White Hill Wind Farm

Environmental Impact Assessment Report

Chapter 3: Description of the Project

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3.1 Introduction

The purpose of this chapter is to provide a description of the project 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 project.

The description considers the location of the project 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 project 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 project 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 developments; the nature and quantity of materials and natural resources used; and the potential production of residues, waste, pollution, noise and nuisances.

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

The project 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 construction phase includes land-use requirements; 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 10-year planning permission is being sought by the Developer for this project. That is, planning permission would remain valid for 10-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".*[1] A 10-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 project is proposed to be 35-years following the full commissioning of the wind farm. Any further operation beyond 35-years would be subject to a further planning application and EIA. This EIAR therefore assumes that full decommissioning will take place at the end of the project lifespan.

3.3 Site Location & Context

The proposed wind farm is located in in west County Carlow and east County Kilkenny; c. 13 kilometres (km) southwest of Carlow, c. 14km northeast of Kilkenny City and c. 4km west of Oldleighlin. The location of the wind farm, in a regional context, is illustrated in **Figure 3.1** below. The wind farm, which will have an overall site area of

[1] This text is replicated at Section 7.22 of the *Draft Revised Wind Energy Development Guidelines 2019*.

approximately 290 hectares, will be located in the townlands of Ridge (Ridge E.D.), Knocknabranagh and Knockbaun, and Baunreagh, Co. Carlow; and Coolcullen, Co. Kilkenny. Accordingly, the wind farm site traverses the administrative boundary between counties Carlow and Kilkenny.

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 129 no. dwellings located within 1.85km of a proposed wind turbine.

The wind farm site is located on an elevated plateau, known as the Castlecomer Plateau, which is located in south County Laois, northwest County Carlow and northeast County Kilkenny. The Castlecomer Plateau is characterised by undulating hills and steep escarpments at its fringes. Dissecting the lowlands on either side of the plateau are the Barrow and Nore rivers, which lie to the east and west respectively. The lowlands are a mixture of pasture and tillage with fields typically bordered by mature broadleaf tree lines and hedgerows. Agricultural land uses extend into the upland areas in the form of more marginal grazing with scrubby hedgerow field boundaries. Extensive commercial conifer plantations emerge on higher slopes throughout the Castlecomer Plateau.

The wind farm site comprises a mosaic of improved and semi-improved agricultural grassland, with tracts of conifer plantation at the northern, western and southwestern fringes. Field boundaries generally consist of mature and semi-mature hedgerows, interspersed with trees, which consist of a mix of species including sycamore, ash, whitethorn, bramble, gorse, bilberry and ferns.

