Bracklyn Wind Farm

Chapter 3: Description of the Proposed Development

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3.1 Introduction

The purpose of this chapter is to provide a description of the proposed development in sufficient detail, which, when taken together with the descriptions of the existing environment provided in each chapter of this EIAR, will allow an independent reader to understand the significant environmental effects likely to arise from the proposed development.

The description considers the location of the proposed development together with its main physical characteristics including design, size, scale and land-use requirements of all relevant phases of the existence of the project from its construction through to operation and decommissioning. The proposed development described in this chapter was arrived at following the consideration of various reasonable alternatives described in **Chapter 2**.

This chapter should also be read in conjunction with the technical plans and drawings submitted with the planning application and photomontages provided in **Annex 9.1** of this EIAR. Further descriptions of specific elements of the proposed development and the existing baseline environment are also provided in individual chapters of this EIAR as they relate to particular environmental factors including, for example, in combination with other proposed developments; the nature and quantity of materials and natural resources used; and the potential production of residues, waste, pollution, noise and nuisances etc.

The description of the proposed development also addresses other off-site/secondary developments which occur as a direct result of the proposed development, including, for example, the importation of materials and aggregates to facilitate construction of the proposed development.

The proposed development will be commissioned in a single construction phase and the construction period is likely to last for approximately 15-18 months. The description of the proposed construction phase includes land-use requirements; proposed site construction works; off-site/secondary developments; description of materials, plant and equipment used to facilitate construction together with a description of potential emissions; waste and traffic etc.

3.2 Project Duration

A ten year planning permission is being sought by the developer for this proposed development. That is, planning permission would remain valid for ten years following the final grant. The *Wind Energy Development Guidelines for Planning Authorities 2006* state that "*Planning Authorities may grant permission for a duration longer than 5 years if it is considered appropriate, for example, to ensure that the permission does not expire before a grid connection is granted. It is, however, the responsibility of the applicants in the first instance to request such longer durations in appropriate circumstances*". A ten-year planning permission is considered appropriate for a development of this nature to ensure all other required licenses and consents are in place.

The operational lifespan of the Bracklyn Wind Farm is proposed to be 30-years following the full commissioning of the wind turbines and electricity substation. Any further operation beyond 30-years would be subject to a further planning application and EIA. This EIAR therefore assumes that full decommissioning of the wind farm will take place at the end of the project lifespan. Any future expansion would be subject to a further planning application.

However, the proposed electricity substation will, once operational, become a 'node' on the national electricity network and will be largely operated and maintained by EirGrid as part of the national electricity network. As a result, the proposed substation does not have a specified operational period and it is highly likely that it will continue to be operated following the decommissioning of the Bracklyn Wind Farm (i.e. after its 30-year operational period) and, therefore, decommissioning of the electricity substation is not proposed.

3.3 Site Location & Context

The proposed development is located in east County Westmeath and west County Meath, approximately 16 kilometres (km) east of Mullingar, approximately 4km south of Delvin and approximately 5km north of Raharney. The proposed wind farm and 110kV substation will be located within the townland of Bracklin, County Westmeath; while the proposed underground grid connection cable and associated infrastructure will be located within the townlands of Bracklin, Co. Westmeath and Coolronan, Co. Meath. The local area is typical of this part of Ireland, with settlement patterns largely comprising dispersed rural dwellings often accompanied by agricultural holdings and buildings. In total, there are 78 no. dwellings located within 1.85km of a proposed wind turbine.

The proposed development site and surrounding topography are typical of the Midlands Region and comprise a generally flat landscape with occasional gentle undulations. The local landscape is also characterised by the presence of extensive peatlands to the south and east of the proposed development site which have been harvested by Bord na Móna.

The site comprises a mosaic of arable crop fields, improved grassland, conifer plantation, natural and broadleaf woodland, and bog woodland. The proposed development site includes commercial conifer plantations, particularly on its southern and eastern fringes. Habitat surveys have also identified pockets of mature woodland scattered throughout the site. Field boundaries generally consist of mature and semi-mature tree lined hedgerows which consist of a mix of species including; ash, beech, hawthorn, birch, hazel, blackthorn, Scots pine, sycamore, spindle, oak, elder, dog rose, bramble, holly, and ivy.

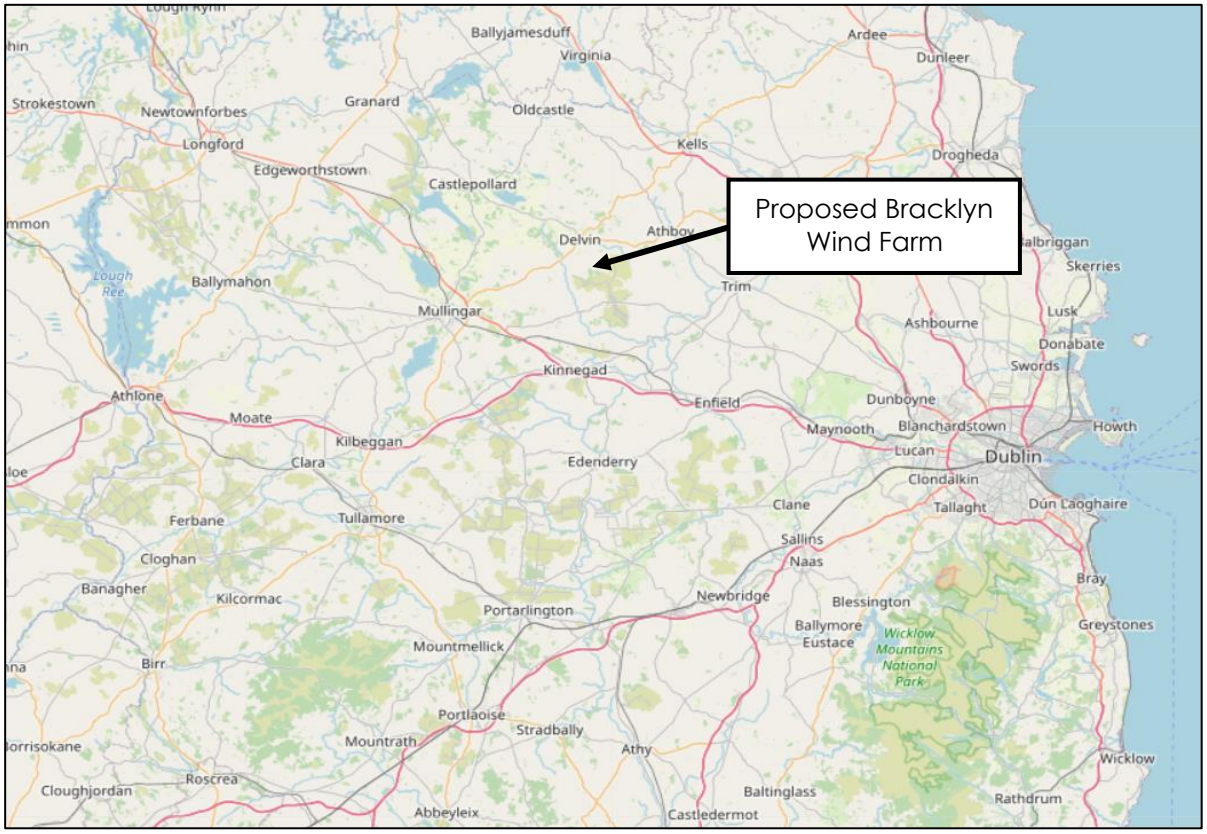

Figure 3.1: Proposed Development Site Location

Plate 3.1: General View across the Proposed Development Site

3.4 Description of the Proposed Development

The proposed development assessed within this EIAR comprises a wind farm, including all associated development works to accommodate its construction, installation, operation, maintenance and the export of electrical power to the national grid. This will include:-

- 9 no. wind turbines with a hub height of 104 metres (m), a rotor diameter of 162m, and an overall tip height of 185m;
- All associated foundations and crane hardstanding areas;
- All associated underground electrical and communications cabling;
- Provision of new internal wind farm site access tracks and use of, and upgrades to, existing agricultural/forestry tracks, and associated site entrance from the L5508 local public road;
- 1 no. site control building;
- 1 no. free-standing meteorological mast of 104m in height;
- 1 no. temporary construction compound;
- Felling of 28 hectares (ha) of commercial forestry plantation to facilitate the construction of infrastructure;
- The storage of excavated material at 2 no. spoil deposition areas;
- Upgrade works to public roads along the turbine component haul route;
- A 110 kilovolt (kV) 'loop-in/loop-out' Air-Insulated Switchgear (AIS) electrical substation and all associated electrical equipment including an Electricity Storage System ;
- 6.3 kilometres (km) of 110kV underground electricity lines, accompanied by 2.5km of associated access track and 3 no. site entrances to facilitate connection of the proposed electricity substation to the existing 110kV Mullingar-Corduff overhead electricity transmission line;
- Upgrade works to public roads along the turbine component haul route; and
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and environmental mitigation measures.

The location of the proposed development is illustrated in **Figure 3.2** (see also **Annex 3.1**) below.

