

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

This chapter has been reviewed and updated where necessary considering any subsequent modifications, updates and additional information acquired for the Further information Request issued by Louth County Council (LCC) on the 6th February 2025 (Reference No: 2460766). It is noted that for ease of reference all changes from the original chapter are shown in orange. Where text has been removed it is shown as ~~strikethrough~~.

2.1 INTRODUCTION

This chapter of the EIAR provides a description of all elements of the proposed Kellystown Wind Farm (Proposed Development). This is required by Article 5(1)(a) and Annex IV paragraph 1 of the EIA Directive and Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended).

The requirements for the Description of the project are outlined below:

- (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.*
- (b) a description of the location of the project;*
- (c) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*
- (d) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*
- (e) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.*

2.2 OVERVIEW

For the purposes of this EIAR, where the 'Proposed Development' is referred to wind turbines, all site infrastructure (access tracks, substation(s)), Battery Energy Storage System (BESS), temporary construction / storage compounds, permanent meteorological mast, biodiversity enhancement measures and the works required within the Redline Boundary for the Grid Connection and Turbine Delivery Route.

This chapter also provides a description of the proposed works required along the Turbine Delivery Route (TDR) which are outside the Redline Boundary and which together, with the works within the Redline Boundary, are defined as 'The Project' which form the basis of the

assessments presented within chapters 5 to 19. This chapter provides details of the construction, operational and decommissioning phases.

This chapter includes an overview of 'the Project' followed by a detailed description of the main components and their method of construction. Measures that have been built into the design of the Project to reduce environmental effects, also known as '*embedded mitigation measures*', are set out in the various technical chapters and in this chapter. In addition to these embedded mitigation measures, Chapters 5 to 20 also present mitigation and enhancement measures where specifically relevant to their assessment topic.

This chapter of the EIAR is supported by Figures in Volume III and the following Appendix documents provided in Volume IV:

- **Appendix 2.1:** Construction Environmental Management Plan (CEMP) Revision 2
- **Appendix 2.2:** Forestry Report
- **Appendix 2.3:** TLI Technical Notes
- **Appendix 2.3a:** TLI - Construction Methodology
- **Appendix 2.3b:** TLI – 05949-DR-001_Junction 10 SLP
- **Appendix 2.3c:** TLI - Kellystown Anticipated Construction Program
- **Appendix 2.4:** List of Projects for Cumulative Assessment

2.2.1 Statement of Authority

Jennings O'Donovan & Partners Ltd. (JOD) have extensive experience in all aspects of wind farm development, from design and planning stages through to construction. JOD have been active as engineering consultants in the wind energy market in Ireland since 1998 and have completed numerous wind farm projects, varying from single wind turbine installations to large-scale, multi-turbine developments with a total of over 2,000 MW generation capacity.

This section has been prepared by Mr. Ryan Mitchell of JOD. Mr. Mitchell has a Bachelors' Degree in Animal Conservation and Biodiversity, has a strong proven background in ecology and civil engineering project management with 7 years' of experience working in the sector. He is experienced in report writing, EIAR chapter writing and project management working on EIA Reports (EIAR) for wind farm developments in Ireland.

The chapter has been reviewed by Mr. David Kiely of JOD. Mr. Kiely has 42 years' experience in the civil engineering and environmental sector. He has obtained a bachelor's degree in civil engineering and a Master's in Environmental Protection, has overseen the

construction of over 60 wind farms and has carried out numerous soils and geology assessments for EIARs. He has been responsible for the overall preparation of in excess of 60 EIARs.

This Chapter was reviewed and updated considering any subsequent modifications, updates and additional information acquired for the Further information Request issued by Louth County Council (LCC) on the 6th February 2025 (Reference No: 2460766) by Mr. Ryan Mitchell an Environmental Scientists at Jennings O'Donovan & Partners Ltd.

2.3 PROJECT DESCRIPTION

Planning permission is being sought by the Developer for the construction of 5 wind turbines, a Permanent Met Mast, 38kV on-site substation and all ancillary works and the construction of an underground Grid Connection to Drybridge 110kV Substation, in the townlands of Ballymakenny, Brownstown, Carntown, Carstown, Cartanstown, Castletown, Drumshallon, Gallstown, Groom, Kearneystown, Keeverstown, Killineer, Mell, New Town, Monasterboice, Piperstown, Stonehouse, Swinestown, Tullyallen, Tullyard and Tullyeskar, Co. Louth.

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

- The Construction of 5 no. wind turbines which are discussed in detail in **section 2.6.2** with the following parameters:
 - a) Total tip height range of 179.5m – 180m,
 - b) Rotor diameter range of 149m – 163m,
 - c) Hub height range of 98m to 105m,
- Construction of Crane Hardstand areas and Turbine Foundations.
- Construction of new internal site Access Tracks and upgrade of existing site roads, to include passing bays and all associated drainage.
- The provision of 2 no. new permanent site entrances with access onto the local road L6274 in the townlands of Kearneystown and Gallstown. This will include removal of existing vegetation for visibility splays to facilitate the use of it for the delivery of construction materials to the site.
- The permanent realignment of 1 no. existing entrance for construction and operational access to the 38kV electrical substation compound from the local road L2275
- The provision of an existing site entrance No. 4 on a private road in the townland of Drumshallon which connects to the local road L2275.
- The construction of 3 no. Temporary Construction Compounds with associated temporary site offices, parking area and security fencing.
- The provision of two permanent spoil storage areas

- The construction of 1 Permanent meteorological mast of 36m.
- Development of a site drainage network.
- Development of biodiversity enhancement measures.
- Construction of 1 no. permanent 38kV Substation with 1 no. control building with welfare facilities, all associated electrical plant and equipment, security fencing, lightning protection, security cameras and gates, all associated underground cabling wastewater holding tank, and all ancillary structures and works.
- Battery Energy Storage System (BESS) within the substation compound including 4 no. battery storage bays of 8 no. battery units.
- All associated wind farm underground electrical and communications cabling connecting the turbines and masts to the Onsite Substation, including a section in the public road corridor the townlands of Gallstown and Kearneystown.
- Ancillary forestry felling to facilitate construction and operation of the Development.
- Operational stage site signage.
- The construction of 1 no. new road in the townland of Castletown at the R162 / L-6274-0 Junction to facilitate the delivery of the turbine components.
- All works associated with the connection of the onsite substation to the national electricity grid via the existing Drybridge 110 kV Substation located in the townland of Tullyallen; The cabling will be located within the public road corridor or existing tracks for its entire length. The total length of the proposed 38kV underground cable connection is 12.650km.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought. However, part of the substation and all of the grid connection will be handed over to ESB networks to own and operate. As part of the national grid infrastructure, their life can extend beyond the life of the wind farm. Accordingly, permission is sought for the grid connection and substation in perpetuity.

The EIAR assesses The Project which includes the Proposed Development as outlined above. In addition, the Project includes temporary modifications to the existing public road infrastructure to facilitate delivery of abnormal loads and turbine delivery. These works will be carried out at the following locations: Galway Docks, Monivea Rd, Junction Galway, Junction on the R339, N6, Lucan Roundabout, N4 joining the M50, Hill of Rath Roundabout and Rosehall Roundabout.

Only one Turbine Delivery Route and one Grid Connection Route will form part of this planning application details of which are outlined above in section 2.3. Alternative routes

have been assessed as part of the EIAR in **Appendix 3.1**, these do not form part of the planning application.

Following a review of the proposed development based on the Request for Further Information, it has been determined that site entrance 4 is not required for the construction, operation and decommissioning of the proposed development, as all works can be accommodated via the proposed site entrances 1-3. Therefore, it is proposed that entrance 4 will not be taken forward as part of from the proposed development, and the initially proposed use of entrance 4 will instead be accommodated at entrance 2. The author of this chapter has reviewed the revision, and no implications for the assessment presented in this chapter have been identified.

2.3.1 Design Flexibility

As stated in **Chapter 1: Introduction** and Section 2.2 of this chapter the Proposed Development will comprise the construction of 5 No. wind turbines and associated hardstand areas with the following parameters:

- a) Total tip height range of 179.5m – 180m,
- b) Rotor diameter range of 149m – 163m,
- c) Hub height range of 98m to 105m

For the purposes of this EIAR, various types and sizes of wind turbines, within the proposed ranges outlined above, have been selected and considered in the relevant sections of the EIAR.

2.4 SITE LOCATION AND ENVIRONS

2.4.1 Introduction / Existing Land Use

The Wind Farm Site, as shown in **Figure 1.1** has a total area of 64.5ha. It is located 8.3km north of Drogheda, 23.6km South of Dundalk and 50km North of Dublin. The Wind Farm Site falls within two wind energy designation zones labelled '**Preferred**' and "**Open to Consideration**" in the Louth County Development Plan (CDP) 2021-2027. According to the objective - IU 58 of the Louth CDP¹, the Development Plan's aim is to encourage the placement of wind farms and related infrastructure in these areas within county Louth. The M1 is situated approximately 1.92km west of the nearest turbine. The Department of Defence highlighted that the proximity to the M1 could potentially affect Air Corps' ability to access regional areas. However, a detailed aviation study was undertaken by Aviation

¹ Louth County Development Plan 2021-2024 – Chapter 10 Infrastructure and Public Utilities
<https://www.louthcoco.ie/en/publications/development-plans/louth-county-development-plan-2021-2027/chapter-10-web-.pdf>

Planning Consultants (O'Dwyer and Jones), the study concluded that the Proposed Wind Farm site was not in conflict with any current aviation requirements for further details (see, **Section 14.9 Aviation in Chapter 14: Material Assets**).

The Wind Farm Site is in private ownership and situated within an area of livestock and pasture farmland and forestry. The Wind Farm Site includes areas of scrubland, native woodland and one recognised wetland site (Drumshallon Lough cNHA). The Wind Farm Site is situated within the following townlands: Brownstown, Cartanstown, Drumshallon, Gallstown, Groom, Kearneystown, Keeverstown, Piperstown, Stonehouse and Swinestown.

The overall length of the Grid Connection between the substation and the existing 110 kV substation (**Figure 2.1** Grid connection from Onsite Substation and Control Building to Drybridge 110kV) is 12.65km. Of this, 900m is located within the Wind Farm Site and the remaining 11.75km is located in the public road. The principal land use in the general area consists of a mix of forestry and cattle grazing, pasture farmland, residential properties and agricultural structures. The proposed Grid Connection route passes through the townlands of Brownstown, Ballymakenny, Carstown, Carstown, Killineer, Mell, New Town Monasterboice, Tullyallen, Tullyeskar and Tullyard, County Louth. The proposed grid connection will consist of underground 38 kV cables. An alternative route option was assessed and considered within **Chapter 3: Alternatives**. However, only the route detailed above and outlined in **Figure 2.1** will form part of the Proposed Development.

Temporary works will be required to accommodate the delivery of the turbine components. The temporary works are included as part of this application and are assessed as part of this EIAR. These areas are within the existing public road corridor and located in the townlands of Ballybaan Beg, Castletown and Mell situated in County Louth. Palmerston Upper and Townparks are situated in County Dublin.

A total of 375 sensitive receptors were **initially** identified within 2km of the proposed turbines. This includes dwellings and a local school. **As part of the Further Information Request to include the office building in Gallstown (Kilsaran Quarry) a total of four commercial buildings in the quarry were assessed, these additional sensitive receptors are not residential properties. The updated Shadow Flicker Assessment in Chapter 17: Shadow Flicker now includes 379 sensitive receptors which includes the following (374) residential buildings, (4) commercial, (1) school.**

Regarding (setback distances, SPPR2 of the Draft Revised Wind Energy Development Guidelines December (2019) mandates a minimum setback of 4 times the wind turbine's tip height, or at least 500 meters, from residential properties for visual amenity, with some flexibility for small-scale, on-site energy generation developments. The proposed layout was designed to achieve an optimal separation distance between the dwellings and the proposed turbines, providing a minimum separation distance of 720m between turbines and the nearest dwellings. In accordance with Section 6.18.2 of the Draft 2019 Guidelines, 4 no. properties are owned by landowners involved with the Project and have agreed to a reduced setback distance with the Applicant. It is worth noting that the properties availing of the exception are all in excess of the mandatory minimum setback of 500 meters, with the closest dwelling located 552m from Turbine 05. The remaining 3 no. dwellings are setback in excess of 500m, with a setback of 563m, 686m and 689m from Turbine 02. All sensitive receptors located within 2km of the proposed turbines are shown on **Figure 1.3**.

2.4.2 Forestry

The Study Area (See, **Figure 2.2**) surrounding the Wind Farm Site contains approximately 64.5 ha of commercial forestry, all of which is privately owned. Turbines T01 and T05 are surrounded by forestry. Therefore, tree felling will be required as part of the Proposed Development. To facilitate the construction of access tracks, civil works and turbine hardstands 9.41ha of forestry will need to be permanently clear-felled. The forestry areas comprise of Ash, Sycamore, Sitka spruce and Norway spruce. The felling area proposed is the minimum necessary to construct the Proposed Development and to comply with construction set back distances and environmental mitigation i.e. bat buffers (further details relating to this can be found in the **Appendix 2.1 CEMP, Appendix 2.2 Forestry Report Chapter 7: Bat Ecology and Chapter 14: Material Assets**).

It is a requirement that a felling licence is obtained before any forestry felling takes place. A condition of the felling licence that each land parcel must be replanted according to the replanting requirement for each harvest unit type. It should be noted that the clear-felling of trees in the State requires a felling licence. The felling licence will list the specific details of the replanting required under the replanting condition. All felled areas will need to be replaced in the form of replacement afforested land. Further details are provided in **Chapter 14: Material Assets in Section 14.6: Land use- Forestry**.

The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing'). The Forest

Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. The Developer commits that the location of any replanting (alternative afforestation) associated with the Project will be greater than 10km from the wind farm Site and also outside any potential hydrological pathways of connectivity i.e., outside the ecological zone of Influence (Zoi) within which the proposed project is located and will not give rise to any cumulative significant impacts with the project. Further details regarding the Zoi are outlined in **Chapter 6: Biodiversity**.

