposed Grid Connection will consist of approximately 0.8km of overhead line (comprising 0.4km of OHL from the proposed steel masts for the double loop-in/loop-out from the proposed onsite 220kV substation to the

existing OHL), 4 no. new steel masts, and the removal of 1 no. existing steel mast. The proposed new 4 no. lattice masts will be located within the site.

Of the 4 no. proposed new steel masts, 2 no. new steel masts will be constructed at the proposed onsite 220kV substation, and 2 no. new steel masts will be constructed along the existing Shannonbridge-Maynooth 220kV OHL. The existing Shannonbridge-Maynooth 220kV OHL conductor will be terminated at 2 no. towers in order to facilitate a new OHL loop from the proposed onsite 220kV substation into the Shannonbridge-Maynooth 220kV OHL. The existing conductor will be removed between the steel masts; the new steel mast locations have been selected based on ground surveys, ground profiles, allowable angles and ruling span checks.

Steel Mast Structures

The following section outlines the methodology to be followed during construction works of the new steel masts which will be constructed north of the proposed onsite 220kV substation and underneath the existing Shannonbridge-Maynooth 220kV OHL:

1. *A foundation c.4.4m x 4.4m x 3.6m is excavated and the formation levels (depths) will be checked by the onsite foreman. See Plates 4-12 and 4-13 below. The excavated material will be temporarily stored close to the excavation and excess material will be used as berms along the site access roads.*
2. *The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The base and body section of each tower will then be assembled next to excavation.*
3. *Concrete trucks will pour concrete directly into each excavation in distinct stages. A final pour for the mast is the encasing of the mast leg which shall be finished 300mm over finished ground level. The leg of the mast is required to be shuttered with metal panels to form its required shape (see Plate 4-14 below).*
4. *The mast foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. All surplus excavated material and removed from the mast locations and stored in berms for use across the construction site.*
5. *An earth mat consisting of copper wire will be laid c. 400mm below ground around the mast.*
6. *A hardstand area for the crane shall be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.*
7. *A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.*
8. *A temporary hardstand area shall be constructed to allow the assembly and laydown of the towers.*
9. *As the masts are located under the existing 220kV line, the line will be de-energised by ESB Networks so work can commence on the construction of the masts.*
10. *The mast section will be lifted into place using the crane and guide ropes and the body sections will be bolted into position (see Plate 4-15 below).*

Plate 4-12 Steep Back Excavation. Source: BnM

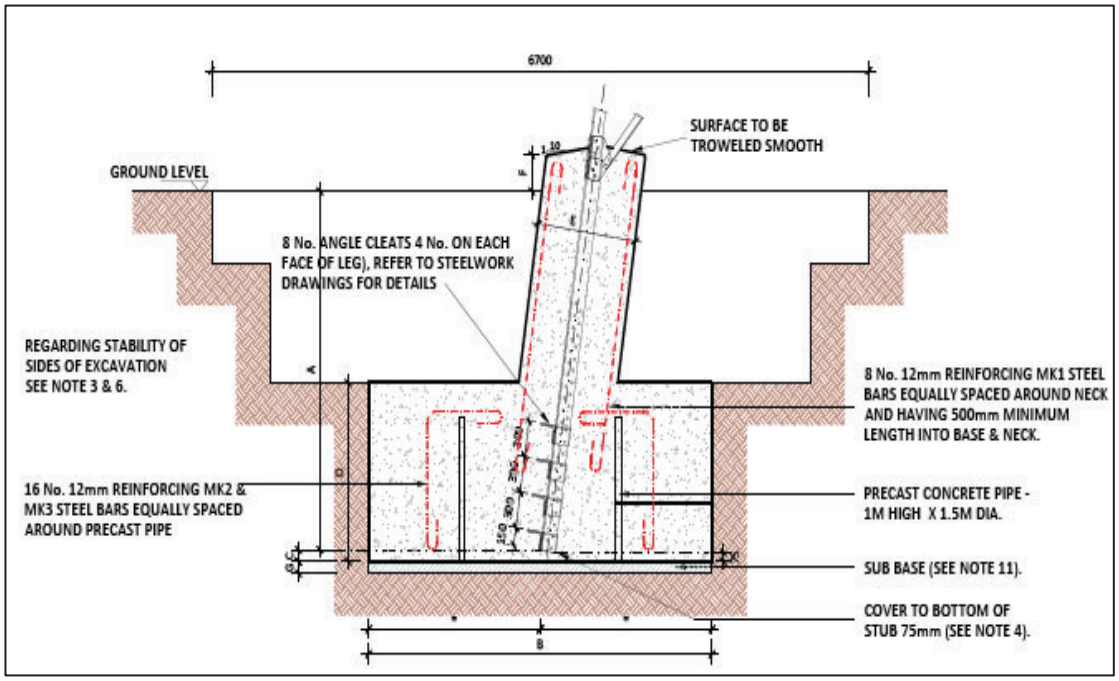


Plate 4-13 Steel mast tower foundation. Source: BnM

Plate 4-14 Steel lattice tower foundation complete. Source: BnM

Plate 4-15 Completed End Mast Tower. Source: BnM

Gantry Structures

The following section outlines the methodology to be followed during construction works of the gantry tower structures which will be constructed underneath the existing Shannonbridge-Maynooth 220kV OHL:

1. *A foundation of c. 5m x 4m x 2.35m deep will be constructed.*
2. *Reinforced bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each gantry will be assembled next to the excavation.*
3. *A setting template is sued to set and hold the gantry J-bolts in position while the concrete is being poured and cured.*
4. *Concrete trucks shall pour concrete directly into each excavation in distinct stages. A final pour for the base is the encasing of the gantry leg which shall be finished 300mm over finished ground level.*
5. *The gantry foundations shall be backfilled on leg at a time with a 200mm layer of deep compacted T.0 graded granular fill material. A finishing 100mm layer of compound stone is layered on top of a geotextile to finish the compound ground level. The backfill shall be placed and compacted in layers.*
6. *A hardstand area for the crane shall be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.*
7. *A physical barrier (Heras Fence Site Boundary) shall be put in place to restrict plant from coming too close to the OHL.*
8. *A temporary access road shall be constructed to allow access to the tower locations.*
9. *A temporary hardstand area shall be constructed to allow the assembly and laydown of the gantries.*
10. *The gantries shall be constructed lying flat on the ground beside the recently installed cable compound on the temporary hardstand.*
11. *The gantry section will be lifted into place using the crane and guide ropes and the body section will be bolted into place (see Plate 4-16 below).*

Plate 4-16 Stepped Back Excavation for Gantry Foundations. Source: BnM

Stringing of Conductors

Stringing of OHLs on the supporting lattice structures will be kept clear of all obstacles along the straight by applying sufficient tension. This method requires the pulling of a light pilot line (nylon rope) which is normally carried by hand into the stringing wheels. This in turn is used to pull a heavier pilot line (steel rope) which is subsequently used to pull the conductors from the drum stands using specifically designed “puller – tensioner” machines (Plate 4-17). The main advantages with this method are:

- The line is protected from surface damage.
- Major obstacles can be completed without any significant disruption.

Plate 4-17 Puller – Tensioner Machine. Source: BnM

Once the conductors have been pulled into position, one end of the straight is terminated on the appropriate tension fittings and insulator assemblies. The free end of the straight is then placed in temporary clamps which take the conductor tension. The conductor is then cut from the puller-tensioner and the conductor is sagged using a chain hoist. Bird flight diverters or warning spheres can be added following the sagging procedure if required.

4.11.2.2 Substation and Control Building

Once ground preparation per the methodology for site roads as described previously is completed, the onsite substation will be constructed by the following methodology:

1. *The 220kV Gas-Insulated Substation (GIS) shall be in a compound of c. 119.2m by 66.75m, surrounded by a 2.6m-high palisade fence with a total area c. 7,956.6m^2. See Plate 4-18 below for a typical 220kV GIS switching substation.*
2. *The IPP portion shall be in a compound of c. 19m by 12m. surrounded by 2.6m high palisade fence with a total area c. 3,099m^2. The IPP compound will have a shared fence line with the 220kV substation.*
3. *The substation and IPP compound drainage shall be marked by a qualified engineer.*
4. *A drainage system shall be installed around the compound area.*
5. *Topsoil and subsoil shall be removed from the footprint of the compound using an excavator. The excavated material shall be temporally stored in adjacent berms for layer use during reinstatement works.*
6. *A layer of geotextile material shall be laid over the footprint of the compound (please see Plate 4-19 below).*
7. *Using an excavator, a base of clause 804 material shall be laid followed by a 6F2 layer which will provide a finished surface. Clause 804 material is a specific type of material used in road construction and sub-base layers consisted of crushed stone, crushed concrete, or a mixture of both, 6F2 material is a granular fill material consisting of crushed concrete, crushed brick, or reclaimed construction aggregate.*
8. *Each layer shall be compacted using a vibrating roller.*
9. *Earthing cable shall be laid underground around the vicinity of the substation for connection to various electrical components during the electrical fit-out phase.*

10. *The construction of the substation compounds consists of a 220kV two-storey switching GIS building, two 220kV gantries, and associated outdoor electrical equipment.*
11. *Adequate lighting shall be installed around on the compound on lighting masts.*
12. *Lighting protection masts with an approximate height of 18m shall be installed to provide lighting protection to the substation compound.*
13. *Two 220kV gantries and associated line equipment shall be required to connect the 220kV overhead lines into the substation. Support structures shall be located outdoors.*

Plate 4-18 Typical 220kV GIS Switching Substation. Source: BnM

Plate 4-19 Crushed Rock Roadway Build-Up with Geo-Textile. Source: BnM

4.11.2.2.1 Bored well

The bored well will be constructed in line with a common domestic borehole using a drilling rig. The rig will be reversed to the target drill site using every care to get to the exact proposed well location. Final plumbing and centralising will be completed utilising hydraulic jacks and packing plates to ensure a secure base for the rig.