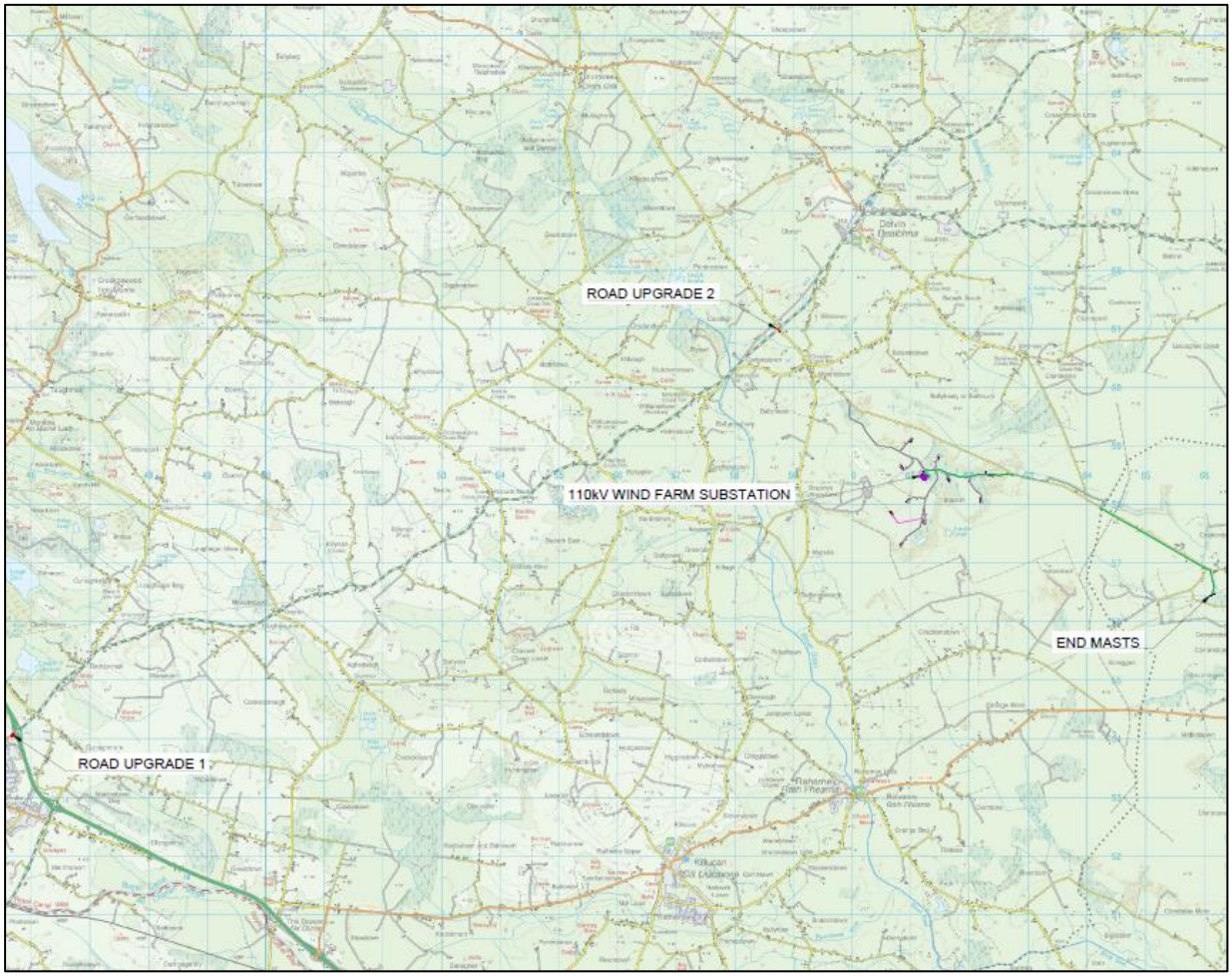

Figure 3.2: Layout of the Proposed Development

Figure 3.3: Proposed Wind Farm Site Layout (see also Annex 3.2)

Each element of the proposed development is discussed in turn below and this EIAR should be read in conjunction with the technical plans, drawings and other particulars included in the accompanying planning application.

3.4.1 Wind Turbines

As discussed in **Chapter 2**, the proposed wind turbine design and layout has been informed by a number of factors including environmental constraints, maximising energy yield and maintaining sufficient inter-turbine separation distances to minimise wake effects and maintain correct operational performance. The coordinates of the proposed wind turbines are set out in **Table 3.1** below.

ID*	Easting**	Northing**	Approximate Altitude (mAOD)
T1	660970	759136	83
T2	660780	758679	91
T3	660893	758066	93

T4	661188	757707	83
T5	660780	757320	82
T6	661425	758849	79
T7	661617	758418	79
T10	662349	758514	78
T11	662153	758072	82

Table 3.1: Proposed Wind Turbine Coordinates and Existing Ground Levels

During the assessment of project alternatives (see **Chapter 2), the number of wind turbines within the scheme was reduced from 11 no. to 9 no. with turbines T8 and T9 being omitted due to environmental constraints. As the public consultation process had commenced at his time and the public were aware of the turbine identifiers, it was decided, in the interests of consistency, to retain the initial turbine IDs and simply exclude the T8 and T9 identifiers from the proposed development.*

***Note: Coordinates provided In Irish Transverse Mercator (ITM)*

****Note: Micrositing and any immaterial deviations to the proposed turbines within an overall development envelope are fully assessed and incorporated into this EIAR.*

The proposed wind turbines will have an overall tip height of 185m. The turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms, mounted on a steel/concrete tower of tubular construction.

The blades will be constructed of glass reinforced plastic. The colour of the proposed turbines and blades will be white, off-white or light grey in accordance with the *Wind Energy Development Guidelines for Planning Authorities 2006*, or as determined by An Bord Pleanála.

The turbines will be geared to ensure that all turbines rotate in the same direction and will typically have a cut-in wind speed of 3 metres-per-second (m/s) and a cut-out speed of 25 m/s. At the cut-out speed the turbine will automatically shut down. The typical components of a standard wind turbine are illustrated in **Figure 3.4**. The rated output for each turbine, based on the proposed model selected, is 6.0MW, resulting in a total rated output of 54MW for the proposed development

Each turbine will utilise its own transformer, which will be located inside the nacelle. Transformers will either be oil-filled (and bunded to prevent spillage) or of a solid cast resin type, which is effectively non-polluting should a spillage occur. The transformers will increase the electrical voltage on site and on-site electrical cables will connect the turbines to the electrical control building within the proposed 110kV electricity substation.

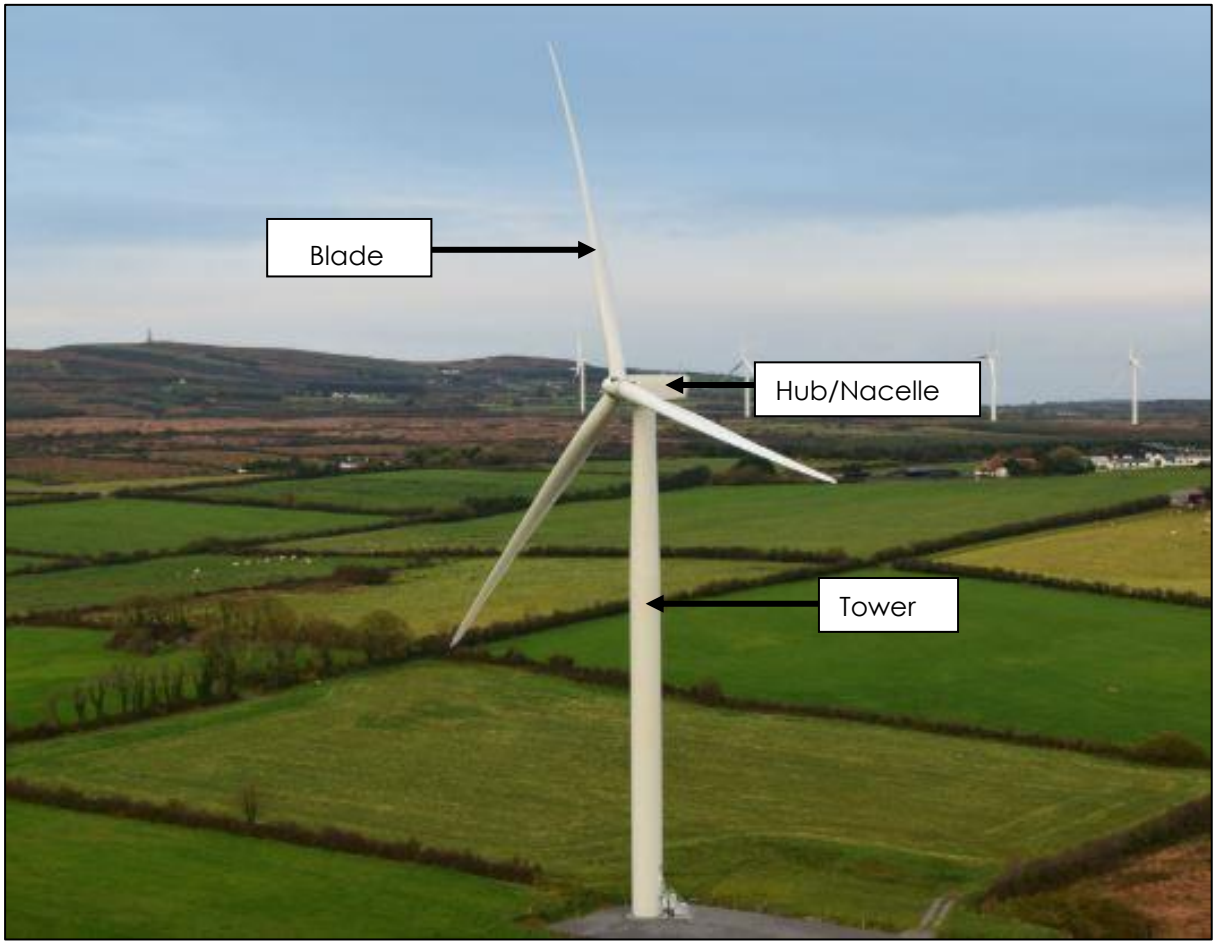

Figure 3.4: Typical Wind Turbine and Components

Details of the proposed turbine make, model and dimensions are provided at **Table 3.2** below. A drawing of the proposed wind turbine is provided at **Annex 3.3**.