2.4.3 Biodiversity enhancement

The Proposed Development includes a Biodiversity Enhancement Management Plan (BEMP) in support of the Environmental Impact Assessment Report (EIAR). This has two main components, these include wetland enhancement area and the offsetting the loss of hedgerow and bat mitigation, which is proposed within the Redline boundary.

Hedgerow off setting and Bat Mitigation

A total of approximately 300 m of hedgerows will be lost as part of the development. A total minimum area of 900 m² of replacement planting is required to offset this loss. However, this figure will be doubled to 1,800 m² (0.18 ha) in recognition of the importance of local hedgerows. The planting will take place within a 0.5 ha plot that has been identified to the northwest of Turbine T05 and contiguous with an existing strip of mature broadleaved woodland. Plantings will consist of native Irish species from certified Irish genetic stock.

The species will be selected from the following:

- Hawthorn *Crataegus monogyna*
- Blackthorn *Prunus spinosa*
- Hazel *Corylus avellana*
- Alder *Alnus glutinosa*
- Holly *Ilex aquilifolium*
- Rowan *Sorbus aucuparia*
- Grey willow *Salix cinerea* subsp. *oleifolia*
- Downy birch *Betula pubescens*
- Guelder rose *Virburnum opulus*
- Spindle *Euonymus europaeus*
- Crab apple *Malus sylvestris*

Hawthorn will be the dominant species, comprising up to 40% of the planted area. Hazel and alder will be the principal secondary species, comprising approximately 15% each, with

the remainder made up of other species. Further details are outlined in **Appendix 6.1: Biodiversity Enhancement and Management Plan (BEMP)**.

The replacement hedgerow planting will complement the remainder of the 0.5 ha plot (0.32ha) which will comprise taller tree species required for bat mitigation. As part of the implementation of bat buffers there will be removal of sections of forestry treelines and hedgerows. As part of bat mitigation for this Site, enhancement of the treeline through a replanted extension is proposed totaling (0.32ha). At least two lines of trees will be planted along the western side of the plot. On maturity, these trees will have attained a similar height as those within the existing broadleaved woodland strip.

It is proposed that Pedunculate oak *Quercus robur* will be the principal tall tree species, with oak (species not certain) already present in the existing wood.

The other species will be selected from the following:

- Beech *Fagus sylvatica* - a non-native species, it is well naturalised in Ireland and freely self-sown. As it is a very useful tree for bats and already well represented in the adjoining wood.
- Aspen *Populus tremula*
- Wild cherry *Prunus avium*
- Silver birch *Betula pendula*

Oak will be principal species forming 50% of the plantings. Due to the value of beech for bats, beech will form 25% of the plantings. The remainder will be of the other listed species (as available). Apart from the non-native beech, all stock will be certified of Irish genetic stock. For beech, the stock will be derived from seed collected in Ireland. Further details are outlined in **Appendix 6.1: Biodiversity Enhancement and Management Plan (BEMP)**.

Wetland Habitat Enhancement

The Study Area (See, **Figure 2.2**) surrounding the Wind Farm Site contains the Drumshallon Lough wetland complex is described in detail in the **EIAR Chapter 6**. The complex comprises lake, marginal swamp vegetation, wet woodland, wet grassland, marsh and transition mire. The transition mire is listed on Annex I of the EU Habitats Directive (Transition mires and quaking bog, code: 7140). At the Drumshallon site, the conservation status and the functionality of the transition mire is considered generally good, with occasional grazing/wallowing by cattle the main threat. This habitat has been avoided in the design construction process and will not be impacted by the project. The two management

areas, A and B. The entire wetland management areas (A & B) within the BEMP has an area of 3.53ha. Management areas A and B will be made stockproof by the erection of suitable fencing where required. In addition, the control and removal of gorse from the management area A will be imposed as this will be beneficial for establishment of semi-natural grassland, which would be expected to be of a wet or neutral character and useful for insects and other wildlife. Further details are outlined in **Appendix 6.1: Biodiversity Enhancement and Management Plan (BEMP)**.

2.4.4 Cumulative Projects

2.4.4.1 Cumulative Wind Farms and Solar Installations within 20km

The potential cumulative impact of The Project has been assessed in line with Annex IV of the EIA Directive as amended the methodology of assessment has been outlined in **Chapter 1: Introduction - Section 1.11.3.2 Cumulative Effects**. A summary of the relevant projects with potential to create cumulative impacts has been included in **Appendix 2.4** and detailed cumulative impact assessments are included in each relevant section of the EIAR.

The location of proposed, permitted, and operational wind farm installations within a 20km radius of the proposed turbines are shown on **Figure 2.3** and **Table 2.1** below provides further information on these developments. There is a total of four wind farms within 20km radius of the Proposed Development these collectively have a total of 7 turbines. Dunmore Wind Farm has a total of 4 turbines built in two stages (Part 1 & Part 2), whereas Collon Wind Farm and Meade Potato Company are both comprised of one turbine. The nearest operational wind farm is Dunmore Wind Farm (Part 1) which is located 11.4km to the west of the Site. WuXi Biologics was recently granted planning permission in July 2024 for a single turbine located 19.5km North of the project.

Table 2.1: Wind Farms within 20km of the Proposed Kellystown Wind Farm

Wind Farm Name	Number of Turbines	Distance and Direction from the Development Site Boundary	Status
Dunmore Wind Farm (Part 1)	2	11.4km west of the site	Operational
Dunmore Wind Farm (Part 2)	2	11.4km west of the site	Operational
Collon Wind Farm	1	12.9km west of the site	Operational
Meade Potato Company	1	17km west of the site	Operational
WuXi Biologics	1	19.5km north of the site	Permitted

2.4.4.2 *Gallstown (Kilsaran) Quarry*

The active *Gallstown (Kilsaran)* quarry is situated adjacent to the Proposed Development in **Figure 2.4**. Turbine T01 is the nearest turbine approximately c.208 from the quarry site boundary. Due to the proximity and the nature of the development, the quarry has been assessed as a relevant cumulative development and potential combined effects are detailed throughout the EIAR. The Proposed Development infrastructure such as the Wind Turbines are situated in adequate positions from the Kilsaran Quarry and will not be impacted by expansion plans. Wind Turbines are designed and constructed to withstand enormous strain from heavy gusts and seasonal storms. The blasting quarry will have no impact on the structural integrity of the turbines or the ground structure in which they are situated. Further details are outlined in **Chapter 10 Soils & Geology**, **Chapter 13: Noise & Vibration** and **Appendix 13.4 Ground Vibration and Air Overpressure Blast Monitoring Report**.

The quarry commenced operation in 1993 following receipt of planning permission and was subsequently obtained a Quarry Registration Certificate (LCC Reg. Ref. RQ1) in January 2005 on foot of the requirements of section 261 of the Planning and Development Acts, 2000 (as amended).

The quarry site comprises approximately c. 84.5 hectares. A portion of the northern edge of the site is bounded by a Local Road L6274, which connects a County Road L2275 and a Regional Road R132, and by greenfield land containing 1 No. vacant dwelling. The extractive methods currently practiced on site are comprised of topsoil and overburden removal, drilling, blasting, crushing, washing and screening of rock to produce roadmaking stone, stone for concrete and general aggregates.

The quarry site has recently been granted planning permission (LCC Reg. Ref. 22190) on the 27th November 2023 to extend the extractive area to include a parcel of land comprising c. 10ha to a proposed depth of +60m AOD. This area of land is located to the central eastern portion of the site. The total average annual extraction rate of 750,000 tonnes is expected to continue for a period of 25 years. The expansion plans which are outlined in **Figure 2.4** have been assessed throughout the EIAR and concludes this will not negatively affect the Proposed Project and not impede the granted expansion plans of *Gallstown (Kilsaran) Quarry*.

2.4.5 Land Ownership

The majority of the Site is located on lands under the ownership of private landowners who have consented to the application and the Proposed Development. Letters of consent accompany this application.

2.5 WIND RESOURCE

The Site experiences high average annual wind speeds, primarily on account of its elevation. The Irish Wind Atlas produced by Sustainable Energy Ireland shows average wind speeds for the country and it shows that wind speed resource at the Site is consistent with a wind farm development (6.4m/sec at 30m, 7.90m/sec at 75m, 8.4m/sec at 100m and 9.2m/sec at 150m/s). The megawatt output for the wind farm is anticipated to be within a range of 28.5-36MW. This is dependent on the model of turbine which is finally selected for the Wind Farm Site which falls within the parameters detailed in Section 2.6.2 and 2.6.3 Design flexibility.

2.6 SITE INFRASTRUCTURE AND CONSTRUCTION

2.6.1 Proposed Layout Design

The layout of the Proposed Development has been optimised using wind farm design software (WindPro) to maximise the energy yield from the Proposed Development, while maintaining sufficient distances between the proposed turbines so as to ensure turbulence and wake effects do not compromise turbine performance. The layout design was informed by the following constraints and buffers align with the best practice standards:

- No works will occur within a distance of at least 50m from water courses (Excluding Road and Grid crossings)
- No works will occur within a distance to land drains (i.e. perforated drainpipes, used in domestic, commercial, agricultural and industrial areas to stop the ground from being waterlogged) to at least 10m (excluding Road and Grid crossings).
- No works will occur within a distance 20m of archaeological monuments
- No works will occur within a distance from turbines to inhabited houses of at least 720m, without a proximity agreement from the occupier.
- No works will occur within distance from turbines to inhabited house of at least 572m, where consented permission has been received.
- No works will occur within a distance of at least 200m from an active bat roost
- Avoidance of ground slopes of greater than approximately 10-14%
- Avoidance of telecommunication infrastructure and links
- utilities and gas infrastructure the buffers align with best practice and advice from GNI/ESB.

- Avoidance of sensitive habitats

The overall layout of the Site is shown in **Figure 2.45** in **Volume III**. This figure shows the proposed locations of the wind turbines and associated hardstanding areas, electrical substation, met mast, temporary construction compound, internal access tracks and the Site entrances. The ITM and ING coordinates of the turbines are listed in **Table 2.2**.

Table 2.2: Turbine ITM Coordinates

Turbine No.	ITM Easting (m)	ITM Northing (m)	ING Easting	ING Northing
T01	707338	784036	307411	284020
T02	708442	784164	308514	284148
T03	708057	783557	308129	283541
T04	708686	783447	308759	283432
T05	708319	782834	308391	282818

2.6.2 Wind Turbine Technology

The proposed turbines will be of modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one appearance from another (aside from the size characteristics). Turbine appearance is proposed to be matt non-reflective finish in a white, off-white or grey colour.

The proposed wind turbines, as shown in **Plate 2.1** below, consists of four main components:

- Foundation Unit
- Tower
- Nacelle (turbine housing)
- Rotor

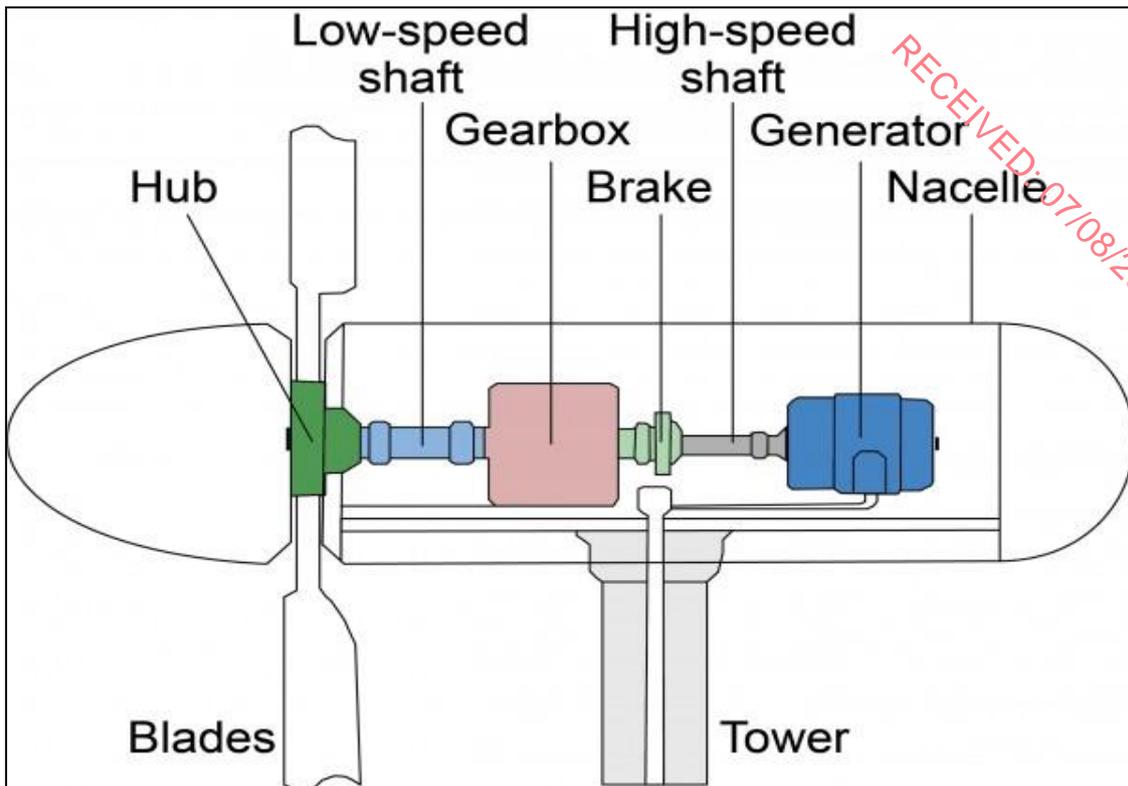


Plate 2.1: Turbine components² Source: (University of Michigan, 2022)

The turbine will have a circular based tower, sitting on a reinforced concrete foundation. The tower will support the nacelle, rotor hub, and rotor blades. The wind turbine towers will be made of steel or a hybrid of steel and concrete. The nacelle is mainly metal (steel, copper, aluminium, etc.) with a metal/plastic/glass-reinforced plastic (GRP) body, while the blades will be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or similar composite materials.