Open hole drilling will commence using a rotating drill head to accommodate a 200mm outer conductor steel casing to adequate depth. A nominal 125mm PVC well sleeve will be placed mid-range within the borehole once drilling head and string have been removed.

The drill string is that part of the drilling unit which works mainly within the borehole, connecting the surface drill rig to the bit. In effect the main function of the drill string is the efficient transmission of power in the deepening hole. As required the drill pipes are mechanically lifted into place and released when the drill pipe is over the table. The next pipe is then screwed into the last drill pipe and torqued up as drilling continues.

Air and water will be used to flush out the hole as drilling proceeds. Discharge water and drill cuttings will be diverted to an adapted skip by Bauer pipe from drill table at the back of the drilling rig. This will allow settlement of fines and sediment.

An in-well pump will direct water to a water tank within the roof space of the proposed control building (subject to final design).

4.12 Operation

The Proposed Wind Farm is expected to have a lifespan of approximately 35 years. As part of the Proposed Wind Farm planning application, permission is being sought for the full operational life of the Proposed Project. 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 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.

4.12.1 Maintenance

Each turbine will be subject to a routine maintenance programme involving several checks and changing of consumables, including oil changes. In addition, there may be 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.

The proposed onsite 220kV substation and site tracks will also require periodic maintenance. The proposed onsite 220kV substation would be operational 24 hours per day, 7 days per week throughout the year. Substations can be operated remotely and manually. Supervisory operational and monitoring activities will be carried out remotely using a Supervisory Control and Data Acquisition (SCADA) system, with the aid of computers connected via a telephone modem link. The following maintenance procedures will also be adhered to:

- Periodic service and maintenance works which include some vehicle movement.
- For operational and inspection purposes, substation access is required.
- Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following:
    - 6-month service – 3-week visit.
    - Annual service – 6-week visit.
    - Weekly visits as required.

Occasional technical problems may require maintenance visits by technical staff. During the 6-month and annual service visits, some waste (lubricating and cooling oils, packaging from spare parts or equipment, unused paint, etc.) will arise. This will be recorded and removed from the site and reused, recycled or disposed of in accordance with the relevant legislation in an authorised facility.

It is estimated that 1-2 daily visits will be made to the site for authorised persons and vehicles to undertake minor routine maintenance and inspection, if and when required. Although the level of activity required for the maintenance of the both the Proposed Wind Farm and Proposed Grid Connection infrastructure is minimal, the impacts associated with traffic volumes for this period are assessed in Chapter 15.

4.12.2 Monitoring

Section 8 of the CEMP sets out a programme of monitoring required for the operational phase of the Proposed Project. The CEMP will be consulted for detailed information on the monitoring requirements during the operational phase. However, a brief summary of the key information is provided below:

- Monthly sampling and laboratory analysis will be undertaken for the first 6 months of the operational phase of the Proposed Wind Farm.
- The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.
- Post-construction bird monitoring which includes breeding bird surveys, winter roost surveys and corpse searching on the site determine the level of fatalities for the site as a result of collisions with the installed turbines. These surveys will be completed in accordance with guidelines issued by the Scottish Natural Heritage (SNH, 2009).
    - Vantage point surveys will be undertaken to monitor flight activity within a 500m radius of the turbine positions monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the Proposed Wind Farm
- Post-construction bat monitoring will be undertaken for at least 3 years post construction of the renewable energy development. The monitoring will also include corpse searching in the areas surrounding the turbines to gather data on any actual collisions.
- Monitoring of habitat enhancement will be carried out annually until the proposed habitats have been sufficiently established and have given consistent results for 3 consecutive years after the establishment phase.
- Monitoring for shadow flicker at properties where any exceedance of the shadow flicker limit has been predicted as outlined in Chapter 5.
- Post turbine commissioning noise monitoring.

4.13 Decommissioning

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully.

The decommissioning of the Proposed Wind Farm will be completed in compliance with the requirements of the Rehabilitation Plan for Lemanaghan Bog as appropriate.

Upon decommissioning of the Proposed Wind Farm, the wind turbines will be disassembled in the 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 turbines 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 proposed turbines to the proposed onsite 220kV substation will be removed from the cable ducts and any direct buried cables will be cut and left in situ. 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 from the site for recycling. Turbine foundations would remain in place underground and would be covered with previously excavated earth and allowed to revegetate or 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 Project by the time the decommissioning of the Proposed Wind Farm 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 be widely utilised for amenity purposes by the local community and as part of the MTN.

The Proposed Grid Connection will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid.

A Decommissioning Plan has been prepared (Appendix 4-8) the detail of which will be agreed with the Local Authority prior to any decommissioning. 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 agree with the Planning Authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR. Please note, decommissioning of the Proposed Wind Farm will be completed in compliance with the requirements of the Rehabilitation Plan for Lemanaghan Bog (Appendix 2-4) as appropriate.

As noted in the Scottish Natural Heritage (SNH) report *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 Proposed Project, 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".*