Turbine Model	Output (MW)	Hub Height (m)	Rotor Diameter (m)	Overall Tip Height (m)
Vestas V162-6.0	6.0	104	162	185

Table 3.2: Proposed Turbine Model and Dimensions

Each assessment contained in individual chapters of this EIAR has therefore been undertaken on the basis of the proposed turbine make, model and dimensions, as set out above. It is important to note, however, that turbine technology advances very quickly with component dimensions constantly changing to maximise efficiency. Furthermore, the process for securing planning permission and all other subsequent consents can take a significant period of time. It may therefore be that, at the time of construction, the abovementioned proposed turbine model is no longer available in the market. Accordingly, while this EIAR assesses the likely significant environmental effects of the proposed turbine and its principal dimensions, as described above, it also fully incorporates an assessment of any immaterial deviations thereof. Any proposal to immaterially deviate from the above dimensions must be subject to a separate future application process. Any such application would be required to demonstrate that the deviations to the turbine make, model and dimensions are immaterial, including by reference to this EIAR and any conditions of planning consent.

3.4.2 Turbine Foundations

Each turbine tower is secured to a steel ring foundation which can comprise either a reinforced concrete (gravity) foundation or a piled foundation. The precise type of foundation to be used for each turbine will depend upon the specific ground conditions at each location. This shall be established through detailed technical design and post-consent geotechnical investigations prior to construction, as is normal best-practice in all construction projects.

Initial geotechnical investigations carried out to date at each of the turbine locations, with the exception of turbine T10, demonstrate that the subsoil conditions are generally benign and suitable for the construction of standard turbine raft foundations. Turbine T10 is located in an area of peat of up to 1.8m in depth and as such this location may require a piled foundation. Further details of the characteristics of ground conditions across the proposed development site can be found at **Chapter 6**.

The depth of excavation required for each wind turbine foundation will vary depending on precise ground conditions. The diameter of the standard raft (gravity) foundations will be c. 22m. The diameter of a piled foundation will be c. 19m. Foundation depths will range between 3m and 5m in depth depending on ground conditions at each turbine location. The total volume of excavated material at each foundation will range between approximately 940m^3 and 2,260m^3.

Once the turbine foundation has been excavated and the base fill emplaced, the bottom section of the tower or 'can' is installed. Reinforced steel rebar is built around and through the can before concrete is poured into the foundation in accordance with the turbine manufacturer's specifications. A typical turbine foundation is shown at **Figure 3.5** below. It is proposed that, where possible, concrete, aggregates and other materials for turbine foundations shall be sourced locally, which will reduce the total distance travelled by HGVs drawing construction materials to the subject site (see **Chapter 13**) and associated emissions (see **Chapter 8**).

Figure 3.5: Typical Turbine Foundation

Excavations will be undertaken by conventional mechanical methods and no blasting will be required. Peat, soil, subsoil, rock and vegetation removed during construction of turbine foundations will be appropriately stockpiled (see **Chapter 6**) and, in so far as is practicable, re-used to reinstate the foundation and provide additional ballast. Any excess material arising will be utilised for reinstatement purposes (e.g. for landscaping or the creation of trackside berms) elsewhere within the proposed development site or deposited at the dedicated spoil deposition areas.

3.4.3 Turbine Hardstands

Hardstand areas shall be established adjacent to each turbine to facilitate crane operations for turbine erection and, occasionally, for maintenance and final decommissioning. Each hardstand area shall be 55m x 35m for the construction phase and will consist of levelled and compacted (unsealed) hardcore. The location and precise alignment of the hardstands may necessitate some immaterial deviations in accordance with the micro-siting tolerance threshold (see **Section 3.4.9**).

The crane hardstands will be retained in situ during the operational phase of the proposed development to accommodate any occasional crane activities in the event of a major component change-out.

Temporary set down areas will be located immediately adjacent to each hardstand during the construction phase to accommodate the temporary storage of turbine components following their delivery to the proposed development site, and crane

components during crane assembly. Following the erection of the turbines, these set down areas will be reinstated with excavated material, re-seeded and allowed to revegetate.

3.4.4 On-Site Access Tracks

A total of 6.8km of on-site access tracks will be required for construction purposes and for site access during the operational phase. This will comprise 3.7km of newly-constructed access tracks and the utilisation/upgrade of 3.1km of existing agricultural/forestry tracks.

The access tracks shall be similar to normal agricultural tracks but with a slightly wider typical running width of 5m (wider at bends to accommodate turbine component delivery vehicles). Good quality agricultural/forestry access tracks already exist within the site and these existing tracks will be utilised where possible. Existing tracks will be upgraded and new tracks constructed, where necessary, to provide continuous access to the proposed turbine locations.

Access tracks will be unsealed and constructed of crushed stone material to allow for permeability. While initial site investigations do not indicate the presence of any significant volumes of rock on site, any material arising from the excavation of foundations etc. will, where possible, be reused in the construction of access tracks. However, it is likely that the majority of material will be imported to the proposed development site from local quarries (see **Chapter 13**).

A textile layer may be needed in some locations to avoid any subsequent vehicle access problems. Some cut/fill in the construction of the access tracks may be necessary to ensure that horizontal and vertical alignments are suitable to accommodate abnormal HGV loads and adequate drainage. The wind turbine manufacturer shall be consulted during the detailed post-consent design process to ensure that the access tracks are suitable to accommodate turbine components. This may necessitate some immaterial deviations in the precise alignment of the access tracks.

Passing bays and turning heads shall also be provided along the access tracks to accommodate turning of long loads and passing traffic, as required. Additional excavated strips will be required alongside the access tracks to accommodate drainage and cable trenches. Where excess material arises from the construction phase, it will be utilised in the construction of trackside berms or disposed of at the dedicated spoil deposition areas.

Access to the proposed wind farm and substation will be provided by an existing forestry entrance from the L5508 local road. The existing access point will be upgraded to accommodate construction traffic and abnormal HGV loads and in accordance with the requirements of the Local Authority, particularly regarding the provision of appropriate site visibility splays to ensure traffic safety[1].

Following the construction phase, the specifications of the site entrance will no longer be needed to accommodate abnormal HGV movements. Accordingly, it will be reduced in size to standard agricultural access points and appropriately fenced off and gated to prevent unauthorised access. The reinstatement of the site entrance will also incorporate the replanting of hedgerows. Hedgerows will be

[1] Visibility splays will be provided in accordance with the provisions contained within CPO 16.33 of the Westmeath County Development Plan 2021-2027.

appropriately sited to allow for future growth while ensuring, at all times, that visibility splays are maintained during the operational phase.

Figure 3.7: Typical Access Track

No major watercourses are present within the site. However, a number of drainage ditches and lower order watercourses/streams do exist. Where it is necessary for access tracks to cross these drains/watercourses, the relevant bodies (e.g. Inland Fisheries Ireland, Office for Public Works (OPW)[2]) will be consulted prior to construction. As appropriate, a Section 50 Licence application will be made to the OPW prior to the installation of culverts/bridging structures over relevant watercourses.

Following the construction phase, access tracks, passing bays and turning heads that are not required during the operational phase will be reinstated, wherever

[2] The OPW is responsible for the implementation of the regulations in European Communities (Assessment and Management of Flood risks regulation SI 122 of 2010 and the Arterial Drainage Act, 1945, including Section 50.

possible. It is likely, however, that the majority of the tracks will be required during the operational phase for maintenance operations and will be used as part of ongoing agricultural/forestry activities on the subject site.

Additionally, it should be noted that the existing access tracks are, on occasion, used by members of the local community for recreational purposes. While access may be temporarily restricted during the construction phase for health and safety reasons; following the completion of construction, current access arrangements will be reinstated.

3.4.5 Electrical Cabling, Communications Cabling & Site Control Building

All on-site electrical and communications cables will be placed underground and be of a solid polymeric construction with either aluminium or copper conductors. All electrical cables will follow the alignment of the on-site access tracks, insofar as is practical. Trenching will be by a mechanical digger. The proposed depth of the cable trench is 1m with a width of 0.5m. The excavated material from the excavation of trenches will be side-cast alongside the trench and reinstated following the laying of cables.

An electrical site control building will be constructed within the proposed development site. The purpose of this control building is to act as a 'node' to where the underground electrical (and communications) cabling circuits from each wind turbine will converge. The control building will contain electrical apparatus and will transfer electricity from each individual circuit to a single circuit for its onward transmission to the 110kV electricity substation.

The control building will measure 17.83m x 7.33m (gross floor area of 130.7m^2) and will have an overall height of 6.04m to ridge height. The control building will be constructed of blockwork and finished in sand and cement render, blue/black slate roof covering and galvanised steel doors. The control building will contain a control room, switchgear room, storeroom and welfare facilities for staff during the operational phase of development. The control building will not require a dedicated water source due to infrequent use and the low volumes that will be required (toilet facilities and hand washing) and thus its design will incorporate a rainwater harvesting system. Wastewater from the control building will be stored in a sealed tank and will be tankered off-site as required by a local licensed waste collector. Water supply and waste water management proposals of this nature are common practice for wind farm developments.

3.4.6 Meteorological Mast

A temporary meteorological (anemometer) mast currently exists centrally within the proposed development site for measuring wind speed and meteorological conditions. This mast is 80m in height and was installed in accordance with the provisions of Class 20A of Schedule 2, Part 1 of the Planning and Development Regulations 2001 (as amended)[3]. The meteorological mast has recorded an average wind speed for the site of approximately 7.1m/s at 104m (adjusted). It is proposed that this mast will be removed and replaced with the permanent mast.

[3] A planning application was subsequently lodged with Westmeath County Council under Planning Register Reference 20/6221 to increase the height of the mast to 100m and for its continued use for a period of 5-years. Planning permission was granted by An Bord Pleanála on 14 June 2021 under Reference ABP-308608-20.