The wind turbines that will be installed on the Proposed Development site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times. Each turbine will have an installed generator. The turbines proposed contain a two planetary stages gearbox. The final turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

For the purposes of this EIAR and in compliance with the formal Opinion issued by Louth County Council, three candidate wind turbines, within the proposed ranges outlined above,

² (Michigan, 2022)
University of Michigan, 2022. *Center for Sustainable Systems*. [Online]
Available at: <https://css.umich.edu/publications/factsheets/energy/wind-energy-factsheet>
[Accessed 9th October 2024].

have been selected for the purpose of assessing the likely environmental effects of the throughout this EIAR. This allows for a robust assessment of the likely environmental effects of wind turbines within the proposed dimensional range. Turbine design parameters outlined in **Table 2.3** have a bearing on the assessment of shadow flicker, noise, visual impact, traffic and transport and ecology (specifically birds), and the different potential impacts arising from the range of parameters are assessed in full in the relevant EIAR chapters. For further details refer to **Chapter 1: Introduction (Section 1.6 - Turbine Parameters Used for EIAR Assessments)**.

Table 2.3: Turbine Range

Turbine Parameter	Candidate Turbine
Turbine Blade Tip Height	179.5 - 180m
Rotor Diameter	149 - 163m
Hub Height	98 - 105m

2.6.3 Site Access

The Proposed Development will be accessed via ~~4~~ **3** site entrances to facilitate the construction, operational and decommissioning phases of development. Two of which will be new site entrances; One existing entrance will be realigned and upgraded for the substation and associated infrastructure. ~~Another existing entrance will be used for the permanent met mast.~~ All the site entrances are illustrated on **Figure 2.56** and the site entrance coordinates are listed in **Table 2.4**.

Table 2.4: Site Entrance coordinates

Site Entrance	ITM Easting (m)	ITM Northing (m)	ING Easting	ING Northing
1	706935	784740	306993	284720
2	708042	784949	308100	284929
3	709348	782576	309407	282556
4	709496	783106	309555	283086

A new site entrance (No.1) will be constructed at the northwest of the site in on the Local Road L-6274-0. Proposed works to this entrance consists of the removal of existing vegetation to achieve visibility splays. This entrance will facilitate the delivery of construction materials to the site and will remain in-situ for the operational stage of development.

A new site entrance (No.2) will be constructed at the north of the site on the Local Road L-6274-0. Proposed works to this entrance include the removal of hedgerow and existing vegetation to achieve visibility splays. This entrance will facilitate the delivery of construction materials to the site. **Site Entrance 2 and the Proposed Development access track network will remain in-situ during the operational life of the Proposed Development and will link the Permanent Met Mast to the L6274 at Site Entrance 2.**

The Turbine Delivery Route and the Construction Haul Routes will utilise Site Entrances 1 and 2 for the construction stage of development.

The existing site entrance (No.3) will be realigned and upgraded this site entrance is located at the east of the site on the Local Road L2275-24. Proposed works to this entrance will consist of the removal of existing vegetation to achieve visibility splays. This entrance will facilitate the delivery of construction materials to the site and will remain in-situ to facilitate access to the substation for the operational stage of development.

The existing site entrance (No.4) is located on a private road no, off the Local Road L2275-24, to the east of the site. However, following a review of the Proposed Development site entrances as part of the design team response to Further Information request issued by Louth County Council, it is proposed that site entrance No.2 on the L6274 and its associated access tracks will now be used during the construction and operation of the Permanent Met Mast, instead of site entrance No.4.

~~No road upgrades are envisioned the proposed works to this entrance will be the removal of existing vegetation to achieve visibility splays. This entrance will facilitate the delivery of construction materials to the site and will remain in-situ to access the Permanent Met Mast during the operational stage of development.~~

The layout of the Proposed Development will remain the same as no road upgrade works on the existing access track or junction modifications at the existing priority junction (Site entrance 4) were proposed as part of the original planning application. No additional modifications are required to facilitate the increase use of this entrance as there will be no

significant increase in use. The application documents have been updated to reflect and assess the new use of site entrance no.2 (**Chapter 16: Traffic and Transport**).

2.6.4 Turbine Foundation and Turbine Hardstands

All turbine suppliers have a requirement for a Turbine Hardstand area to be constructed beside each turbine. The general layout of the Turbine Hardstand is designed to accommodate the requirements of turbine suppliers and the delivery, laydown, and assembly of turbine components (in particular rotor assembly) prior to turbine lifting and assembly and is shown on **Planning Drawing No: 6918-PL-601**. The turbine hardstands are needed to support the cranes during turbine construction, the operational and maintenance phase, and for Decommissioning. The Turbine Hardstands will be constructed first and used to facilitate Turbine Foundation construction, such as steel reinforcement delivery and pouring of concrete.

Construction of the turbine and hardstands will require the excavation of overburden material to the noted area and depth. The main Turbine Hardstands will be 3,960m² in area and will be of 0.5m in depth, depending on the local bedrock profile and the varying soil depth. The main crane operational area (2900m²), Boom assembly mounting assembly area (66m²), Blade Finger Pad Level (86 m²), Assist Crane Pads (216m²), Blade laydown area which is temporary approximately 2668m². In total, this represents a surface area of 34,300m² for 5 turbines and a permanent footprint of 19,800m².

The Turbine Foundations will be a maximum of 27.2m in diameter and have a maximum depth of approximately 3.5m. The central part of the foundation (plinth) as seen on **Planning Drawing No: 6918-PL-501-02** will be a maximum of 6m in diameter and will be raised from the main Turbine Foundation below ground level. It will encompass a cast-in insert or bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.

The volume of concrete and steel required for each Turbine Foundation is expected to be 949m³ and 84.78 tonnes respectively. The area around and above the turbine foundation will be backfilled with compacted granular material and the only portion exposed in the long term will be the central foundation section.

Depending on the results of detailed confirmatory site investigations (post consent), the possibility of installing rock anchors will be explored as a means of reducing the footprint and material volumes of the turbine foundations. The application of traditional gravity emplacement foundation design has been assessed for EIA purposes. This represents a

worst-case scenario, but it should be noted that the predicted environmental effects could be reduced where rock anchor foundations could be used for some of the turbine foundations.

The anticipated construction methodology for each of the turbine foundations is outlined here. Each wind turbine foundation will need to be taken down to competent bearing strata by excavating through the subsoil, and rock where necessary. Further details on the construction methodology will be outlined in the **CEMP: Appendix 2.1** any modifications to the construction methodology will be captured here after detailed ground investigations. It is important to note alternative construction methodology is not anticipated as outlined in **Chapter 10: Soils and Geology**.

The proposed methodology of construction for gravity Turbine Foundation is described as follows:

- Set out Turbine Foundations and required finish levels etc.
- Construct formation and/or supporting structures e.g., piles.
- Construct drainage as required.
- Provide a minimum of 100mm concrete blinding.
- Place bottom mat of steel reinforcing.
- Place turbine anchor cage.
- Fix cable ducting and foundation earthing.
- Complete reinforcing steel.
- Fix shuttering to base sidewalls.
- Fix ducts and earthing wires between insert and walls of base.
- Carry out checks and any corrective works as directed by engineer.
- Check weather conditions and schedule concrete deliveries.
- Place concrete and take quality control slumps and cubes.
- Complete concrete surface finishing.
- Apply curing and protection of concrete.
- Strip formwork after 48 hours.
- Place earthing wires around and over the base.
- Backfill base sides and place overburden on sloping part of foundation.
- Confirm that cube results are satisfactory.
- Grout the top flange.

The proposed methodology of construction for rock anchor Turbine Foundation is described as follows:

- Set out Turbine Foundations and required finish levels etc.
- Construct temporary coring drilling platform.
- Drill cores for rock anchors to the required levels.
- Insert rock anchors and grout into position.
- Construct drainage as required.
- Provide a minimum of 100mm concrete blinding.
- Place bottom mat of steel reinforcing.
- Place free issue turbine base insert or anchor cage.
- Fix cable ducting and foundation earthing.
- Complete reinforcing steel.
- Fix shuttering to base sidewalls.
- Fix ducts and earthing wires between insert and walls of base.
- Carry out any corrective works as directed by Engineer.
- Check weather conditions and schedule concrete deliveries.
- Place concrete and take quality control slumps and cubes.
- Concrete surface finishing.
- Apply curing and protection of concrete.
- Strip formwork.
- Placing of any earthing wires around and over the base.
- Backfill base sides and place overburden.
- Confirm that cube results are satisfactory.
- Grout the top flange.
- Stress the rock anchors to the prescribed loads.
- Install caps to rock anchors.

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2.6.5 Turbine Component Delivery Route

The turbine nacelles, tower hubs and rotor blades will be delivered to the Proposed Development site from Galway Port, County Galway. From there, they will be transported to the Site via the R339, R865, N6, M6, M4, N4, M50, M1 and R169 and R132 as shown on **Figure 2.67**. A breakdown of distances the turbines are required to travel on each road has been detailed in **Table 2.5**.

For abnormal loads between Galway Port and the Site, works will be required to facilitate the delivery of turbine components. These will be relatively minor in nature, for example,

temporary removal of street furniture and signage. These works have been outlined in detail in **Table 2.6** The swept path analysis drawings are included in **Appendix 15.1 -Turbine Delivery Sweep Path Analysis**.

Table 2.5: Turbine Delivery Route Distances

Turbine Delivery Route	Distance in Kilometres travelled on (km)
Port of Galway	
New Docks Road	0.11km
Local Road	0.16km
Lough Atalia Road	1.4km
R339	1.9km
R865	0.1km
N6	6.1km
M6	71.5km
N6	8.1km
M6	57.2km
M50	13.0km
M4	45.0km
N4	6.0km
M1	41.62km
N51	1.8km
R132	8.79km
L-6274-0	2.1km
Kellystown Wind Farm	Total Distance = c.265km

The delivery of the turbines to the Site will require co-ordination with a number of statutory bodies including Transport Infrastructure Ireland (TII), Galway County Council, Dublin County Council, Louth County Council, Celtic Roads Group and An Garda Síochána. **The Traffic Management Plan is being updated as per the Further Information Request.** All details are set out in the **Construction Traffic Management Plan** in **Appendix 15.2**. Final details such as time of delivery and agreed diversion routes will be agreed with all

stakeholders prior to construction of the wind farm. Two supplementary Collett reports were undertaken (July 2025) on the Vestas V162 – Blade & Nordex N163 - Blade **Appendix 16.3a & 16b Swept Path Analysis**. The temporary works required to facilitate blade delivery are outlined in **Table 2.6a**.

There is a total of ~~45~~ 13 areas on the haul route that will require temporary works in the public road. Please note that these works are not part of the Planning Application and are not identified within the Redline Boundary, due to the minor temporary works required along these sections (i.e. removal of street furniture and laying down a temporary load bearing surface). They will be consented under separate planning applications with the relevant county councils. These areas have been assessed, and details are outlined in **Table 2.6**.

Table 2.6: Temporary areas of Works on Haul Route in Third Party Lands

NO.	AREA	ITM (EASTING)	ITM (NORTHING)	DESCRIPTION
4	Galway Decks Exist	530493	724926	Swept path assessments have been undertaken and indicates that loads will need to travel through the car park where parking should be suspended, and the fences removed. Confirmation should be made that the surface is suitable for the proposed load weights. Existing Fencing to be temporarily removed to accommodate the existing. In order to confirm the required, exist, it is recommended that a topographical survey is used to repeat the swept path assessment. Once the turbine blade length is confirmed
2	Lough Atalia College Rd Junction	530958m	726073m	Swept path assessments have been undertaken, confirmation should be made that the surface is suitable for the proposed load weights. Existing signs and traffic lights to be removed.
3	College Rd, R338, Wellpark Rd Junction	-531068m	-726263m	Swept path assessments have been undertaken, confirmation should be made that the surface is suitable for the proposed load weights.

NO.	AREA	ITM (EASTING)	ITM (NORTHING)	DESCRIPTION
				Existing signs and traffic lights to be removed. And 30m of hedgerow to be trimmed back.
4	Wellpark Rd R339, Mervue Buss. Park Rd Junction	-531747m	-726710m	Swept path assessments have been undertaken, confirmation should be made that the surface is suitable for the proposed load weights. Approaching the junction on the R339 22m of hedgerow on the RHS to be trimmed back.
5	Mervue Bus. Park rd & Tuam Rd R336 Junction	531807m	727013m	A swept path assessment has been undertaken and indicates that loads will overrun and oversail the verge on the inside of the right turn where a load bearing surface should be laid and one of lighting pole may have to be temporarily removed. Also signs on the right and verge will be temporary removed with load bearing surface be located.
6	Mervue Bus. Park rd Rd R336 Junction	532004	-727204	Swept path assessments have been undertaken, confirmation should be made that the surface is suitable for the proposed load weights. A swept path assessment has been undertaken and indicates that loads will overrun and oversail the verge on the inside of the right turn where a load bearing surface should be laid and two lighting columns may have to be temporarily removed.
7	Rd R336 Junction	532492	726970	A swept path assessment has been undertaken and indicates that loads will overrun and oversail the middle island and one set of traffic lighting may have to be temporarily removed.
8	Junction on the R339	531068	N726264	Swept path assessments have been undertaken confirmation should be made that the surface is suitable for the proposed load weights. A swept path assessment has been undertaken and indicates that loads will overrun and oversail the middle island

NO.	AREA	ITM (EASTING)	ITM (NORTHING)	DESCRIPTION
				and one set of traffic lighting may have to be temporarily removed.
9	Off Road to the N6	534706	726644	A swept path assessment has been undertaken and indicates that loads will overrun and oversail the verge on the inside of the right turn where a load bearing surface should be laid and one of lighting pole may have to be temporarily removed. Also sign on the right and verge will be temporary removed with load bearing surface be located.
40	Lucan Roundabout, N4 joining the M50 Motorway.	e	726264	A swept path assessment has been undertaken and indicates that loads will overrun and oversail on the slip road existing the N4 pollards may have to be temporarily removed.
41	M50 Exit to Motorway	534068	726264	A swept path assessment has been undertaken and indicates that no oversail occurs
42	M50 Motorway exit 13	-705902	776588	A swept path assessment has been undertaken and indicates that loads will overrun and oversail entering on to the roundabout, With approximately 590m2 of hedgerow to be removed or trimmed back. Oversail will occur, with possible island and signage being removed and temporarily being replace with load bearing surface.
43	Hill of Rath Roundabout	706443	776673	A swept path assessment has been undertaken and indicates that loads will overrun and oversail the verge on the right hand side approaching the roundabout and left hand side existing the roundabout. Sign on the middle island approaching and existing the roundabout will be temporary removed with load bearing surface be located.
44	Rosehall Roundabout	707289	776930	A swept path assessment has been undertaken and indicates a load bearing surface will be required over the Rosehall Roundabout. In addition, temporary street furniture will be required to be removed from the roundabout.