ID	Easting*	Northing*	Overall Height (m)	Approximate Altitude (mAOD)
Permanent Meteorological Mast	660639	757853	104	90

Table 3.3: Meteorological Mast Coordinates

*Note: Coordinates provided in Irish Transverse Mercator (ITM)

The proposed permanent mast to be installed on the subject site will be 104m in height and will consist of a freestanding lattice structure to which various measurement instruments will be attached. The purpose of the mast is to monitor wind speeds and climate conditions for the efficient operation of the proposed development. The recorded meteorological data is sent remotely to a computer system located off-site so that the data can be analysed to extrapolate the long-term wind resource at the site. The mast is also required to carry out power curve performance tests, a typical condition of the wind turbine warranty.

Some ground works, including the construction of a concrete foundation and a crane hardstanding area, will be required to erect the mast. The mast will remain on-site during the operational phase of the development (permanent as per the life span of the wind farm). Mast components will be brought to site utilising existing agricultural/forestry tracks within the proposed development site.

3.4.7 Temporary Construction Compound

During the construction period, a temporary construction compound will be required. The compound will be located along the proposed main arterial access track (see planning application drawings) and will have an area of 4,000m^2 (0.4 hectares) comprising:-

- Temporary cabins to be used for the site office, the monitoring of incoming vehicles and temporary welfare facilities for the construction staff, including temporary toilets and potable water;
- Parking for construction staff, visitors and construction vehicles;
- Secure storage for tools, plant and small parts;
- Waste management area where waste will be sorted and collected by a licensed service provider;
- Safe bunded storage of components and materials including fuels, lubricants and oils; and
- Security fencing around the compound.

Temporary portaloo chemical toilets to be provided for construction staff will be sealed units to ensure that no discharges escape into the local environment. These will be supplied and maintained by a licensed supplier. Potable water (for drinking, food preparation, hand washing etc.) will be supplied on-site through water dispensers which will also be sourced and maintained by a licensed supplier.

The construction compound will be marked out and fenced to prevent encroachment onto non-designated areas. Following the completion of all construction activities, the compound will be decommissioned with all structures removed and fully re-instated. Reinstatement will involve removing crushed stone and underlying geotextile, covering with topsoil and reseeding.

The temporary construction compound has been located and designed such that

all cabins, storage containers, waste management facilities and bunded areas will be located a minimum distance of 50m from all natural watercourses in order to minimise the risk of pollution and the discharge of deleterious matter to watercourses. Stormwater which may arise from the roofs of cabins, containers or from sealed bunds will be passed through an oil interceptor prior to being discharged to the local environment.

3.4.8 Grid Connection Infrastructure

3.4.8.1 110kV Electricity Substation

The proposed development also comprises the development of an 110kV electricity substation, including all associated development works to accommodate its construction, operation, maintenance and the export of electrical power generated by the proposed Bracklyn Wind Farm to the national grid via the existing Mullingar-Corduff 110kV overhead electricity transmission line.

As set out at **Chapter 2**; following a comprehensive assessment of available alternative substation design technologies, it has been determined that the proposed development will comprise a 110kV 'loop-in/loop-out' air-insulated switchroom (AIS). The footprint of the substation (overall compound area) will measure 15,400m^2 and will be surrounded by a palisade fence, with associated gates, of 2.6m in height for safety and security reasons. The proposed substation will contain 2 no. control buildings and all necessary electrical equipment and apparatus to facilitate the export of electricity to the national grid. Ancillary infrastructure located within the footprint of the compound will include electrical apparatus, light posts, lightning masts and an Electricity Storage System comprising containerised energy storage modules, transformer and inverter units, heating, ventilation, air condition units and associated underground electricity cabling.

The layout of the proposed substation is illustrated at **Annex 3.4**. It is important to note that this layout has been designed fully in accordance with current EirGrid specifications; however, the Applicant may be instructed by EirGrid to immaterially alter the precise siting and/or specification of control buildings and/or electrical equipment within the overall substation. Any such immaterial deviations have been fully assessed and provided for within this EIAR.

The proposed substation site is located in a relatively flat area of forestry, which comprises primarily conifer plantation and a small area of mixed broadleaved woodland. The footprint of the proposed substation does not traverse any drains or watercourses. There will be a requirement to undertake minor modifications to ground levels in order to achieve the required levels for the buildings, structures and electrical substation equipment. In order to provide a level compound footing, aggregates will be imported to the site to make up levels while, at increased elevations, peat, soil and subsoil will be excavated to provide a level footing.

The substation compound will be surfaced with free-draining crushed stone such that rainwater can percolate to ground. Given the nature of the subsoil environment in the surrounding landscape, it is likely that all aggregate material will be imported to the proposed development site from local quarries (see **Chapter 13**).

The boundaries of the proposed substation are largely surrounded by conifer plantation, such is the nature of the receiving landscape. This will negate the need for further/supplementary landscaping.

The proposed substation will be connected to the proposed wind farm via underground electrical cabling, as set out at **Section 3.4.5** above.

A typical 110kV AIS substation is illustrated at **Figure 3.6**.

Figure 3.6: Typical 110kV AIS Substation

Control Buildings

The proposed substation will contain 2 no. control buildings; one of which, the Customer MV Switchgear Room (the IPP Building), will be operated and maintained by the Applicant while the Transmission System Operator (TSO) 'Control Building' (the Eirgrid Building) will be operated and maintained by EirGrid.

The Customer MV Switchgear Room will measure 8.58m x 20.08m (gross floor area of 172.29m^2) and will have an overall height of 5.54m to ridge height. The building shall be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors. The Customer MW Switchgear Room will house switchgear and associated electrical equipment and apparatus. The building will not require a dedicated water source.

The TSO Control Building will measure 25m x 18m (gross floor area of 450m^2) and will have an overall height of 6.92m (to ridge height). This building shall also be constructed of blockwork and will be finished in sand and cement render, slate roof covering and steel doors. The TSO Control Building will contain a control room to allow operatives monitor and manage the operation of the electrical apparatus and will also include storage and welfare facilities. A rainwater harvesting system will be implemented and wastewater will be stored in a sealed foul holding-tank and removed from site by a local licensed waste collector.

Layout and elevation drawings of the control buildings are provided at **Annex 3.5**. The precise internal layout of the buildings may be subject to further immaterial alterations to reflect any future revisions to EirGrid specifications. As set out above, any immaterial deviations from the precise layout and elevations illustrated at **Annex 3.5** are fully provided for within this EIAR.

Electrical Apparatus

Electrical equipment; including, but not limited to, busbars, line bays and a transformer bay; will be located outside the control buildings (within the palisade fence) and will increase the low voltage of the electricity generated by the proposed wind farm to high-voltage before being transmitted to the national grid. Electrical equipment may also include underground cabling, as necessary, located within the substation compound. Electrical apparatus will also include that associated with the transmission of electricity along the 110kV Mullingar-Corduff electricity network i.e. forming part of the national transmission network.

The positioning of electrical equipment within the substation compound is illustrated on the accompanying planning application drawings and accords with current EirGrid specifications. Immaterial deviations to the precise siting of this internal equipment may be necessary at the time of construction in line with any future revisions to EirGrid specifications. To reiterate, any such deviations are fully provided for and assessed within this EIAR.

Electricity Storage System

The proposed electrical apparatus will also incorporate an Energy Storage System (ESS) which will store electricity generated by the proposed wind farm and which cannot immediately be exported to the national electricity grid. Such a scenario may arise, for example, during times of maintenance of the proposed electricity substation or during times when electricity generated by the proposed wind farm exceeds demand on the electricity grid.

The ESS will comprise 26 no. energy storage modules containing battery modules; ancillary heating, ventilation and air conditioning units and corresponding power conversion systems and transformers; and will be connected to the proposed Customer MV Switchgear Room by underground electricity cables. The proposed energy storage modules, which contain the battery storage infrastructure/technology, measure 3.58m in height (inclusive of heating, ventilation and air conditioning unit and concrete plinth foundation), 12.16m in length and 2.44m wide. Each module will have an external ventilation module/unit for the ventilation/heating system and will be placed on concrete plinths, each of which will be 0.94m above finished ground level.

Layout and elevation drawings/detail of the ESS are provided at **Annex 3.5**. The precise layout and configuration of the ESS and each of the 26 no. modules may be subject to further immaterial alterations to reflect any future technological advancements.

3.4.8.2 Underground Electricity Line & End Masts

The proposed electricity substation is located within the proposed wind farm site and 5.3km (in a straight line) from the location of the proposed end masts. In order to connect the proposed substation to the existing Mullingar-Corduff 110kV overhead electricity line, it is proposed to install 6.3km of 110kV underground electricity line. The underground electricity line ('UGL') will comprise 4.4km located within agricultural lands/forestry and 1.9km within the carriageways/verges of the L5508 and L80122 local roads.

The UGL will be installed within ducting in excavated trenches of 1.315m deep and 0.6m wide. Cables will be pulled through the ducting in sections of 650/750m in length or depending on the length of UGL required. Cable lengths will be

connected at designated 'joint bays' to be constructed along the proposed route. Joint bays, which will consist of precast concrete structures set into an excavated area and surrounded by appropriate fill, will measure 6m x 2.5m x 2.05m, and installed below finished ground level and reinstated in accordance with the local authority/landowner requirements. Communication chambers are also required along the proposed route and will include an access cover to facilitate access should it be required.

Ground levels will then be made up using appropriate material and finished to the requirements of the Local Authority (public road) or landowner (private lands). All trenching works will be undertaken to ensure that only short sections of trench are open at any one time. Excavated materials will be stored separately for use during the reinstatement of the trench or disposal to an appropriate licensed facility as necessary.

The sequence of works is typically as follows:-

- Excavate the trench to the required dimensions, 1.315m deep and 0.6m wide;
- Place a blinding layer at the base of the trench;
- Place and joint the cable trefoil HDPE power ducts using cable ties at 3m intervals;
- Lay in and compact a layer of leanmix concrete around and above ducts; and place a red marker strip above;
- Install a single HDPE communications cable duct;
- Lay in and compact an additional layer of leanmix concrete, and place another red marker strip above;
- Final backfill layer (excavated material if suitable) to include yellow warning tape; and
- Appropriate reinstatement as discussed above.

A detailed Method Statement will be prepared by the contractor outlining the precise methodology to be put in place during the trenching phase. This Method Statement will be reviewed by the Environmental Manager (EM; to be appointed by the contractor) to ensure that the environmental protective measures to be implemented are suitable and to the required standard.

Horizontal Directional Drilling (HDD) will occur at 1 no. location along the proposed grid connection route. The HDD will be required to facilitate a crossing of the L80122 local road at a location c. 80m north of the junction of the L80122 and L5508. Launch and receptor pits will be excavated at either side of the crossing to accommodate the drilling rig. The bore will be at a depth of 3m to ensure that there are no impacts on the road's structural integrity and stability, and there will be no surface expression following the reinstatement of the launch and receptor pits. Marker posts will be placed at either side of the road to indicate the location and alignment of the electricity line.

Prior to the commencement of drilling operations, the appointed contractor will prepare a detailed method statement outlining the precise methodology to be followed. This statement may be reviewed as necessary by the Local Authority.

The UGL installed within agricultural/forestry lands will be accompanied by 2.5km of access track which runs parallel to the UGL. The proposed UGL access track shall be similar to normal agricultural tracks with a typical running width of 3m. Access tracks will be unsealed and constructed of crushed stone material to allow for

permeability. The proposed UGL access tracks will allow for adequate vehicular access to the UGL to accommodate maintenance and repair works as required.

In order to access the above-referenced access tracks, the proposed development also provides for the creation of 1 no. site entrance from the L5508 and 2 no. site entrances from the L80122 local roads. The proposed site entrances will provide access to the private lands to the north of the L5508, to private lands north of the L80122, and to lands to the south of the L80122 in order to facilitate access to the location of the proposed end masts.

The proposed UGL access tracks and site entrances shall be built in accordance with the requirements of the Local Authority, particularly regarding the provision of appropriate site visibility splays to ensure traffic safety[4].

Following the construction phase, the proposed UGL site entrances will be appropriately fenced off and gated to prevent unauthorised access. The reinstatement of the site entrance will also incorporate the replanting of hedgerows. Hedgerows will be appropriately sited to allow for future growth while ensuring, at all times, that visibility splays are maintained during the operational phase.

Plates 1 & 2: Typical Trench Construction

A typical trench elevation is illustrated at **Figure 3.8** (reproduced at **Annex 3.6**).

[4] Visibility splays will be provided in accordance with the provisions contained within CPO 16:33 of the Westmeath County Development Plan 2021-2027 & Section 2.1.3 (Appendix 15) of the Meath County Development Plan 2013-2019 (and replicated at Section 2.3.1 Appendix 13 of the Draft Meath County Development Plan 2021-2027).

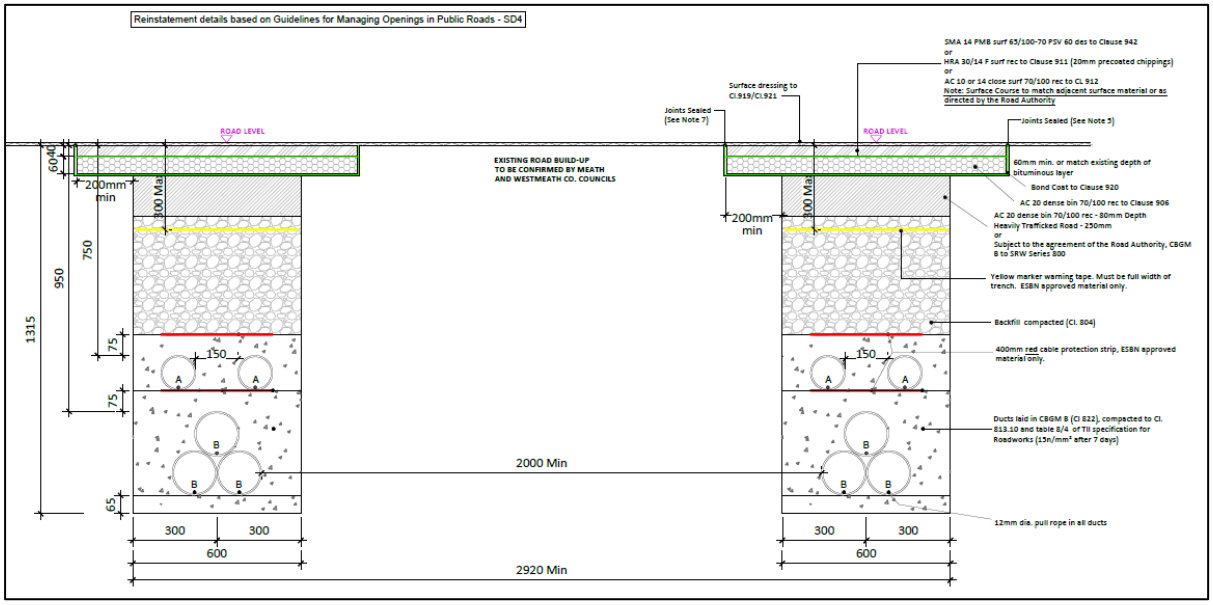

Figure 3.8: Typical Trench Specification

The (2 no.) proposed end masts will be lattice-type towers (see example at **Figure 3.9** below) and will be located immediately beneath the Mullingar-Corduff overhead electricity transmission line. The masts will have a height of 16m and a total permanent above-ground footprint of 76m^2 with concrete foundations below ground to a depth of 3m. However, it should again be noted that the precise specifications of the proposed end masts may be immaterially altered to ensure compliance with any future revised EirGrid specifications.

The proposed end masts will break into the existing Mullingar-Corduff overhead electricity transmission line at a point between two existing pole sets and, as such, the proposed development will not entail the removal or alteration of any existing pole sets.

At the location of the proposed end masts, the Mullingar-Corduff overhead electricity transmission line will be broken and will be connected to the proposed substation via 6.3km of underground electricity line. Once constructed, electricity being transmitted along the Mullingar-Corduff electricity transmission line will be diverted through the proposed substation, allowing electricity generated by the proposed wind farm to be exported to the national grid, before returning to the Mullingar-Corduff electricity transmission line; hence the 'loop-in/loop-out' nature of the proposed substation.

Figure 3.9: Typical End Mast

3.4.9 Earthworks

No borrow pits will be developed as part of the proposed development and no blasting of any rock will take place on-site to generate material for construction works. Initial site investigations have indicated that there is unlikely to be sufficient material won from within the site and thus the majority of aggregates are likely to be imported to site (see **Chapter 13**).

It is proposed to develop 2 no. spoil deposition areas where excess peat, soil and subsoil which cannot be utilised for reinstatement or is unsuitable for landscaping purposes on site, will be stored permanently. The locations of the deposition areas have been selected due to the absence of any environmental constraints, separation distance to watercourses and the presence of natural depressions in ground levels. Spoil will be transported to these locations where it will be placed in layers in accordance with best-practice methods, including supervision of the works by a geotechnical engineer or appropriately competent person. Appropriate drainage management measures will be implemented to ensure that the deposited spoil does not become waterlogged. It is proposed that the smaller (western) deposition area will be used to store peat material while the larger (eastern) area will accommodate soil and subsoil. Facilitating the storage of peat in this way will negate the requirement for transportation off-site to an approved waste disposal facility and reduce the number of vehicle movements associated with the proposed development at the construction phase.

Following the completion of construction, the deposition areas will be graded to match the profile of surrounding land, capped with soil, and will be reseeded. In addition, excess spoil will be used, where possible, to form a thin (≤ 1m) layer over areas which have been recently felled. The material will be allowed to vegetate naturally and will provide for an increased proliferation of local habitats and species, thus representing a localised environmental gain.

Works at the spoil deposition areas will be monitored, on a weekly basis during the construction phase and monthly for a six month period thereafter, by an appropriately qualified geotechnical engineer.

It is estimated that all excess excavated material can be accommodated within the spoil deposition areas. In the unlikely event that excess material arises which cannot be accommodated within the areas, this shall be removed from site and disposed of at a licensed waste disposal facility.

Given the presence of peat within the proposed development site (see **Chapter 6**) and the surrounding landscape, specific proposals have been set out for the management of peat, see Peat Management Plan at **Annex 3.7**.

It should be noted that tarmac cuttings arising from trenching works along the public road, or upgrade works to the L5508, will not be re-used or stored on site due to the possibility of soil contamination but will be removed and disposed of at a licensed waste handling facility.

A preliminary Spoil Management Plan (enclosed within the Construction & Environmental Management Plan at **Annex 3.8**) has been prepared in respect of the proposed development and incorporates proposals regarding the appropriate management of material which may arise from the construction of the proposed development. Prior to the commencement of development at the site, a detailed Spoil Management Plan will be prepared following the post-consent detailed design process and will address the re-use, reinstatement, storage and restoration of all material excavated during the construction phase including detailed methodologies regarding the establishment and management of the spoil deposition areas for the proposed development.

3.4.10 Micrositing

The immaterial micrositing of turbines; access tracks; crane hardstandings; the proposed substation including control buildings, electrical equipment and end masts; and other elements of the proposed development, following post-consent detailed site investigations and geotechnical analysis, also forms part of the proposed development.

A micrositing allowance of 20m in any direction is proposed for wind turbines in accordance with Section 5.3 of the *Wind Energy Development Guidelines for Planning Authorities 2006*. It is anticipated that the agreed tolerance micrositing distance will form a condition accompanying a grant of planning permission.