NO.	AREA	ITM (EASTING)	ITM (NORTHING)	DESCRIPTION
15	Exiting the R132	705255	781491	Exiting the R132 Slip Road will require a temporary road closure this has been agreed in principle with Louth County Council. This will be outlined in the traffic management plan.

Table 2.6a: Temporary areas of Works on Haul Route in Third Party Lands (Public Road corridor)

No.	Location	Grid Reference	Nordex N163	Vestas V162
1	EXIT THE PORT ONTO LOUGH ATALIA ROAD	M 30175 24820	Visual inspection indicates that the loaded vehicles will navigate out of the port onto Lough Atalia Road without any issues.	Visual inspection indicates that the loaded vehicles will navigate out of the port onto Lough Atalia Road without any issues
2	LOUGH ATALIA ROAD/R339 JUNCTION	M 31010 26058	Visual inspection indicates that the loaded vehicle will navigate this junction utilising a contraflow manoeuvre.	Visual inspection indicates that the loaded vehicle will navigate this junction utilising a contraflow manoeuvre.
3	R339 / R338 JUNCTION	M 31119 26239	Visual inspection indicates that a contraflow manoeuvre will be required at this junction. Flexi bollards on the splitter islands after the junction to be removed.	Visual inspection indicates that a contraflow manoeuvre will be required at this junction. Flexi bollards on the splitter islands after the junction to be removed.
4	R339 / CONNOLLY AVENUE JUNCTION	M 31786 26676	Swept Path Analysis indicates that road widening is required on the offside after the junction. Electric pole on the offside of the R339 to be removed.	Swept Path Analysis indicates that road widening is required on the offside after the junction. Lamp posts and traffic light on the nearside of the junction to be removed. Traffic light on the offside to be removed. Electric pole and lamp post on the offside of the R339 to be removed.
5	CONNOLLY AVENUE / R336 JUNCTION	M 31840 26985	Swept Path Analysis indicates that road widening is	Swept Path Analysis indicates that road widening is

			required on the offside of the junction. Lamp posts on the offside of the junction to be removed.	required on the offside of the junction. Lamp posts on the offside of the junction to be removed. Trees on the nearside of Connolly Avenue to be pruned.
6	R336 / N6 JUNCTION	M 32049 27159	Swept Path Analysis indicates that the road signs and lamp post on the nearside of the R336 are to be removed due to the rear projection of the blade component. Hedgerow on the nearside of the R336 to be pruned. Railings and traffic lights on the offside of contra flowed slip road to be removed. Loaded component to contraflow slip road in order to navigate this junction.	Swept Path Analysis indicates that the road signs and lamp post on the nearside of the R336 are to be removed due to the rear projection of the blade component. Hedgerow on the nearside of the R336 to be pruned. Railings, lamp post and traffic lights on the offside of contra flowed slip road to be removed. Loaded component to contraflow slip road in order to navigate this junction.
7	N6 COOLAGH ROUNDABOUT	M 34736 26588	Swept Path Analysis indicates lamp posts and road signs on the nearside of roundabout entry to be removed due to the oversail of the trailer body. Road signs on the offside splitter island to be removed due to the rear projection of the blade component.	Swept Path Analysis indicates lamp posts and road signs on the nearside of roundabout entry to be removed due to the oversail of the trailer body. Road signs on the offside splitter island to be removed due to the rear projection of the blade component.
8	N4 / M50 JUNCTION	O 07538 35306	Visual inspection indicates that the loaded blade will navigate this junction without issue.	Visual inspection indicates that the loaded blade will navigate this junction without issue.
9	M50 / M1 JUNCTION	O 17782 41575	Visual inspection indicates that the loaded blade	Visual inspection indicates that the loaded blade

			will navigate this junction without issue.	will navigate this junction without issue.
10	M1 / N51 ROUNDABOUT	O 05857 76584	Swept path analysis indicates that road widening and modifications to street furniture is required.	Swept path analysis indicates that road widening and modifications to street furniture is required.
11	N51 / R168 ROUNDABOUT	O 06502 76656	Swept path analysis indicates that road widening and modifications to street furniture is required.	Swept path analysis indicates that road widening and modifications to street furniture is required.
12	N51 / R132 ROUNDABOUT	O 07339 76910	Swept path analysis indicates that road widening is required on both the offside of N51 & the R132. Modifications to street furniture is also required.	Swept path analysis indicates that road widening is required on both the offside of N51 & the R132. Modifications to street furniture is also required.
13	R132 SLIP ROAD	O 05271 81695	Visual inspection indicates that the loaded blade is required to contraflow this location in order to avoid modifications. Police will be required to close this section of road to allow the loaded vehicle to pass safely.	Visual inspection indicates that the loaded blade is required to contraflow this location in order to avoid modifications. Police will be required to close this section of road to allow the loaded vehicle to pass safely.

All 13 areas noted in Table 2.6a have been described and assessed in the original EIAR, no additional lands are required.

One area (No.164) on the haul route will require works in third party lands (Private Landowner) . This work has been captured in the Redline Boundary as this section is under control of the developer further details can be found on **Planning Drawing: 6918- PL-101**. A road will be laid to facilitate the delivery of the turbine components. This area has been assessed and details are outlined in **Table 2.7**.

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Table 2.7: Works on Haul Route in Third Party Lands (Private Landowner)

No.	Area	ITM (Easting)	ITM (Northing)	Description
164	R162 / L-6274-0 Junction	705776	784670	<p>A swept path assessment has been undertaken and indicates that loads will need to utilise an offline track in order to 'cut the corner'. A load bearing surface should be laid in third party land and a Hedgerow and wire fence should be removed. Telegraph wires and poles will need to be removed for the duration of the transportation of the wind turbine components.</p> <p>Embankment to be reprofiled. Detailed design of the proposed track is required.</p> <p>An indicative road edge has been provided from this point to the site entrance based on the available aerial mapping where the road is considered to be greater than 4.5m. An indicative 4.5m has been provided for the remaining section as this is the minimum required running width required by turbine manufacturers. All marking up is beyond this 4.5m road width.</p>

2.6.6 Site Access Roads (Internal Road Network)

The Site access tracks are necessary to allow access for cranes and delivery trucks during the construction phase of development and to facilitate servicing/repairs to the wind turbines during the operational lifespan of the development. The existing forest tracks/Site Access Roads will be used as far as possible to minimise additional land take. These roads will be upgraded as necessary so that the minimum width will be 4.5m. Site Access Roads will be wider at bends and at passing bay locations where the width will be 5.5m. Gradients will be limited to no more than 1 in 7 (14%) and a stone layer provided, so as to provide a good grip during wet weather. Gradients of Site Access Roads will not exceed this value.

Table 2.8: Estimated Excavation for Road Construction

Road Section	Length (m)	Width (m)	Area (m ²)	Depth to firm Sub-soil/Rock (m)	Depth of Sub soil to be excavated (m)	Total Volume to be excavated (m ³)	Vol of soil to be excavated (m ³)	Vol of sub-soil to be excavated (m ³)	Vol of rock to be excavated (m ³)
Upgraded tracks	524	5	786	0.6	0.3	1179	786	393	0
New Site Access Road	5753	5	28,765	0.6	0.3	11,199	8630	4315	0
New Turning Areas, Splays, Laybys			7471.2	0.6	0.3	3362	1121	1121	0
Totals						17,485	11,657	5,828	0

There will be 6,854m of new Site Access Roads required to facilitate the Proposed Development. These roads will be constructed to a maximum width of 7.5m at bends. All associated site Access Road infrastructure will cover an area of 33,554m² and require 15,099m³ of crushed rock. These roads will be excavated to a level where the underlying soil or rock that can bear the weight of traffic without shifting or compressing. The access roads will be constructed using rock and capping stone from nearby quarries listed in Section 15.2 of **Chapter 15: Traffic and Transportation**. The Site Access Roads will facilitate a minimum 12 tonne axle construction loading. The design will consist of 250mm to 510mm of sub-base material. The Site Access Road construction detail is shown on **Planning Drawings: 6918-PL-300 & 6918-PL-301**.

The Site Access Roads (location as detailed in **Figure 1.1**) will be maintained during the construction phase. This will involve cleaning and surface improvement works. Harmful constituents from fuel spills and drips such as hydrocarbons pose a risk of environmental contamination and also a risk to human health if found in drinking water sources. The Access tracks will result in the crossings of 3 no. minor watercourses on the Wind Farm Site. Crossings are designed to accommodate the track width and minimise length of affected channel. Hydraulic design of crossings has been undertaken as per the guidance and requirements provided in CIRIA C786 “Culverts, Screen and Outfall Manual”, Further details are outlined in **Chapter 11: Hydrology and Hydrogeology**. All imported stone to the Site will have undergone appropriate quality testing. When weathered, the stone will not contain any constituents which may be harmful to the environment and in particular surface and groundwater. Further details of the prevention of this can be found in the Emergency and Response Management Plan of the CEMP in **Appendix 2.1**.

2.6.7 Met Mast

As part of the grid code³ requirements, all wind farms with an installed capacity of greater than 10MW are required to supply continuous, real-time data for the wind farm location. The data required is the wind speed and wind direction at turbine hub height, air temperature and air pressure. The data required for the Project will be provided by a dedicated Met Mast of 36m in height (location as detailed in **Figure 1.1**).

The Met Mast will be located on the east of the Site as detailed in **Figure 1.2** and will be a free-standing lattice type structure as shown on **Planning Drawings 6918-PL-701**. The Met Mast foundation will be 8m by 8m, with a depth of 1.5m. It will encompass a cast-in insert or bolts to connect to the bottom of the Met Mast and reinforced bar structural elements. The area around and above the foundation will be backfilled with compacted granular material. The Met Mast will be linked to the onsite Substation via buried Wind Farm Internal Cabling for power and communication; it will be required for the duration of the operational phase of the proposed wind farm Development.

2.6.8 Electrical Substation, Control Building and Associated Compound

It is proposed to construct one 38kV electricity substation within the Site, as shown on **Figure 2.1**. The substation will be located in the southeast of the site (ITM X 708851 ITM Y 782947) and accessed via site entrance 3 via Local Road L2275-24. This will provide a connection point between the wind farm and the grid connection node point at the existing Drybridge 110kV substation. Electricity transmitted between the turbines and the substation on the Site will be at 38kV.

The substation will serve two main functions:

- 1) Provide housing for switchgear, control equipment, monitoring equipment, and storage space necessary for the proper functioning of the wind farm; and
- 2) Provide a substation for metering and for switchgear to connect to the ESB grid.

The construction and electrical components of the substation will be to ESB Networks specifications. The substation compound area will be 1300m² and will be 0.5m in depth and will be constructed from engineered stone material using similar construction techniques as for the crane hardstands. The overall substation compound will be enclosed by a 2.65m high palisade fence and will contain a single control building, Battery module containers, ancillary equipment, including the transformers, switch gear, fault protection, metering, car

³ EirGrid (22 July 2005). EirGrid Grid Code Version 6

parking, lighting columns and other ancillary elements necessary for the operation of the Development.

The control building, which is situated within the substation footprint, this will contain an ESB room, control room, switchgear room, small store, an office and toilet. This will comprise a single story pitched roof structure with traditional rendered finishes and measure 17.49m x 7.33m with a floor area of approximately 128m². Details of the control building are shown on **Planning Drawings 05949-DR-125-P1**. The appearance and finish of the control building will be similar to an agricultural building with a slated roof and nap plaster finish. It will have a footpath around it, and an adjacent parking area. The final finish of the control building will be an off-white or grey colour.

There will be two lightning monopole protection masts which will be approximately 18m in height and associated site works. Warning / health & safety signage will be displayed as is normal practice for such installations. They will be Constructed as per ESB Specification for 18m Lightning Monopole **Planning Drawings: 05949-DR-132-P1**. Only motion-sensitive lighting will be used.

A telecommunication antenna will be fixed externally to the substation control building for communication and control purposes (e.g., for the Supervisory Control and Data Acquisition (SCADA) System) for the Developer, turbine suppliers and ESB Networks. There will be a small area (122m²) outside the compound, and adjacent to the access track, that will be a hard surfaced for operational and maintenance and includes four parking spaces. See details of the substation control building on **Planning Drawings: 05949-DR-127-P1**.

It is proposed to install a rainwater harvesting system as the source of water for toilet facilities. A potable water supply will be brought on site in bottles. Wastewater from the staff welfare facilities in the control building will be collected in a sealed storage tank, fitted with a high-level alarm. This is a device installed in a fuel storage tank that is capable of sounding an alarm, during a filling operation, when the liquid level nears the top of the tank. All wastewater will be tankered off-site by a licensed waste collector to the nearest wastewater treatment plant, There will be no on-site treatment of wastewater.

To reduce any visual impacts on the surrounding area, the colours proposed for the Battery module containers will be either dark green or grey which is not considered to change the visual assessment. However, this will be decided at detailed design stage of the

development. The modules will be non-reflective to ensure there will be no reflection or glare which may impact avian species.

Ancillary elements of the Proposed Development will include a palisade, or similar type fence securely around the compound and a gravel surface inside the compound. External lighting will be provided at the main containers which will be used for maintenance purposes and turned on only as required.

2.6.9 Battery Energy Storage System

The proposed Battery Energy Storage System (BESS) will comprise 8 steel containers 17.3m x 3m x placed on concrete plinth foundations 300mm above the general site level and will be assembled on four terraces over permeable granular unbound surfacing (battery containers are shown on **Planning Drawings: 05949-DR-125-P1.**). Each container will house a modular array of lithium-ion batteries, or similar type technology. The battery array will be placed in modular racks which will allow them to be taken out and replaced as needed. The containers will contain control equipment, HVAC equipment, fire safety equipment and inverter units. The transformer units will be housed in separate containers located in front of each of the main battery containers see **Planning Drawings: 05949-DR-125-P1.**

The current energy storage technology favored today is Li-ion batteries. These batteries are used widely due to their fast response time, which makes them preferable for grid-scale deployment. The Li-ion batteries vary in cell chemistries (e.g., Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt Oxide, Lithium Cobalt Oxide, Lithium-Titanate) and cell arrangement (e.g., cylindrical, pouch, prismatic). Chemistry and arrangement will dictate the batteries' performance characteristics. The final selection of energy storage technology for the battery used will be based on the latest technology available at the time of construction, there will not be any difference to the environmental effects, regardless of the type of battery used.

While the precise storage technology may vary, the parameters of the battery modules in terms of height, width, size and footprint will not vary from those identified in the planning drawings see **Planning Drawings: 05949-DR-125-P1.**

Each battery module is connected to a set of power conditioning units which regulate power flow to and from the battery modules.

2.6.10 Transformers and Internal Cabling

Each turbine will be connected to the substation on Site via 38kV underground cables. There will be approximately 6677m of internal cabling of which 545m within the public road corridor. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the Control Building. The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts 1m below the ground surface within the Site Access Tracks and/or their verges. The cable ducting will be installed to ESB Networks requirements specifications. A cross-sectional drawing is shown in **Planning Drawing 05949-DR-110-PL**.

The Wind Farm Internal Cabling routes will be bedded in surplus excavated soil material. Danger tape, incorporating a metallic strip, will be laid during backfilling. Where the Wind Farm Internal Cabling is to cross Site access tracks, suitable electrical ducting will be provided. An as-built layout plan showing the location of underground Wind Farm Internal Cabling will be on permanent display within the control building.

Clay plugs or concrete cut offs will be installed at regular intervals in the cable ducting trenches where they are located on slopes to prevent the trenches from becoming preferential flow paths for runoff from the Site.

Transformers will be located inside each turbine.

Excavated material will be stored uphill of the trench excavations which will prevent any sediments from being washed downhill. Silt fences will be installed down gradient of the excavations to prevent silt runoff.

2.6.11 Grid Connection

A Grid Connection offer will be sought from the grid system operators by application to EirGrid. The substation will connect via underground 38kV cable to the existing Drybridge 110kV substation. The route of this Underground Grid Connection (UCG) is provided in **Figure 2.1**. The overall length of the Grid Connection between the substation and the existing Drybridge 110kV substation is 12.65km, of which 900m is within the Wind Farm Site and 11,750m is located along the public road corridor.

Grid Connection Route

Only the grid route described in this project description will be applied for in the planning application. An alternative route option has been assessed within **Appendix 3.1**

The Grid Connection route will exit the Drybridge 110kV Substation Compound west onto the Slane Road, L-20000 for 100m before turning north along the L-2322 for 200m. The UGC veers north-east onto the N51 toward the roundabout at Drogheda North, which is junction 10 • **Appendix 2.3b: TLI – 05949-DR-001_Junction 10 SLP** on the M1 motorway. The cable then is routed north-west on the R168 for 750m. At Tullyallen, the cable route turns southeast onto a disused section of road for 250m. It is proposed to utilise Horizontal Directional Drilling (HDD) method to cross beneath the M1 motorway. On the east side of the motorway the UGC cable continues along the L-63324.

The Grid Connection route then turns southeast along the L-6332. At the bridge named Waterunder Bridge, a HDD method will be employed to cross beneath the bridge. The UGC turns east at the roundabout at Mell and carries on along the R-166. At Moneymore, the route turns north-west onto R-132 and continues for 2.6km along the R-132. The UGC then crosses into the L-23083. A sharp south-east turn is taken at Tulleskar onto the L-2308 for approximately 3km. On the L-2308, there is a bridge, with a stone arch underneath the road without bridge parapets, at Carntown, A HDD method will be employed to cross beneath this bridge all HDD methodology is outlined in section **2.6.12.4 2. Grid Connection Horizontal Directional Drilling Works and water crossings.**

The Grid Connection route turns north onto the L-2310 for 0.9km and thereafter transitions into the L-2275. On the L-2275, there are two culverts to be crossed. A HDD will be employed to cross beneath these culverts. Before the Grid Connection route approaches Piperstown, a further HDD will be required to cross this bridge. At Piperstown the Grid Connection turns west and enters wind farm lands via private access route for c.500m. Accessing the wind farm from the southeast corner, the grid connection route will continue to head north for circa. 400m before reaching The Wind Farm Site substation.

The Grid Connection will be constructed to the requirements and specifications of ESB Networks Limited. The three conductors will be laid in separate ducts which will be laid in accordance with the ESN functional specifications for 38kV Networks Ducting/Cabling (Minimum Standards). The width of a 38kV cable trench with a trefoil formation will be 600mm. The depth of the trench for 38kV cables is 1.22m. A separate duct will be provided

within the trench for fibre optic communications. Refer to ESBN Cable ducting Specifications in **Appendix 2.2**.

The following is a summary of the main activities for the installation of ducts:

- All relevant bodies i.e. ESB Networks Limited, Gas Networks Ireland, Eir, Louth County Council, Transport Infrastructure Ireland and Uisce Éireann. will be contacted and up to date drawings for all existing services will be sought so that the grid connection ducting does not damage or interfere with existing services. This will be rechecked by the Contractor prior to excavations taking place.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CATSCAN (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction in that locality to prevent contamination of any watercourse.
- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.22m deep.
- All spoil from trenches in public roadways will be removed from Site as it is excavated and transported to licenced facilities. Soil and stone will be excavated separately from bituminous material.
- Once the trench is excavated, a 65mm depth base layer of sand (in road trench) or CBGM B (CL822) concrete will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.
- uPVC ducts will be installed on top of the compacted base layer material in the trench.
- Once the ducts are installed, couplers (a device used for joining pipes) will be fitted and capped to prevent any dirt entering the unjoined open end of the duct.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.
- The co-ordinates will be plotted on as-built record drawings for the Grid Connection cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or CBGM B (CL822) concrete will be installed and compacted (off

road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and will be compacted.

- Timer spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.
- A layer of CL808 (in road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.
- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road will then be reinstated on a temporary basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).
- When trenching and ducting are complete, the installation of the Grid Connection cable will commence between the Electrical Substation and the existing 110kV substation at Drybridge.
- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.
- The cables will be joined together within the precast concrete cable junction box (Joint Bay).
- The finished surface above each cable joint bay is reinstated on a permanent basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).

2.6.11.1 Joint Bays and Communication Chambers

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay will be 2.73m x 4.5m x 1.275m pre-cast concrete structures installed below finished ground level. Concrete for joint bay and communication chamber foundations shall be grade C16/20. Joint bays shall be provided to meet the requirements of standard cable drum lengths and/or as required to limit cable pulling forces. Joint bays shall be no further than 1200m centre to centre apart. A precast concrete slab will be constructed on top of the bay. The joint bay locations have been identified and assessed as part of the EIAR.

The joint bay locations have been dictated by suitable terrain and access to facilitate the operation of cable pulling equipment at any phase of the development and future operation of the installation in accordance with the ESB Networks Limited specifications.

Communication chambers, which are pre-cast concrete structures with an access cover at finished surface level., will be installed at every joint bay location to facilitate connection of fibre-optic communication cables between the onsite 38kV substation and the existing Drybridge 110Kv substation.

Section 1 (6325m) of the Grid Connection route from Drybridge 38kV substation contains 8 Joint bays. The details are outlined below and shown in Site Layout Plan **Planning Drawings 05949-DR-101,102,103,104.**

- Joint Bay 01 (JB-01) will be located at the entrance of Drybridge 110kV Substation compound within ESB property.
- Joint Bay 02 (JB-02) will be located approx. 1050m from JB-01 in this list. It is proposed that this Joint Bay will be installed within the R-168.
- Joint Bay 03 (JB-03) will be located approx. 700m from JB-02 in this list . It is proposed that this Joint Bay will be installed within the L-63324.
- Joint Bay 04 (JB-04) will be located approx. 920m from JB-03 in this list . It is proposed that this Joint Bay will be installed within the R-166.
- Joint Bay 05 (JB-05) will be located approx. 830m from JB-04 in this list . It is proposed that this Joint Bay will be installed within the R -132.
- Joint Bay 06 (JB-06) will be located approx. 700m from JB-05 in this list . It is proposed that this Joint Bay will be installed within the R-132.
- Joint Bay 07 (JB-07) will be located approx. 960m from JB-06 in this list . It is proposed that this Joint Bay will be installed within the R-132.
- Joint Bay 08 (JB-08) will be located approx. 990m from JB-07 in this list . It is proposed that this Joint Bay will be installed within the L-23083.

Section 2 (6325m) of the Grid Connection route from Drybridge 38kV substation contains 8 Joint bays. The details are outlined below and shown in Site Layout Plan **Planning Drawings 05949-DR-104,105,106.**

- Joint Bay 09 (JB-09) will be located approx. 960m from JB-08 in this list . It is proposed that this Joint Bay will be installed within the road L-2308.
- Joint Bay 10 (JB-10) will be located approx. 1070m from JB-09 in this list . It is proposed that this Joint Bay will be installed within the road L-2308.

- Joint Bay 11 (JB-11) will be located approx. 1040m from JB-10 in this list. It is proposed that this Joint Bay will be installed within the road L-2308.
- Joint Bay 12 (JB-12) will be located approx. 990m from JB-11 in this list. It is proposed that this Joint Bay will be installed within the road L-2310.
- Joint Bay 13 (JB-13) will be located approx. 970m north to the location of JB-12 in this list. It is proposed that this Joint Bay will be installed within the road L-2275.
- Joint Bay 14 (JB-14) will be located approx. 940m from JB-13 in this list. It is proposed that this Joint Bay will be installed within the private access path to the wind farm.

The precise siting of joint bays, communication chambers etc. within the corridor which has been assessed with be subject to approval by ESB Networks. A cross-sectional drawing is shown in **Planning Drawing: 05949-DR-111**.

2.6.11.2 Trench Layout

The trench layout shall be as per the appropriate ESB Networks drawing(s) in **Planning Drawing 05949-DR-111**. The specification of the TII /Dept of Environment, Louth County Council will be adhered to for the excavation and reinstatement of the ducted cable trenches. The cable trench dimensions 1220mm (Depth) x 600mm (Width) further details are found on **Planning Drawing - 05949-DR-110-P1** and will be in accordance with the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport)⁴.

Where a change in the gradient of the trench is required to accommodate other services, the gradient change shall be as minimal as possible. Ducts shall generally be laid in straight lines to even gradients. However, ducts may be laid to slow and even curves on plan to avoid an obstruction.

The duct route has been designed and constructed to ensure that the cable manufacturer's maximum tensile and sidewall pressure pulling forces shall not be exceeded on the relevant 38kV Cable, see **Planning Drawings 05949-DR-118-P1 & 05949-DR-110-P1**.

2.6.11.3 Joining Ducts

All joining ducts shall be laid in straight lines to even gradients. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will

⁴ [gov - Guidelines for Managing Openings in Public Roads 2017 \(www.gov.ie\)](http://www.gov.ie) [Accessed 9th October 2024].

be thoroughly cleaned by pulling the appropriate size of EirGrid approved duct brush through the duct.

Details of the construction methodology are summarised below:

- Preparatory Works
 - Confirmatory CAT Scan survey & Trial Pit Survey along the cable route
 - Access to the start point and setting out
 - Access to joint bays
 - Silt Attenuation Features and watercourse set back buffer
 - Joint Bay Excavation
- Trenching Works
 - Storage of Materials
 - Trench Operations
 - Managing excess material from trench works

2.6.11.4 Grid Connection Horizontal Directional Drilling Works and water crossings

The proposed cable route will require six Horizontal Directional Drilling (HDD) crossings further details are outlined on **TLI Planning Drawings: 05949-DR-114 - 05949-DR-124**. The cable will cross under the M1 motorway in the townland of Mell, north of junction 10 using HDD method under the motorway subject to detailed discussion and approval by TII and Louth County Council. There are three stone-built bridges and two culverts that will also require HDD undercrossing. Where the cable route intersects with existing watercourses, a detailed construction method statement will be prepared by the Contractor before the commencement of construction and should be approved by the relevant environmental agency such as Inland Fisheries for any water crossings. The six crossings are discussed further below.

Inland Fisheries Ireland has published guidelines relating to construction works along water bodies entitled 'Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites', and these guidelines will be adhered to during the construction of the proposed development.