It is also proposed that hardstands, substation infrastructure, underground cables and access tracks may be immaterially micro-sited subject to compliance with the mitigation measures included in this EIAR.

These immaterial micrositing deviations have been incorporated, and fully assessed, throughout this EIAR, and will have no likely significant impacts on the substantive conclusions of this EIAR.

In accordance with mitigation measures outlined at **Chapter 10** (Cultural Heritage), micrositing will not be permitted for turbines T3 and T11 should it result in turbines being located any closer to the nearby Recorded Monuments.

3.5 Off-Site & Secondary Developments

3.5.1 Turbine Component Delivery Route

While the final selection of a precise haul route has not been selected and will be dependent on the turbine supplier and the port of entry, it has been determined that turbine components will, most likely, enter via the Port of Waterford[5]. It is envisaged that the turbines will then be transported from the Port of Waterford by specialised heavy goods vehicles (HGVs) for the transport of turbine components along the N29, N25, N9, M9, M7, N7, M50, N4, M4, N4, N52, L1504, and L5508 before accessing the site via the proposed site entrance.

In order to facilitate the delivery of turbine components, however, some road works will be required at various locations between the Port of Waterford and the main site entrance on the L5508. A total of 12 no. locations have been identified where works to the public road will be required, 11 no. temporary works locations and 1 no. permanent works locations.

3.5.1.1 Port of Waterford to Dublin (M50)

From the Port of Waterford to Dublin, the turbine delivery route follows motorways and national routes and, thus, due to the characteristics of the road network, no permanent works will be required. It will, however, be necessary to temporarily remove street furniture including road signs, bollards and street lighting and to undertake temporary works to existing roundabouts to accommodate oversized vehicle loads, including the temporary removal of vegetation. Further details of the required temporary works are included in the Route Access Study (see **Annex 3.9**).

The implementation and management of temporary works, which will be fully reinstated following the delivery of turbine components, will be agreed in advance with the relevant local authority prior to the movement of any abnormal loads in the form of a Traffic Management Plan and/or Abnormal Load Permit application, as is the normal course. Should any mature vegetation be removed at any location, it will be replaced with plants of a similar size/maturity to match existing growth.

3.5.1.2 Dublin (M50) to the Subject Site

From Dublin to the proposed main site entrance, the road network comprises motorway, national roads and local roads which are generally capable of accommodating oversized loads. However, both temporary and permanent works will be required along this route. Further details of these locations and works required are provided at **Annex 3.9** and summarised at **Tables 3.4** and **3.5** below. As above, all temporary works will be fully reinstated, and permanent works completed, to the satisfaction of the relevant local authority.

[5] A number of other ports may be used to import turbine components including Dublin Port, Port of Galway, Port of Limerick, Shannon-Foynes Port, and the Port of Waterford. Turbine components travelling between any of the above-named ports and the M4/N52 junction will utilise a combination of regional and national (including motorway) routes which are regularly used in the transportation of turbine components and will not require extensive upgrade works.

Location ID (per Route Access Study)	Description of Temporary Hail Route Works
Location 5.6.1: Exit Port of Waterford onto the N29	Temporary removal of fencing, road signs and safety barriers.
Location 5.6.2: N29/R711 Roundabout	Temporary hardcoring of the roundabout island and temporary removal of road signage.
Location 5.6.3: N29/N25 Roundabout	Temporary removal of road signs and street lighting.
Location 5.6.4: N25/R680 Roundabout	It is noted that two options have been identified during initial haul route inspections. The final decision will be made by the transportation contractor and all necessary works will be agreed with the Local Authority. Both options require the temporary removal of road signage and street lighting.
Location 5.6.5: N25/N9 Roundabout	Temporary removal of road signs and street lighting.
Location 5.6.6: N9/M9 Roundabout	Temporary removal of road signs and street lighting.
Location 5.7.1: N4/N52 Roundabout	Temporary hardcoring of the roundabout island and temporary removal of road signage and street lighting while some existing trees will be pruned.
Location 5.9.1: N52/L1504 Junction	Temporary removal of road signage. In order to allow turbine components transit the junction, existing hedgerows and fencing to the east of the junction will be removed and an area of grass levelled (to the required gradient) and hardcored to accommodate the swept path of turbine delivery vehicles. Following the delivery of turbine components, the all hardcore shall be removed, the area reseeded and hedgerows replanted.
Location 5.9.2: Right bend on L1504	Pruning or removal of a tree to accommodate the swept path of the turbine blades.
Location 5.9.4: L1504/Dumper Depot Junction	Temporary removal of an existing wall and piers. Following the delivery of turbine components, all removed structures will be fully reinstated.
Location 5.9.5: Dumper Depot/L1504 at Junction with L5508	A temporary egress point will be constructed to allow turbine components to navigate from the Dumper Depot onto (and across) the L1504 and onto the L5508. Existing vegetation will be removed, and aggregates placed, to construct the entrance. Following the delivery of turbine components, all aggregates will be removed and hedgerow replanted.

Table 3.4: Temporary Haul Route Upgrade Works

Location (per Route Access Study)	Description of Permanent Haul Route Works
Location 5.9.6: Full length of the L5508 local road to the site entrance	The full length of the road from the 'Dumper Depot Yard' at the junction of L5508and L1504 to the proposed main site entrance will be upgraded to accommodate turbine components and HGV traffic. These modifications will include road widening (on the southern side of the road) to a width of 5m, as well as pruning of roadside vegetation.

Table 3.5: Permanent Haul Route Upgrade Works

Upgrade works to the L5508 will comprise the widening of the carriageway running width to 5m to accommodate construction traffic and abnormal loads. The carriageway structure will be formed, and subsequently paved, using materials approved by the Local Authority and carried out to the required specification. At certain locations along these roads tree pruning will be required. Construction Method Statements for the proposed temporary and permanent works at each location will be prepared prior to the commencement of construction and agreed, in writing, with the Local Authority.

During the delivery of turbine components to site, all HGVs will be accompanied by escort vehicles. An Garda Síochána will also be informed prior to turbine component transportation as, due to proposed HGV manoeuvres (contra-flow and reversing), it will be necessary to temporarily close junctions as the components pass through.

3.5.2 Aggregates Sources & Construction Materials Haul Route

Given the general absence of rock within the proposed development site (see **Chapter 6**), construction materials will be obtained from local quarries/suppliers. Only fully licensed quarries which have been subject to EIA and have appropriate planning permission for the volumes of material to be extracted will be used. These aggregates are slated for extraction in the normal course of the relevant quarry's business and therefore will have no additional likely significant environmental impacts above and beyond those normally entailed in the operation of the quarry.

Quarries, which may be selected to supply materials following a competitive tendering process, are identified at **Annex 2.5** and the likely haul routes to the proposed development site indicated. Suppliers will be instructed to utilise the extensive national and regional road networks to access the site and to avoid local roads insofar as possible. Further details of the construction materials haul route and vehicle volumes are provided in **Chapter 13**.

3.5.3 Construction Drainage Management and Disposal

Construction works will be carried out in accordance with the 'Land & Soil' and 'Water' assessments and mitigation measures included in this EIAR in order to prevent any likely significant effects on nearby watercourses by debris, silt and hydrocarbons (see **Chapters 6** & **7**). These measures have also been implemented in the Natura Impact Statement (NIS) which accompanies the planning application.

Sources of likely significant effects on the hydrological environment during construction include increased volumes of surface water runoff; the generation of silt laden surface water runoff from excavations and the storage of stockpiled materials; contamination due to the leakage of oils/fuel from site vehicles; spillage during refuelling operations; and leakage from chemical, waste and fuel storage areas.

Specific mitigation measures are presented in the relevant chapters of this EIAR in relation to each of these issues. The precise implementation and siting of these measures will be determined, subject to planning permission being granted, following the further post-consent detailed design process and will be included within the Construction Environmental Management Plan (CEMP) to be agreed with the Planning Authority prior to the commencement of construction.

All surface water runoff from stockpiles (including the spoil deposition areas), excavations or from dewatering operations will be passed through an appropriate attenuation train, including silt fences (also known as silt curtains) and silt traps (also known as silt/settlement/sediment/stilling ponds)[6]. Other surface water protection measures which may be implemented, as appropriate, include straw bales, silt bags and siltbusters.

Surface water control measures will be implemented as construction progresses through the site; however, prior to the commencement of earthworks, temporary silt/sediment control infrastructure (e.g. straw bales) will be placed in agricultural drains around the site until the full range of construction phase measures are installed.

The installation of surface water runoff measures will avoid any discharge of silt or sediment laden waters directly to any surface water feature prior to being fully treated. At the point of discharge, buffered outfalls (or level spreaders) will be installed to ensure that erosion or scouring does not occur. Further details of the proposed surface water protection measures are enclosed at **Chapter 7**.

A preliminary Surface Water Management Plan (SWMP) has been prepared in respect of the proposed development (enclosed at **Annex 3.8**, **Volume II**). This SWMP will be further developed prior to the commencement of development, following a further post-consent detailed design process, and will incorporate the precise implementation and siting of surface water management infrastructure.

Following the completion of construction, surface water treatment infrastructure will be decommissioned and removed from site. Due to the permeable nature of the access tracks, hardstands and substation footing, the vast majority of surface water will percolate to ground. Stormwater drainage infrastructure will be installed around the control buildings and transformer plinth to capture any runoff from concrete areas, will be passed through an oil interceptor before being discharged to an agricultural drain. Discharge rates will be designed to mimic greenfield runoff rates thus avoiding any long term alteration to the hydrological regime of the proposed development site.

3.5.4 Tree Felling and Replanting

While the majority of the proposed development is located within pastoral grassland or arable cropland, some infrastructure is proposed to be located within afforested lands. Therefore, and in order to facilitate the construction of wind farm infrastructure, it is proposed to permanently remove 28 hectares (ha) of commercial forestry in order to accommodate the construction of turbine foundations, access tracks, and other ancillary infrastructure.