Bridge 1: Water Under Bridge - Horizontal Directional Drilling [Chainage – 2248m] Coordinates (ITM): 706351.7497, 776768.0851

This Bridge has insufficient cover to install the cable to ESB specification (450mm cover to the top of ducts) within the bridge deck. It is proposed to HDD a minimum of approximately 1500mm beneath the waterway. This depth is based on locating a suitable clay/silt

formation for HDD and the required depth may increase subject to confirmatory geotechnical investigations. All drilling and associated works will take place within the road corridor. The HDD process is outlined in (See **TLI Planning Drawing 05949-DR-120**).

Bridge 2 - Horizontal Directional Drilling [Chainage – 8937m]

Coordinates (ITM): 708864.6884, 780136.3646

This Bridge has insufficient cover to install the cable to ESB specification (450mm cover to the top of ducts) within the bridge deck. This depth is based on locating a suitable clay/silt formation for HDD and the required depth may increase subject to geotechnical investigations. All drilling and associated works will take place within the road corridor. The HDD process is outlined in Section 4.6 of **Appendix 2.4 TLI Technical Notes -Construction Method Statement** (For further details see **TLI Planning Drawing 05949-DR-121**).

Bridge 3 - Horizontal Directional Drilling [Chainage – 11490m]

Coordinates (ITM): 709261.9739, 709261.9739

This Bridge has insufficient cover to install the cable to ESB specification (450mm cover to the top of ducts) within the bridge deck. It is proposed to HDD a minimum of approximately 1500mm beneath the waterway and bridge foundations. This depth is based on locating a suitable clay/silt formation for HDD and the required depth may increase subject to geotechnical investigations. All drilling and associated works will take place within the road corridor. The HDD process is outlined in Section 4.6 of **Appendix 2.4 TLI Technical Notes -Construction Method Statement** (For further details see **TLI Planning Drawing 05949-DR-124**)

Culverts

There are two culverts on the underground cable route which will require Horizontal Directional Drilling. The location of these together with the number of the detailed drawing for the water crossings are shown below: All other culverts to be traversed using standard 38kV Service/Culvert Crossing detail. **See drawing 05949-DR-116,117.**

Culvert 4: Chainage – 10521m Coordinates (ITM): 709144.9012, 781289.8798. This culvert has insufficient cover to install the cable to ESB specification (450mm cover to the top of ducts) within the bridge deck. It is proposed to HDD a minimum of approximately 1500mm beneath the waterway and culvert foundations. **See TLI Planning Drawing 05949-DR-122.**

Culvert 5: Chainage – 10747m Coordinates (ITM): 709148.6194, 781516.3934. This culvert has insufficient cover to install the cable to ESB specification (450mm cover to the top of ducts) within the bridge deck. It is proposed to HDD a minimum of approximately 1500mm beneath the waterway and culvert foundations. **See TLI Planning Drawing 05949-DR-123.**

All other culverts to be traversed using standard 38kV Service/Culvert Crossing detail, see **TLI Planning Drawing 05949-DR-116,117.**

Motorway Crossing Horizontal Direction Drilling [Chainage – 1617m]

Coordinates (ITM): 705783.9529, 777007.3026

It is proposed to cross under the M1 motorway using Horizontal Directional Drilling Method. The drilling rig and launch pit shall be located west of the M1 motorway on a private stretch of road, off the R168. The receptor pit shall be located east of the M1 on the L6322. This is outlined in detail in Section 4.6 of **Appendix 2.4 TLI Technical Notes** -Construction Method Statement (For further details see **TLI Planning drawing 05949-DR-119**).

Each HDD crossing will be constructed by means of directional drilling technology. The crossing will comprise 4 x 110mm HPPE pipes/ducts each directionally drilled. Two separate excavations will be made to a depth of 2 metres to accommodate the directional drilling launch and reception pits. Spoil arising will be stored adjacent to the pit locations for reinstatement, at a minimum 25 metre buffer distance from any watercourse. These temporary spoil mounds will have side slopes battered back to 1:1. Silt fencing will to be erected around the base of each temporary mound. The excavation launches and reception pits will be reinstated on completion of drilling and jointing operations. Further details for each HDD water crossing in provided in the **Appendix 2.4 TLI Technical Notes**.

The drill head will be placed in the open excavation (launch pit) and it will be guided in by the operator for the first 1-2 metres. A series of drill rods will be connected to the head as it travels further along the shaft.

The drill position is always known to the operator and the drill can be manoeuvred in 3 planes / axis. A drilling lubricant will be required. This will be delivered directly to the drill head. This will be ultrabore non-toxic bentonite slurry mixture. Once the conduit is completed, the drill head is exposed at the reception pit and removed. The drill rods are connected to the duct pipe and the drill is reversed, pulling the pipe back through the conduit.

A spoil volume of 4.9m³ will be excavated for each 100m run of 4 pipes. This spoil will be largely sub soil material. The 100m arisings will exit the launch pit within the bentonite slurry mixture. A mobile bunded tank will be located next to the launch pit into which the arisings will be pumped. This will be stored outside of the 25m watercourse buffer zone.

The following measures will be implemented during the directional drilling works:

- No in-stream works will be permitted.
- Works shall not take place at periods of high rainfall and shall be scaled back or suspended if heavy rain is forecast.
- A floating hydrocarbon boom and spill kit will be available.
- Plant will travel slowly across bare ground at a maximum of 5km/hr. If truck rutting is observed, then bog mats or rolling road will be employed.
- Silt fencing will be erected at a setback distance of 5m from the works during excavation.
- Any excess construction material shall be removed from the works areas and disposed of in a fully licensed landfill.
- No re-fuelling of machinery will take place on site or within 50 metres of any watercourse.
- All construction workers will be given a toolbox talk addressing the environmental topics concerning the drilling prior to commencement of construction.

2.6.11.5 *Underground grid connection cable at M1, Junction 10 Roundabout*

Underground Cable at M1, Junction 10 Roundabout [Chainage – 700m]

Coordinates (ITM): 705709.1, 776587.1

The proposed underground cable will skirt around the west side of the M1, junction 10 roundabout entering from the N51 roadway and exiting onto the R168. A detailed topological survey of the roundabout was carried out identifying levels and road edge. A detailed design drawing of the path of the UGC in the roundabout was prepared. See *drawing 05949-DR-001 for reference*.

2.6.12 Borrow Pit

No borrow pit/s are required for this development.

2.6.13 Onsite water crossings

The Proposed Development will result in the crossings of 3 no. minor watercourses. These Crossings are designed to accommodate the track width and minimize length of affected channel full details are provided in the **Water Crossings Management Plan** and in **Chapter 9: Hydrology and Hydrogeology**.

WX01: Water crossing No.1 - Coordinates (ITM): 708244.82, 784749.53

The proposed track crosses EPA watercourse (slieveboy 06). It is proposed a new min. 900 mm bottomless culvert will be installed (See **Planning Drawing 6918-PL-304**).

WX02: Water crossing No. 2 - Coordinates (ITM): 782918.56, 782918.56

The proposed track crosses a minor unnamed watercourse. It is proposed a new min. 900 mm bottomless culvert will be installed (See **Planning Drawing 6918-PL-305**).

WX03: Water crossing No. 3 - Coordinates (ITM): 708876.91, 782631.93

The proposed track crosses a minor unnamed watercourse. It is proposed a new min. 900 mm bottomless culvert will be installed (See **Planning Drawing 6918-PL-306**).

2.6.14 Onsite Drainage

The existing surface water runoff is contained within natural and artificial drainage channels that include stream (excluding water crossings) and river waterbodies, drainage ditches, and other minor natural and artificial manmade drainage features. Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality.

Existing Local Road Drainage

There are existing local road drainage features at the site entrances (shown in Figure 2.1), summarised as follows:

- At Site Entrance 1 - The L6274 local road is drained by road gullies conservatively presumed connected by a pipe. There is a road gully adjacent to Site Entrance 1.
- At Site Entrance 2 - The L6274 local road is drained by a filter drain on its southern side.
- At Site Entrance 3 - An open drain (characteristic of a sunken verge adjacent to the hedge line) runs along the L2275 local road. The drain deepens further north (outside the area affected by the proposed site entrance).

There are a total of ~~48~~ 13 No. attenuation/settlement basins proposed and located throughout the Site. Details of the drainage system are shown **Planning Drawings 6918-**

PL-200 - 6918-PL-203 and outlined in detail in the **Surface Water Management Plan**, part of the CEMP attached as **Appendix 2.1** and full details are provided in **Chapter 9: Hydrology and Hydrogeology**.

There are four natural streams on the Site. A buffer zone of at least 50m will be in place for natural streams and buffer zones of 10m will be in place for field / land drainage ditches, where possible. Sustainable Drainage System (SuDS) principles namely separation of overland flow from construction areas, the mimicking of diverted overland flow around construction areas and treatment trains to treat water from construction areas, will all be employed as explained in **Chapter 9: Hydrology and Hydrogeology**. Associated controls are listed below:

Source controls for surface water

- Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
- Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.

In-line controls for surface water

- Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.

Treatment systems for surface water:

- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbusters and/or other similar/equivalent or appropriate systems.

When heavy rainfall is predicted, then works will be suspended or scaled back.

Further details on drainage management and mitigation can be found in **Chapter 9: Hydrology and Hydrogeology** and the **Surface Water Management Plan** attached as **Appendix 2.1**.

2.6.15 Table of Key Development Infrastructure Metrics

The Key Development Infrastructure Metrics are contained in **Table 2.9**. This table is provided for ease of access by the public who maybe reviewing the EIAR Chapters.

Table 2.9: Key Development Infrastructure Metrics

Description	Length [m]	Width [m]	Depth [m]	No.
Upgraded Site Access Track	524	1.5	0.45	-
New Site Access Track (Inclusive of turning heads and road widening etc.)	6,330	5	0.45	-
Internal Cabling (power & communications)	6677	0.6	1.0	1
Internal Cabling (Public Road)	545	0.6	1.0	1
Turbine Hardstands - cranes	-	-	0.5	5
Turbine Foundations (27.2m diameter)	27.2m Diameter		3.5	5
Electrical Substation	-	-	0.45	1
Battery Energy Storage System	-	-	-	-
Site Compounds	-	-	0.5	3
Met Mast	-	-	0.5	1
Cut & Fill Areas & Junctions	-	-	0.45	1
110kV Cable Trench (On site section)	870	1	0.6	-
110kV Cable Trench (In Public Road)	12,120	1	0.6	-
Joint Pits	4.5	-	-	-
Drainage – Drains	8,234	1.5	0.80	-
Total				

Table 2.10: Summary of Estimated Excavation Quantities (m³)

**All excavated materials will be disposed of at a licensed facility*

Excavated Material Type	Excavated Material Volume (m ³)	Proposed Re-Use Volume	Comments
On site Access Tracks	18,391	5,517 m ³ topsoil	Side cast Topsoil will be stored adjacent to access tracks (2m high berm both sides (20% of network) - 4m wide at base; 2m at top; 2m high) Re-use of material for landscaping purposes elsewhere - remainder of topsoil
		11,657 m ³ subsoil	Surplus Material for Disposal at the Permanent Spoil Deposition Area SD1 & SD2.
Turbine Foundations	12,690	428 m ³ topsoil	Topsoil will be stored in a 20m Apron spreading around 5no turbine hardstand long edges (c. 100m length; Max 0.25m thick) Re-use of material for landscaping purposes elsewhere - remainder of topsoil
		12,262 m ³ subsoil	Subsoil will be stored in a 20m wide Apron spreading around 5no turbine long edges of hardstand (c. 100m length: Max 0.5m thick) Re-use of Till as fill above turbine foundation 1250m ³ each turbine. Surplus Material for Disposal at the Permanent Spoil Deposition Area SD1 & SD2.
Turbine Hardstands & Turbine set down areas	9,693	7,020 m ³ topsoil	Topsoil will be stored in a 20m Apron spreading around 5no turbine hardstand long edges (c. 100m length; Max 0.25m thick) Re-use of material for landscaping purposes elsewhere - remainder of topsoil
		3090 m ³ subsoil	Subsoil will be stored in a 20m wide Apron spreading around 5no turbine long edges of hardstand (c. 100m length: Max 0.5m thick) Re-use of Till as fill above turbine foundation 1250m ³ each turbine. Surplus Material for Disposal at the Permanent Spoil Deposition Area SD1 & SD2.
Electrical Sub-Stations & temporary Compounds.	1,549	2,205 m ³ topsoil	Re-use of material for landscaping purposes elsewhere. Any surplus material will be disposed at the permanent Spoil Deposition Area SD1.

Excavated Material Type	Excavated Material Volume (m³)	Proposed Re-Use Volume	Comments
		1,199 m³ subsoil	Surplus Material for Disposal at the Permanent Spoil Deposition Area SD1 & SD2.
Grid Connection* Including 545m internal cable within the public road.	8,852	2,447 m³ topsoil	To be disposed of at a licensed facility Please see Waste Management Plan for more details Appendix 2.1
		6,601 m³ subsoil	
Drainage	11,844	3,553 m³ topsoil	Side cast Topsoil will be stored adjacent to access tracks (2m high berm both sides (20% of network) - 4m wide at base; 2m at top; 2m high) Re-use of material for landscaping purposes elsewhere - remainder of topsoil Surplus Material for Disposal at the Permanent Spoil Deposition Areas SD1 and SD2.
		8,291 m³ subsoil	

Further details can be found in **Appendix 2.1 – Spoil Management Plan.**

2.7 CONSTRUCTION

The first phase of the Proposed Development will comprise the construction phase. This phase will begin with Site preparation works and will be complete when the turbines are built and ready for commissioning, and when any associated reinstatement and revegetation has taken place and all wastes have been removed from the Site. For this Development, it is envisaged that the construction phase will last approximately 16 -24 months. An anticipated construction programme is set out at **Table 2.11.**

Table 2.11: Wind Farm Anticipated Construction Programme (18 Months)

Activity	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Establishment/ Fencing off	X																	

Activity	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Temporary Construction Compound (Early installation, if required).		X	X															
Permeant Met Mast		X	X															
Forestry felling and drainage		X	X	X	X													
Internal Access Road Upgrade & Construction		X	X	X	X	X												
Substation & Compound Construction				X	X	X	X											
Substation Electrical Works									X	X	X	X	X	X	X	X		
Substation Commissioning																		X
Excavation & Construction of Turbine Foundations & Hardstands		X	X	X	X	X	X	X	X	X								
Internal Cabling Installation								X	X	X								
Turbine Delivery and Erection										X	X	X	X					
Grid Connection										X	X	X	X					
Energisation															X	X		
Turbine Commissioning																X	X	X
Site Restoration																	X	X

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2.7.1 Construction Sequencing

It is envisaged that the following will be the sequence of construction for the Development:

1. Site Preparation including felling and drainage (e.g., stilling ponds);
2. Site Roads and further tree felling;
3. Contractor Compound and Welfare Facilities;
4. Turbine Hardstands, Turbine Foundations, met mast foundations, internal cable ducting, 38 kV substation;
5. Installation of the Grid Connection;
6. Erection of wind turbines and met mast;
7. Commissioning and Energisation.