[6] Please note that the titles of surface water protection infrastructure are used interchangeably within this EIAR and accompanying documentation.

A Felling Plan has been prepared for the proposed development and is enclosed at **Annex 3.10**. The Felling Plan illustrates the areas where forestry will be permanently felled which equates to c. 28ha.

The felling to be undertaken will be the subject of a felling licence application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017. In accordance with the Forest Service's policy on granting felling licenses for wind farm developments, a copy of the relevant planning consent is required to be submitted with the felling licence application which, as a result, cannot be applied for until such time as planning permission is obtained for the Proposed Development.

In accordance with the Forest Service's published policy on granting felling licences for wind farm developments, areas of forestry which have been felled to accommodate turbine bases, access roads and any other wind farm-related uses must be replaced by replanting at an alternative site. As part of the felling licence application process, it will be necessary for the Applicant to identify appropriate replacement lands. These lands can be located anywhere within the Republic of Ireland and will be subject to a separate environmental assessment and technical approval process as part of the felling licence consenting process. The Applicant can confirm that no felling will take place within the proposed development site until such time as a felling licence has been obtained incorporating the technical approval of the identified replacement lands to be afforested.

3.6 Construction Phase

The construction phase is likely to last for approximately 15-18 months from commencement of construction activities through to the installation and commissioning of the turbines and ending with site reinstatement and landscaping.

The construction phase of the development will comprise a 6 no. day week with normal working hours from 07.00 to 19.00 Monday to Friday and 07.00 to 13.00 on Saturdays. It may be necessary to undertake works outside of these hours to avail of favourable weather conditions (e.g. during time of low wind speed to facilitate turbine erection etc.) or during extended concrete pours (e.g. where turbine foundation pours must be completed within 24 hours). Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.

No construction works are envisaged during the operational phase. Works during this phase will typically involve the routine inspection and servicing of the turbines, electrical substation and ancillary structures (including drainage infrastructure), as necessary. In exceptional circumstances there may be a requirement for more substantial works e.g. replacing a turbine blade, or gearbox/generator replacement. Intermittent maintenance of the wind farm site will be undertaken as necessary, including access tracks, hardstandings and substation.

Further details of the construction phase and specific mitigation measures to be implemented are provided in each chapter of this EIAR as they relate to each environmental topic.

3.6.1 Construction Sequence

The construction method for the proposed wind farm will consist of the following general sequence:-

- Traffic management measures to be implemented in advance of commencement of haul route upgrade works. Works to be completed to ensure unimpeded access during the construction of the proposed development;
- Upgrade works to the L5508 will be commenced;
- Surface water protection measures to be installed;
- The construction of the site entrances, ensuring that requisite traffic visibility splays are provided;
- Establishment and continued management of spoil deposition areas;
- Progressive construction of internal on-site access tracks;
- Construction of the temporary construction compound for off-loading materials and equipment, and to accommodate temporary site offices;
- Construction of bunded areas for oil, fuel and lubricant storage tanks;
- As the internal access tracks progress to each turbine location, foundation excavations for the turbines will commence and foundations laid. The hardstanding areas will be constructed as track construction advances;
- Construction of site control building;
- Other temporary upgrade works along the turbine component haul route will be commenced;
- Once the on-site access tracks are completed, the trenching and laying of underground cabling will begin;
- Installation of turbines will commence once the on-site access tracks, hardstands, foundations and drainage measures are in place and the road upgrade works are complete. It is anticipated that each turbine will take approximately 1 no. week to install. Two cranes will be used for this operation. As each turbine is completed, the electrical connections will be made;
- Decommissioning of the temporary meteorological mast and installation of the permanent meteorological mast will then take place; and
- Progressive site reinstatement, restoration and landscaping including re-profiling and of spoil deposition areas and peat storage areas, removal of temporary construction compound and turbine storage areas; erection of post-and-wire fencing around turbines, access tracks and at site entrances; and erection of gates and vegetation at site entrances.

The construction method for the proposed substation and grid connection will consist of the following general sequence (to be completed concurrently with wind farm construction):-

- The construction of the site entrances and access tracks;
- Site preparatory and groundworks associated with the substation compound footprint including control building;
- Construction of the control buildings;
- Construction of bases or plinths for electrical apparatus, including Electricity Storage System containers;
- Erection of palisade fencing around substation;
- Installation of internal and external electrical apparatus in control buildings and within compound area;
- Site preparatory and groundworks associated with the strain tower foundations,
- Erection of end masts;
- Installation of underground electricity line between substation and end masts;
- Commissioning and testing of electrical apparatus;

- Connection of underground electricity line to the 110kV Mullingar-Corduff electricity transmission line;
- Final commissioning of all electrical equipment and apparatus; and
- Progressive site reinstatement, restoration, landscaping and planting proposals including the installation of stockproof fencing and the erection of gates.

Once the turbines are installed and the substation and electrical system completed, the turbines will be tested and commissioned.

A detailed Construction & Environmental Management Plan (CEMP) will be prepared in advance of all construction activities and will incorporate all mitigation measures proposed in this EIAR. An outline CEMP has been prepared and is provided at **Annex 3.8**.

The construction phase will be supervised by a range of environmental and engineering specialist personnel including a Project Supervisor for the Construction Stage (PSCS), Ecological Clerk of Works (ECoW), Archaeological Clerk of Works (ACoW), among others, who will liaise closely with the appointed Contractor's on-site Environmental Manager to monitor and to ensure that all applicable measures are implemented. The detailed CEMP, which will incorporate further technical information following the undertaking of post-consent detailed design, will be submitted to the Planning Authority for approval prior to any works commencing on the proposed development site. The CEMP shall also provide additional details of intended construction practices including:-

- Specific design details of the temporary construction compound including identification of areas for the storage of construction waste, site offices and staff facilities;
- A detailed Traffic Management Plan for the timing and routing of construction traffic to and from the construction site and associated directional signage, to include in particular proposals to facilitate and manage the delivery of oversized loads and alternative arrangements to be put in place for pedestrians and vehicles in the case of the temporary closure of any public road or footpath during the course of site development works;
- Implementation stage details of the proposed construction methods, including detailed measures regarding the management of spoil at the dedicated deposition areas, certified by a suitably qualified civil engineer;
- Specific measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network;
- Details of appropriate measures for construction stage noise, dust and vibration, and any monitoring of such levels;
- Storage and containment of all construction related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. All such bunds shall be roofed to exclude rainwater;
- Appropriate provision for re-fuelling of vehicles;
- Off-site disposal of construction/demolition waste and construction-stage details of how it is proposed to manage excavated soil:
- Detailed design measures to ensure that surface water run-off is controlled such that no silt or other pollutants enter watercourses in full compliance with the measures outlined in this EIAR; and
- Further details of the intended hours of construction.

The CEMP will also take full cognisance of and incorporate the measures outlined within any specific environmental management plans proposed as part of this EIAR

and will also incorporate any specific requirements set out in conditions of consent, subject to a grant of planning permission.

3.6.2 Site Entrances

As discussed at **Section 3.4.5** above, there will be a single site entrance to the proposed wind farm and substation. The site entrance for the proposed wind farm and substation is located along the L5508. As identified above, 3 no. site entrances will also be required to accommodate access to the proposed underground electricity line. 2 no. site entrances will be provided in order to facilitate permanent access to the underground electricity line in private lands, 1 no. from the L5508 and another from the L80122, whilst an additional (permanent) site entrance will be provided from the L80122 to facilitate access to the proposed underground electricity line and end masts.

Following the delivery of turbine components, the scale of the wind farm site entrance will be reduced but will be reinstated such that it remains capable of accommodating abnormal loads in the event of a major component change-out during the operational phase of development. The reinstatement of the site entrance will comprise the erection of post and rail fencing, gates and the planting of hedgerows. Hedgerows will be appropriately located to allow for future growth while ensuring, at all times, that appropriate visibility splays are maintained during the operational phase.

3.6.3 Hardstanding Areas and On-Site Access Tracks

The areas of hardstanding for crane operations and on-site access tracks will generally be constructed as follows:-

- Peat, topsoil and subsoil will be removed and stored in separate mounds in appropriate areas adjacent to the crane site/access tracks;
- Crushed stone will be laid on a geo-textile mat (where required) and compacted in layers to an appropriate depth;
- Where access tracks are required to cross any drainage ditches, these will be piped and spanned with an appropriate bridging structure. Where access tracks cross a watercourse, bottomless culverts will be installed (where possible) to prevent any interference with the hydraulic capacity of the watercourse; and,
- Areas of temporary hardstanding (for turbine component storage and crane assembly) will be reinstated following the construction phase by removing aggregates, replacing the excavated spoil and reseeding (or allowing to vegetate naturally). The crane hardstandings and on-site access tracks will be retained during the operational phase to facilitate access for maintenance personnel and in the event of a major component change-out.

3.6.4 Temporary Construction Compound

Topsoil will be removed from the required area and side cast for temporary storage adjacent to the compound area. The compound base will be made up of well graded aggregates, compacted as necessary. A designated waste management area and fuels and chemicals storage area will be provided along with site offices, parking, staff welfare facilities and equipment storage areas. The compound will be fenced with temporary security fencing to restrict access. Following the completion of the construction phase, the temporary construction compound will be fully removed and the compound will be reinstated with excavated material and

reseeded.

3.6.5 Construction Drainage Management & Disposal

Construction works will be carried out in accordance with the 'Land & Soil' and 'Water' assessments and mitigation measures included in this EIAR in order to prevent any likely significant impacts on nearby watercourses by debris, silt and oils (see **Chapters 6** & **7**). Sources for likely significant effects on the hydrological environment during construction include increased volumes of surface water runoff; the generation of silt laden surface water runoff from excavations and the temporary storage of stockpiled materials; potential for surface water and groundwater contamination due to leakage oils/fuel from site vehicles; spillage during refuelling operations; and leakage from chemical, waste and fuel storage areas.

Specific mitigation measures are presented in the relevant chapters of this EIAR in relation to each of these issues. The precise implementation and siting of these measures will be determined, subject to planning permission being granted, following the post-consent detailed design process and will be included within the CEMP to be agreed with the Planning Authority prior to the commencement of construction.

During the construction phase, temporary stockpiles of excavated materials will be stored appropriately in designated areas of the site (a minimum of 50m from nearby watercourses or drains), in order to minimise the risk of silt laden surface water runoff entering surrounding water courses. All surface water runoff from stockpiles, excavations or from dewatering operations will be passed through an appropriate attenuation mechanism, such as a silt trap or stilling pond. Other surface water protection measures which may be implemented as appropriate include silt fences, silt bags and siltbusters. Silt or sediment laden waters will not discharge directly to any surface water features and will be appropriately attenuated before being discharged in a manner which ensures that erosion does not occur, for example via buffered outfalls.

3.6.6 Chemical Storage and Refuelling

Storage areas for oils, chemicals and fuels will comprise bunded areas of hardstand of sufficient capacity within the temporary construction compound. Bunds will have a watertight roof structure and will be supplied by a licensed manufacturer to enable adequate safe storage for the quantities of material required. An adequate supply of spill kits will be readily available in order to clean up any minor spillages should they occur. A hydrocarbon interceptor will be installed within the surface water drainage system during the construction phase to trap any hydrocarbons that may be present. A 50m buffer will be observed around all surface water features and no fuel/chemicals shall be handled or stored within this zone.

From the construction compound, fuel will be transported to works area by a 4x4 in a double skinned bowser with drip trays under a strict protocol and carried out by suitably trained personnel. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for its carrying capacity. As above, a 50m buffer will be observed around all surface water features and no refuelling will be permitted within this zone.

3.6.7 Construction Waste Management

Waste will be generated during the construction phase and the main items of anticipated construction waste are as follows:-

- Hardcore, stone, gravel, concrete, plaster, topsoil, subsoil, timber, concrete blocks and miscellaneous building materials;
- Waste from chemical portaloo toilets;
- Plastics; and
- Oils and chemicals.

Waste disposal measures proposed include:-

- On-site segregation of all waste materials into appropriate categories including, for example, topsoil, bedrock, concrete, bricks, tiles, oils /diesels, metals, dry recyclables e.g. cardboard, plastic, timber;
- All waste materials will be stored in skips or other suitable and sealed receptacles in a designated area of the construction compound;
- Wherever possible, left over materials (e.g. timber off-cuts) and any suitable demolition materials shall be re-used on-site;
- Uncontaminated excavated material (rock, topsoil, sub-soil, etc.) will be re-used on-site in preference to importation of clean inert fill;
- Bedrock may be encountered during foundation excavation. If bedrock is encountered it will be utilised for infill during construction;
- All waste leaving the site will be transported by permitted contractors and taken to suitably licensed or permitted facilities and will be recycled, recovered or reused, where possible; and
- All waste leaving the site will be recorded in accordance with legal requirements and copies of relevant documentation maintained.

3.6.8 Construction Employment

It is estimated that up to 120 no. people will be employed during the 15-18 month construction phase. The actual number will depend on the activities being undertaken at any given time and will vary throughout the course of the construction programme. Employment will be the responsibility of the construction contractor but it is likely that the workforce will include labour from the local area.

3.6.9 Construction Traffic

Vehicular traffic required for the construction phase is likely to include:-

- Articulated trucks (HGVs) to bring initial equipment onto site and later to bring the turbine components, electrical cables, steel reinforcement for foundations, anemometer mast, and ancillary equipment;
- Tipper trucks and excavation plant involved in site development and excavation works;
- Cranes to erect the turbines; and
- Miscellaneous vehicles and handling equipment, including vehicles associated with construction workforce.

Likely significant impacts from construction traffic could include temporarily increased local traffic levels and traffic noise. Construction traffic on the local road network will be managed in accordance with a Traffic Management Plan and the requirements of the Local Authority. This may include the installation of temporary

road signage and traffic lights, as appropriate. Noise arising from construction traffic would be localised, temporary and of a short term duration.

Deliveries of turbine components will take place at times to avoid peak traffic periods, and are likely to occur during night-time hours. All abnormal loads will be accompanied by an advance escort vehicle. Once the turbines are operational, the traffic movements will be greatly reduced to, on average, once/twice per week by a light commercial vehicle for maintenance purposes. There may be an occasional need to replace some turbine components but these are unlikely to be frequent.

Traffic mitigation measures will be implemented during the construction phase, as follows:-

- Signage at site entrances giving access information;
- Temporary traffic restrictions kept to minimum duration and extent;
- Diversions put in place to facilitate continued use of roads, where restrictions have to be put in place;
- Construction traffic management – one way systems where possible and strictly enforced speed limits (particularly along the L1504 and L5508);
- Provision of a designated person to manage access arrangements and act as a point of contact to the public;
- All temporary road alterations and public road upgrades to be carried out in full consultation with the Local Authority; and
- No hedgerows or potential breeding habitats to be removed during the breeding season.

3.7 Operational Phase

The operational phase of the proposed wind farm[7] is 30 years. During this period, the wind turbines will be operational and, other than routine maintenance and monitoring, there will be no other activities on site and agricultural activities can continue as normal. On average the proposed development will be serviced once/twice per week by a light commercial vehicle for maintenance purposes. In exceptional circumstances there may be a requirement to replace a turbine component, which would require more substantive works on site.

Waste will be generated during the operational phase including, for example, cooling oils, lubricating oils and packaging from spare parts or equipment. All waste will be removed from site and reused, recycled or disposed of in accordance with best-practice and all regulations in a licensed facility.

Further details on the operational phase and specific mitigation measures are provided in each chapter of this EIAR as they relate to each environmental topic.

3.8 Decommissioning Phase

The operational phase of the proposed wind farm is 30-years. At the end of this period several options will exist:-

- Continued operation of the existing turbines;
- Refurbishment/replacement of the turbines and continued operation; and
- Decommissioning of the wind farm.

[7] See **Section 3.2** regarding the operational lifetime of the proposed electricity substation.

Any further operation beyond 30-years would be subject to a further planning application and EIA. In its scope, this EIAR assumes full decommissioning of the proposed wind farm will take place after 30-years. All structures above ground level shall be demolished and removed from the site for reuse/recycling; however, access tracks are likely to be retained for continued use by the landowners for agricultural/forestry purposes.

A Decommissioning Management Plan will be agreed with the Local Authority in advance of decommissioning works. Further details on the decommissioning phase and specific mitigation measures are provided in each chapter of this EIAR as they relate to each environmental topic.

3.8.1 Wind Turbines

Wind turbines are comprised of the tower, nacelle and blades which are modular items that can be disassembled. This will involve a process which will be similar to the construction phase, but in reverse. If the turbines are to be sold on or reused elsewhere they shall be removed from site by specialist vehicles similar to those used during their transportation to site. If wind turbine components are not to be reused then they shall be scrapped. This shall involve the removal of all components to an approved waste handling/recycling facility where components will be sorted according to their material of construction. Turbine components are mainly inert steel/ferrous metals which can be reused or recycled.

3.8.2 Turbine Foundations

Wind turbine foundations shall be grubbed up to a depth of 1m below ground level using conventional mechanical diggers. Exposed rebar and holding down bolts shall be burned off and removed off site to an approved waste handling facility for recycling or disposal. The broken concrete can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively it may be used on site as an inert fill to make up levels as part of a wider decommissioning/restoration plan, reducing the need for the importation of additional soil onto the site. Excavations shall be backfilled with excavated material, soiled over and seeded out.

3.8.3 Hardstands & Access Tracks

Hardstands shall be grubbed up to a depth of 1m below ground level and the excavated material shall be used to regrade the hardstand area to match existing ground contours and profile. Additional inert material derived from demolition in other areas of the site may be used if sufficient material is available. Once the area has been profiled to match the surrounding ground, 50mm of topsoil shall be spread over the reinstated area. This area shall then be seeded out. If it is decided not to retain the access tracks on site for agriculture purposes, then these shall be removed using a similar methodology.

3.8.4 Transformers & Cabling

The decommissioning of transformers will depend entirely on any future use of the wind turbine. If the turbine is to be used elsewhere, the transformer will be removed from site for refurbishment and future use. If the turbine is to be scrapped, the transformer will be removed to an approved waste handling/recycling facility and stripped of any useable parts with the remainder being recycling.

Excavations shall be carried out to expose any cables buried in trenches to a depth of 1m below ground level and the cable removed. The majority of cables used in wind farm construction contain a core of either copper or aluminium. Both of these materials can be recycled. Any cable off-cuts shall be removed off site to an approved waste handling facility where the cores shall be recycled and the remaining material shall be disposed of at an approved facility. Excavations carried out to expose cables shall be backfilled with excavated material, soiled over and seeded out.

3.8.5 Meteorological Mast

The decommissioning of the meteorological mast will involve the removal of wind measuring equipment, the separation of the lattice mast sections and their removal from site for re-use in other projects or for recycling. The mast foundations shall be grubbed up to a depth of 1m below ground level and the excavated material shall be used to re-grade the area to match existing ground contours and profile. Excavations shall be backfilled with excavated material, soiled over and seeded out.

3.9 Monitoring

A monitoring period of 2-years immediately following the decommissioning and restoration activities will be implemented. The monitoring period allows for the subject site to experience seasonal changes and to determine if additional restoration works are required. If, during this time, any failure of works or reinstatements carried out were to occur, they shall be made good using similar methods as described above, or as agreed with the Local Authority.