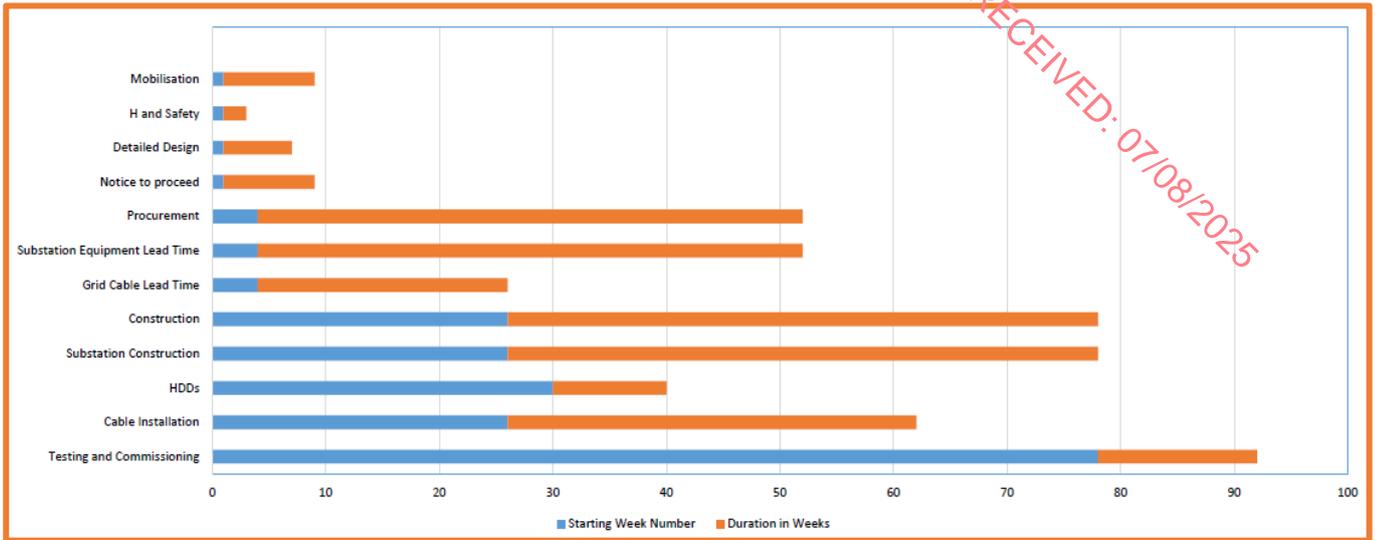
The first step will be to prepare the Site for construction. This will include felling and implementing the designed drainage measures for all site infrastructure. The Site Access Roads will then be constructed and/or upgraded. The next step will be to construct the Temporary Construction Compound and Welfare Facilities. The next step will be to prepare the areas of the site where site infrastructure is to be located by marking out the construction works corridor, the relevant environmental buffer zones.

Following the site preparation, construction of the crane hard-standing areas for the five turbines will occur. The five Turbine Foundations will then be excavated, and foundations constructed using reinforcing bar (rebar) and imported concrete. No concrete batching will take place on site.

Following the construction of the Turbine Foundations, internal cable ducting from the turbine locations to the on-site 38 kV substation will be laid in trenches along the constructed access roads.

The Grid Connection route will then be constructed. There will be 12.65km of trenches for underground cabling (UGC) to Drybridge 110 kV substation. The ducts to be installed in an excavated trench which will be 600mm wide and 1m deep. There will be variations on this design to adapt to bridge crossings, service crossings and watercourse crossings as per TLI Technical notes included in **Appendix 2.3**. Construction of the 38kV substation will proceed in parallel with the other works. **The construction sequence and timeframe (90-weeks) for the grid connection is outlined in Table 2.11a: Grid Connection - Anticipated Construction Programme included in Appendix 2.3c: TLI - Kellystown Anticipated Construction Program.**

Table 2.11a: Grid Connection - Anticipated Construction Programme.



The last step will be to erect the five wind turbines on the foundations using two cranes. Mechanical commissioning and testing of the turbines can then proceed. Electrical commissioning will be undertaken once the substation has been energized.

2.7.2 — Micrositing

Micrositing is now not proposed as part of the development.

~~The Development infrastructure is designed around considerations of technical, economic, and environmental constraints. While the Site layout was optimised as far as practicable and EIA standard environmental investigations have taken place, adverse geotechnical ground conditions may require the minor micrositing of Development infrastructure. As per Section 5.3 Ground Conditions/Geology of the current 2006 Wind Energy Development Guidelines (“the 2006 WEDG”):~~

~~“Provision must be made for carrying out site-specific geo-technical investigations in order to identify the optimum location for each turbine. These investigations may suggest minor adjustments to turbine location. In order to accommodate this practice, there should be a degree of flexibility built into the planning permission and EIS. The extent of flexibility will be site specific but should not generally extend beyond 20 metres. Any further changes in location beyond the agreed limits would require planning permission.”~~

~~Any such movement will only be implemented if necessary and the above noted requirements of the 2006 WEDG will be followed. Such variations in ground conditions will only become apparent following excavation of the turbine foundation area during the~~

~~construction phase. A movement of the turbine will require the associated turbine hardstand and site access track to 'follow' the turbine foundation move.~~

2.7.3 Construction and Environmental Management Plan (CEMP)

A CEMP is appended to the EIAR in **Appendix 2.1**. The CEMP includes an emergency response plan, spoil management plan, surface water management plan, surface water quality and inspection management plan and a waste management plan. The CEMP includes all the mitigation measures proposed within the EIAR and the NIS. A summary of the mitigation measures is included in **Appendix 17.1** and is also included in the **CEMP Appendix 2.1**.

The CEMP provides a commitment to mitigation and monitoring and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the Project will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later phases, such that there is a robust mechanism in place for their implementation. The CEMP will govern the construction phase, and will be continued through to the commissioning, new operational phase and decommissioning management plans will be developed as appropriate. An Environmental Manager / Ecological Clerk of Works (ECoW) with appropriate experience such as working on large scale renewable projects and with relevant qualifications e.g. BSc in ecology or environmental management and accreditation such as CIEEM will be appointed for the duration of the construction phase so that the CEMP is effectively implemented.

In the event planning consent is granted for the Proposed Development, the CEMP will be updated prior to commencement of 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 following sections describe key activities without the introduction of the appropriate mitigation measures described in this EIAR may cause harm or nuisance to the public. The potential impacts of each are considered in the relevant chapters of of this EIAR.

2.7.4 Refuelling

Vehicles will be refuelled off-site where possible. For vehicles that require refuelling on-site, fuels will be stored in the temporary construction compound and banded to at least 110% of the capacity of the largest tank within the bund or 25% of the total tank capacity, whichever is greater. Refuelling will take place via a mobile double skinned fuel bowser.

The bowser will be a double axel refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

2.7.5 Concrete

There will be no concrete batching on the Site. Rather, it will be transported to the Site as it is required. A dedicated, bunded area will be created to cater for concrete wash-out and this will be within the each of the onsite Temporary Construction Compounds. This will be for the wash-out of the chutes only after the pour. Concrete trucks will then exit the Site via site entrance 1 & 2 and return to the supply plant to wash out the mixer itself.

The main concrete pours at the turbine locations will be planned in advance and proposed mitigation measures (are detailed in **Chapter 9: Hydrology and Hydrogeology**) will be as follows:

- Avoiding large concrete pours, for Turbine Foundations for example, on days when temperatures are not optimal as per (BS 8110) (EN1992-1-2) or when heavy or prolonged rainfall is forecast i.e., during a period in which a Met Éireann Status Yellow, Orange or Red weather event has been notified.
- Ensuring that all concrete pour areas are dewatered prior to pouring concrete and while the concrete is curing.
- Making covers available so that areas can be covered if heavy rain arrives during the curing process which will prevent runoff of concrete which has a high pH.

The chutes wash out on-site will require a small volume of water. This water will be directed to the concrete washout area which will be a temporary lined impermeable containment area or a siltbuster type washout unit⁵ or similar. The unit catches solid concrete and filters and contains the washout liquid for pH adjustment and solid separation.

If a temporary lined impermeable containment area is used, these are usually constructed using straw bales and lined with an impermeable geotextile membrane. An example is shown on **Plate 2.2**. An alternative construction method would be to dig a hole in the ground and place an impermeable geotextile membrane in the hole so that no wastewater can penetrate the cover and seep into the soil and groundwater.

⁵ <https://www.siltbuster.co.uk/solutions/concrete-washwater/>



Plate 2.2: Typical Temporary Concrete Washout Area

The washout area is covered when not in use during periods when wet weather is forecast to prevent ponding of rainwater. During periods of dry weather, the area can be left uncovered to allow evaporation of water. Once concrete pours have been completed, the remaining water will be tankered off site to a licenced facility for disposal. Solid concrete remnants will be disposed of at an EPA waste licenced facility. It can be estimated that there will be approximately 2m³ of solid concrete waste per Turbine Foundation pour that will need to be disposed of, or a maximum of 10m³ in total to facilitate the Proposed Development.

Deliveries of concrete for Turbine Foundation construction will be carried out outside of normal working hours to limit impacts on traffic and local road users. Each turbine pour is proposed to take place in a single day, so over five days for this Project.

Further measures that will be used to mitigate the risk of pollution from concrete pours are as follows:

- The concrete trucks will not be washed out on Site but will be washed out on return to the batching plant.
- Site access tracks will be constructed so that all concrete trucks will be able to access all areas of Site with ease and no concrete will be transported around the Site on open trailers or dumpers to avoid the risk of spillages.
- All concrete for the Turbine Foundations will be pumped into the shuttered formwork using a hydraulic concrete pump. Two pumps will be present on site for each foundation pour.

- The Traffic Management Plan (**Appendix 16.2**) will specify the exact routes and arrangements for concrete delivery as well as outlining emergency measures to be taken.
- Signage will be erected near concrete pour areas to advise drivers that concrete washout on site is not permitted.

2.7.6 Dust Suppression

During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network assessed in detail in **Chapter 18: Air and Climate**. Damping down may be required to ensure that dust does not become friable. This is most likely to occur during periods of dry and/or windy weather. This requires wetting the material and ensuring water is supplied at the correct levels for the duration of the work activity. Further details are set out in set out in detail in **Section 18.3.7.1 Construction Phase Mitigation in Chapter 18: Air and Climate**.

A wheel wash facility will be employed on-site which will wash mud and debris from vehicles egressing the Site and reduce mud and debris from getting onto the local road network. Where stone is sourced off-Site, HGVs entering the Site carrying stone will be covered to prevent dust generation. A road sweeper will be made available for use in case of any mud or debris making it onto the public road network **Planning Drawing 6918-PL-802**.

2.7.7 Construction Hours

The Development will have 44 to 61 construction workers during the construction phase. Working hours for construction will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends, from 08:00 to 13:00 on a Saturday. It should be noted that, during the turbine erection phase, operations will need to take place outside those hours, with concrete pours commencing at 05:00 and continuing till 16:00, to facilitate Turbine Foundation construction and so that lifting operations are completed safely. Hours of working for turbine foundation construction will be agreed with Louth County Council prior to the commencement of Turbine Foundation construction. A detailed Traffic Management Plan (**Appendix 16.2**) will be implemented during the construction phase.

2.7.8 Construction Compound and Temporary Works Area

There will be 3 no. temporary construction compounds and one laydown area for the mat on site during the construction and decommissioning phases. They will be set up upon commencement of the construction phase. The proposed location for the temporary construction compounds are shown in **Figure 2.1**.

The proposed location for the temporary construction Compound No 1 is northeast of T01 and the layout is shown in **Planning Drawing 6918-PL-400**. The compound will be 25m by 25m and approximately 0.5m in depth $625\text{m}^2 / 312.5\text{m}^3$. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for sealed type staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

The proposed location for the temporary construction compound No 2 is located near the site entrance 2, which facilitates access to T02-T05 and the layout is shown on **Planning Drawing 6918-PL-401**. The compound will be 70m by 30m and approximately 0.5m in depth $2500\text{m}^2 / 1250\text{m}^3$. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for sealed type staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

The proposed location the temporary construction compound No 3 for the substation is located in the southeast of the site. The layout is shown on **Planning Drawing: 6918-PL-402**. The compound will be 35m by 25m and approximately 0.5m in depth $875\text{m}^2 / 437.5\text{m}^3$. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units for sealed type staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel facilities.

The proposed location of the temporary construction laydown area for the Permanent Met Mast is in the southeast of the site. The layout is shown on **Planning Drawing 6918-PL-110**. The construction laydown area will be 20m by 10m and approximately 0.5m in depth $200\text{m}^2 / 100\text{m}^3$. The compound will be used as a storage area and parking facilities.

An area within each compound will be used for the storage of fuel and oils and this will be suitably bunded. The bund will be lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table. Double protection containers / equipment will be used along with drip trays. Full details are included in the CEMP, please refer to **Appendix 2.2**.

During the construction phase, water will be supplied to the temporary compound by water bowser. The maximum wastewater production is estimated to be the same as the maximum water consumption (2000 litres per day)⁶. The project will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the construction phase with 44 to 61 construction workers on site at peak. A holding tank is proposed for wastewater management. Wastewater will be removed off-site weekly, by a licensed wastewater disposal company and disposed at an appropriate licenced facility, likely to be situated in the Drogheda area.

2.7.9 Construction of Crane Hardstands and Foundations

The construction method for all the crane hardstands will be via excavated approach. Each crane hardstand will be 4,670m². Foundations will be taken down to competent bearing strata by excavating through the soil, subsoil, and rock if necessary.

The method of construction for Turbine Foundation is described below:

- Install temporary drainage around perimeter of excavation (see **Chapter 11: Hydrology and Hydrogeology** for full details of proposed drainage);
- Excavate soil and rock and temporarily store adjacent to the works;
- Form a level working area to build foundation;
- Install lean-mix concrete layer
- Install formwork and reinforcement;
- Pour concrete;
- Cure concrete;
- Once the concrete has set and the earthing system is in place, backfill the foundation with rock; and
- Use excavated soil to build up the area around the turbine base

2.7.10 Turbine Assembly

Once on Site, the wind turbine components will follow a prescribed route to minimise manoeuvring. Components will be placed on Turbine Hardstands prior to assembly. A *'just in time'* delivery strategy will be in place for turbine blades to reduce the need for temporary set down areas. One large crane will be required for erecting the turbines, assisted by smaller cranes. Similar cranes will also be required for maintenance during the operational phase for maintenance and replacement works. As with all other vehicles, refuelling of

⁶ Table 3 of the EPA WW treatment Manual (Treatment systems for Small Communities, Business, Leisure Centres and Hotels), Environmental Protection Agency, 1999. Quarry (excluding canteen) best reflects a construction site. [Available online: https://www.epa.ie/publications/complianceenforcement/wastewater/EPA_water_treatment_manual_smallcomm_business.pdf]

cranes will be carried out in accordance with site procedures to minimise the risk of spillage or pollution.

The towers will be delivered in sections, and work on assembly will not start until a suitable weather window is available. The bottom tower section will be bolted onto the concrete foundations. The mid tower section will then be lifted into position and bolted to the bottom tower section. Finally, the top tower section will be lifted into position and bolted to the mid tower section. Three methods can be used to attach the blades:

1. The blades can be attached to the nacelle and hub on the ground. The hub and blades are then lifted as one. The nacelle of a wind turbine houses the drive train and other tower-top components. The hub of the wind turbine connects the blades to the main shaft and ultimately to the rest of the drive train.
2. The hub can be attached to the nacelle and the two blades attached to the hub while the nacelle is on the ground – the "*bunny lift*". The nacelle is then lifted into position and the third blade lifted into place separately. This requires manoeuvring of several components on the ground and usually the repositioning of cranes.
3. Lifting the nacelle and hub as one unit, as described above and then attaching the blades one at a time, rotating the hub between lifts. The blade lifting operations do not require repositioning of the crane.

The most appropriate method will be decided by the lifting contractor and the turbine manufacturer, prior to turbine erection. Given the dimensions of the blades, the third method will be the most likely implemented. None of the other methods outlined above will have any impact on the environment.

2.7.11 Construction Traffic

It is estimated in Chapter 16: 16 Traffic and Transportation that during civil construction, approximately 6,677 (13,354 movements) fully loaded Heavy Goods Vehicle trips will be required for the development. Full details are described in full in **Section 16.3 in Chapter 16: traffic and transport.**

The first month of the wind farm construction period will involve deliveries of materials for site access works, site compound, site offices and site security. It is anticipated that a maximum of 15 HGV vehicles (30 HGV movements) will visit the Site on a daily basis during the first month of the contract.

Months 2 to 10 will involve deliveries of materials for turbine hardstands, turbine foundations, site access tracks, electrical substation building and cable / ducting works, This period will include deliveries of road construction materials for access tracks and turbine hardstands, ready mix concrete and steel reinforcement for turbine foundations. It is anticipated that a maximum of 168 HGV vehicles (336 HGV movements) will visit the site daily during the period of weeks 8 to 24. This will occur on 5 days during this 9 month period when turbine foundations are poured. An estimated 119 HGV arrivals and (238 HGV movements) assuming a capacity of 8m³ concrete truck deliveries will be required per Turbine Foundation.

Prior to construction commencing on site, a Traffic Management Plan (TMP) will be developed by the contractor and submitted to Louth County Council for agreement. This Plan will contain details of all proposed signage and temporary traffic control measures on the L2275, Cockle Road, R132, N51, R168, Barrack Lane and Slane Road., as well as warning of the entrance to the construction Site/wind farm.

2.7.12 Reinstatement and Monitoring

Following completion of construction, all plant and machinery will be removed from the Site. The construction compound and other temporary works/assembly areas needed for the construction period, will be reinstated using the original spoil material removed and stockpiled close to the location from where it was excavated as explained in **Chapter 6: Biodiversity** and **Chapter 10: Soils and Geology**. Temporary construction fencing/gates will be removed from site. Stockpiles will be restricted to less than 2m in height and located outside of the surface water buffer zones. All stockpiling locations will be subject to approval by the Site Manager and Project Ecological Clerk of Works (ECoW).

The grid route will be completed as described in **Section 2.6.9**. Once all construction works are complete on private lands, work areas will be reinstated with excavated soil and either seeded out with native species, allowed to vegetate naturally, or reinstated with excavated grass turves and will be restored to their original condition. This work will be carried out in consultation with the landowner and in line with any relevant measures outlined in **Appendix 2.1 CEMP**.

All on-site installed drainage network will be left in place. This will be periodically monitored to ensure that it is operating to its stated design purpose. Water monitoring on nearby natural watercourses will be undertaken prior to, during and post construction to determine

if any pollution has migrated off-site, and if so, implement measures to rectify the impact. Details of this can be found in **Chapter 11: Hydrology and Hydrogeology**.

2.7.13 Construction Supervision and Monitoring

The construction activities will be monitored by a site engineer, a geotechnical engineer, a qualified archaeologist and an ecological clerk of works (ECoW). The geotechnical engineer will be contracted for the detailed design phase and their services retained throughout the construction and reinstatement phases. The geotechnical engineer will oversee all earthworks and excavation activities and monitor for issues such as ground stability, water ingress into excavations etc. Roles and responsibilities are further detailed in **Appendix 2.1**.

Daily monitoring of excavations by the Geotechnical/Site Engineer will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken. Further details of what this will involve are detailed in **Chapter 10: Soils and Geology** and **Chapter 11: Hydrology and Hydrogeology**.

The ECoW will be employed prior to the commencement of the construction phase and will monitor the working corridor and review the pollution control measures and working practices during construction and have input into site remediation. The ECoW will have stop work authority if, for example, there is potential for sensitive habitat features to be encroached upon or there is the possibility of silt/pollution runoff to natural watercourses. Further details are detailed in **Chapter 6: Biodiversity**.

The archaeologist will have responsibility for ensuring that potential archaeological features are protected and will also have stop work authority should any be discovered during excavations. If any potential archaeological features are discovered, the archaeologist will inform the National Monuments Service (NMS). Further details are detailed in **Chapter 15: Cultural Heritage**.

An inspection and maintenance plan will be developed for the planned Site drainage prior to commencement of construction. Regular inspections of the installed drainage system will be undertaken, especially after heavy rainfall events, to check blockages and ensure that there is no build-up of standing water in any part of the system where it is not designed to be. Excess build-up of silt at check dams, attenuation/settlement ponds or any other drainage feature will be removed. Further details are provided in **Appendix 2.1**:

Construction Environmental Management Plan - Management Plan 3 - Surface Water Management Plan.

During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSS) will be undertaken for each primary watercourse close to the Site, and specifically following heavy rainfall events (i.e. weekly, monthly and event based). Further details are detailed in **Chapter 11: Hydrology and Hydrogeology.**

The CEMP for the Development will set out the proposed site organisation, sequencing of works, methodologies, mitigation measures (including those outlined above) and monitoring measures. Further details are outlined in **Appendix 2.1: Construction Environmental Management Plan.**

Daily monitoring of excavations by the geotechnical engineer will occur during the construction phase. High levels of seepage inflow are not expected to occur, however in the unlikely event they occur excavation work will immediately be stopped, and a geotechnical assessment undertaken. Further details are outlined in **Appendix 2.1: Construction Environmental Management Plan.**

The local road network near the Site, used to transport construction materials, will be monitored during construction, so that any damage caused by construction traffic associated with the project can be identified and repaired. Any required monitoring programme will be agreed with the local authority, prior to the commencement of any construction works. Ready mix concrete and rock will be sourced from local quarries and monitoring may also be undertaken on the route as required. Further details are detailed in **Chapter 14: Material Assets.**

2.7.14 Construction Employment

It is estimated that 44 to 61 construction workers will be employed on-Site during the peak period of Turbine Foundation construction.

2.8 COMMISSIONING

Wind farm commissioning is expected to take in the region of two months to complete from the erection of the final turbine to the commercial exportation of power to the national grid. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical and mechanical testing and

control measures to check that the wind farm will perform and export power to the national grid, as designed.

2.9 OPERATION AND MAINTENANCE

During the operation of the wind farm, the turbine manufacturer, the wind farm operator, or a service company will carry out regular maintenance of the turbines, substation and site infrastructure. Personnel will enter the site via the site entrance. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm. ESB networks will operate their section of the substation.

2.10 DECOMMISSIONING

The Applicant is applying for a consent for a period of 35 years for the operation of the wind farm. The full description of the decommissioning is as follows:

- Removal of five wind turbines and above ground concrete plinths.
- Removal of above ground meteorological mast structure.
- Removal of all associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation. Ducting is to remain *in-situ*.

All other elements of the proposed development including the on-site substation, will remain *in-situ*. The Site Access Roads and associated drainage systems will serve ongoing forestry and agriculture activity in the area. All other hard surfaced areas will be allowed to revegetate naturally. Based on the experience of the EIAR project team of monitoring operational wind farm sites throughout the country, the approach of allowing these areas to revegetate naturally has proven to be very successful and less environmentally impactful than removing this infrastructure.

Cranes of similar size to those used for construction will disassemble each turbine using the same crane hardstands. The towers, blades and all above ground components will be removed from site and reused, recycled, or disposed of in a suitably licenced facility. Turbine parts will be cut on site so as to fit on articulated trucks (The financial costs of decommissioning, at current material values, will be more than met by the recycling value of the turbine components).

Potential impacts will be similar to that of the construction phase, albeit to a lesser extent and assessed in each chapter of this EIAR.

There will be no reinstatement works required during the decommissioning phase.

A decommissioning plan is included as part of the CEMP in **Appendix 2.1**. Prior to the decommissioning works, a plan will be submitted to the planning authority for written agreement.

2.11 PUBLIC CONSULTATION

Public consultation consisted of a multi-stage approach, as outlined in the Community Report (**Appendix 1.4**).

Once the initial scope of the project was clear, consultation on the Proposed Development began in October 2022 with the aim of making as many members of the local community aware of the project as possible. During the week commencing 17 October 2022, an information leaflet was distributed to all homes within 2km of the project site, to introduce the project, provide details of its scope, highlight the associated Community Benefit Fund, provide contact details for the project webpage, email address and dedicated Community Liaison Officers, and encourage positive two-way dialogue from an early stage.

Members of the EDF Renewables project team also went door-to-door visiting all homes within 1km, to share this same information and give local residents the opportunity to ask any questions they had regarding the proposed development. A press release was also issued to local newspapers to announce the project. A similar round of public consultation took place in July 2023, following the publication of a preliminary turbine layout.

In addition, EDF Renewables hosted a public exhibition on the 1st of December 2023 in the Drumshallon Forge Heritage Centre. An invitation was distributed to all homes within 2km of the Site, adverts were placed in the Drogheda Independent newspaper and a press release was issued to all local media. All TDs, Senators and Cllrs in the relevant area were invited to attend the event. This public information day featured information about the project, the environmental surveys completed to date, photomontages illustrating the visual impact of the turbines from local viewpoints, details of the project timeline and information on other aspects of wind energy. In total, the public information day was attended by c.150 people. There is also a virtual public exhibition, containing all of the information presented at the in-person event.

2.11.1 Community Benefit

If the project receives planning permission and is constructed, EDF Renewables will set up a Community Benefit Fund which will allocate funds from the wind farm to community groups in the area.

If consented, the proposed Kellystown Wind Farm will provide sustainable, low carbon energy generation infrastructure to meet Ireland's growing demand. The development benefits to the local community would include investment in local infrastructure and electrical systems, local job creation, and significant contributions to the local authority Louth County Council in the form of development contributions and commercial rates over the project lifetime of 35 years.

If successful in the Renewable Electricity Support Scheme (RESS), the proposed Kellystown Wind Farm would provide a community fund calculated in accordance with the RESS Terms and Conditions which are currently set at €2 per MW/h of electricity produced by the project. This is to be made available to the local community for the duration of the RESS (15 years). In this case the Community Benefit Fund would amount to an average of approximately €180,000 per annum. The actual fund will vary around this average from year to year, depending on each year's wind conditions.

An independent fund administrator would be appointed to manage and govern the fund. The Community Benefit Fund belongs to the local community and the premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, the first task will be to form a benefit fund development working group that clearly represents both the close neighbours to the project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that would administer the Community Benefit Fund.

The types of projects and initiatives that could be supported by such a Community Benefit Fund could include youth, sport and community facilities, schools, educational and training initiatives, and wider heritage, and environmental projects. The number and size of grant allocations will be decided by a Community Fund liaison committee with various groups and projects benefiting to varying degrees depending on their funding requirement.