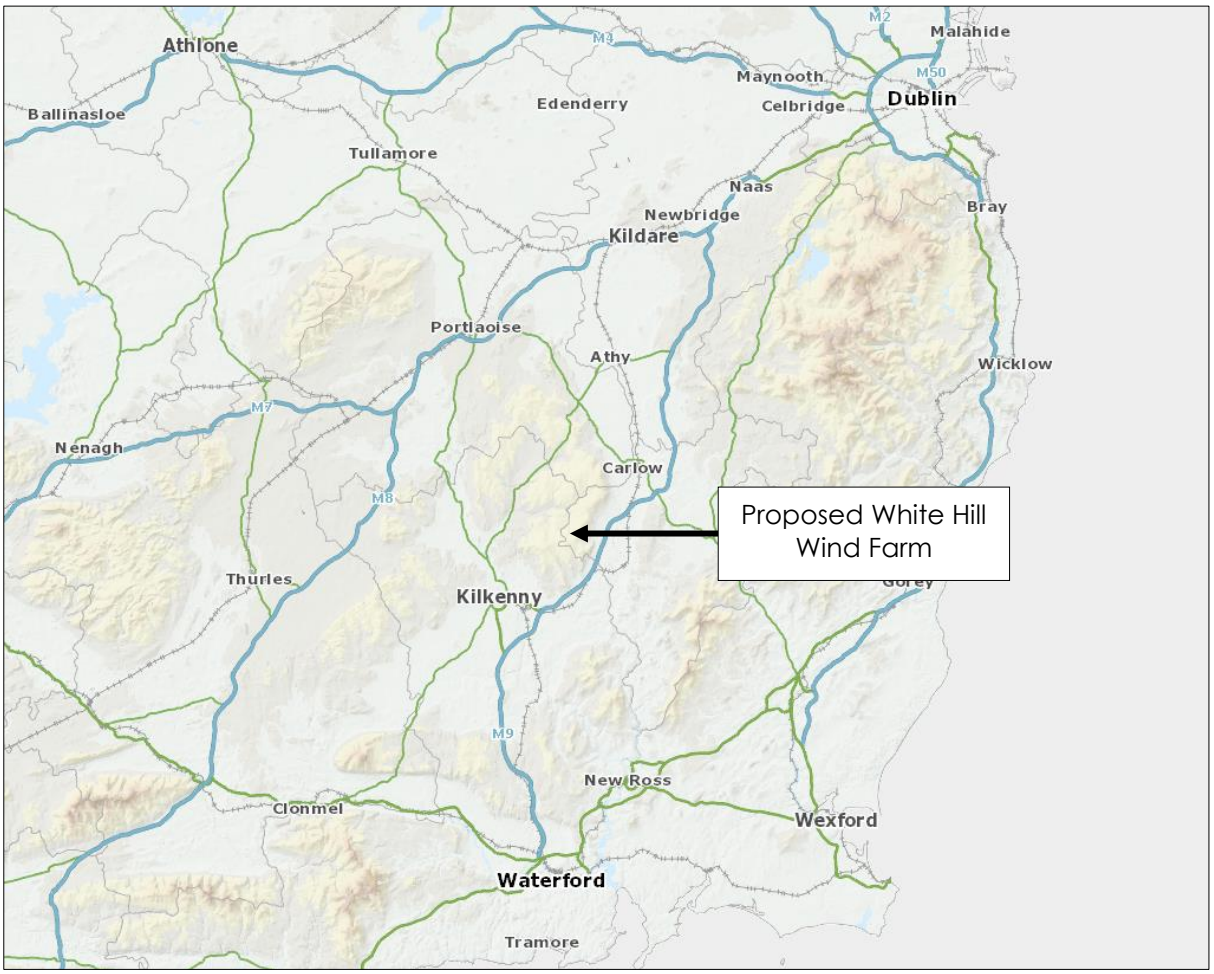

Figure 3.1: Project Site Location

Plate 3.1: General View across the Wind Farm Site

3.4 Description of the Project

The project 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:-

- 7 no. wind turbines with a hub height of 104 meters (m), a rotor diameter of 162m, and an overall tip height of 185m;
- All associated turbine foundations and crane hardstanding areas;
- All associated underground electrical and communications cabling;
- Construction of internal wind farm access tracks;
- Construction of a site entrance from the L3037 local public road and upgrades to 2 no. existing agricultural entrances from the L7122 local public road;
- 1 no. guy-wired meteorological with an overall height of 30 metres;
- 1 no. temporary construction compound;

- 3 no. borrow pits which, when exhausted, will be utilised to permanently store excess excavated material;
- The storage, as required, of excavated material at 2 no. further dedicated spoil deposition areas;
- Change of use of existing residential dwelling to wind farm site office;
- A 38 kilovolt (kV) electrical substation, switchroom and equipment compound, associated electrical equipment including an electricity storage system, and site entrance and access track from the L7117;
- Felling of 15 hectares (ha) of commercial forestry plantation to facilitate the construction and operation of wind farm infrastructure; and,
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and environmental mitigation measures.

Off-site and secondary elements of the project which are included for assessment in this EIAR and are included in the current planning application, include:-

- The construction of a temporary access track (150m in length) between the N78 and L1834; and,
- Carriageway strengthening works at 'Black Bridge' on the L1835 and L3037.

Off-site and secondary elements of the project which are included for assessment in this EIAR but are **not** included in the current planning application and will be subject to a separate licensing and/or consenting process, include:-

- 15km of underground electricity lines to facilitate connection of the wind farm electricity substation to the existing Kilkenny 110kV substation; and,
- The planting of 15ha of commercial (replacement) forestry on lands in the townland of Drumagelvin, Co. Monaghan.

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

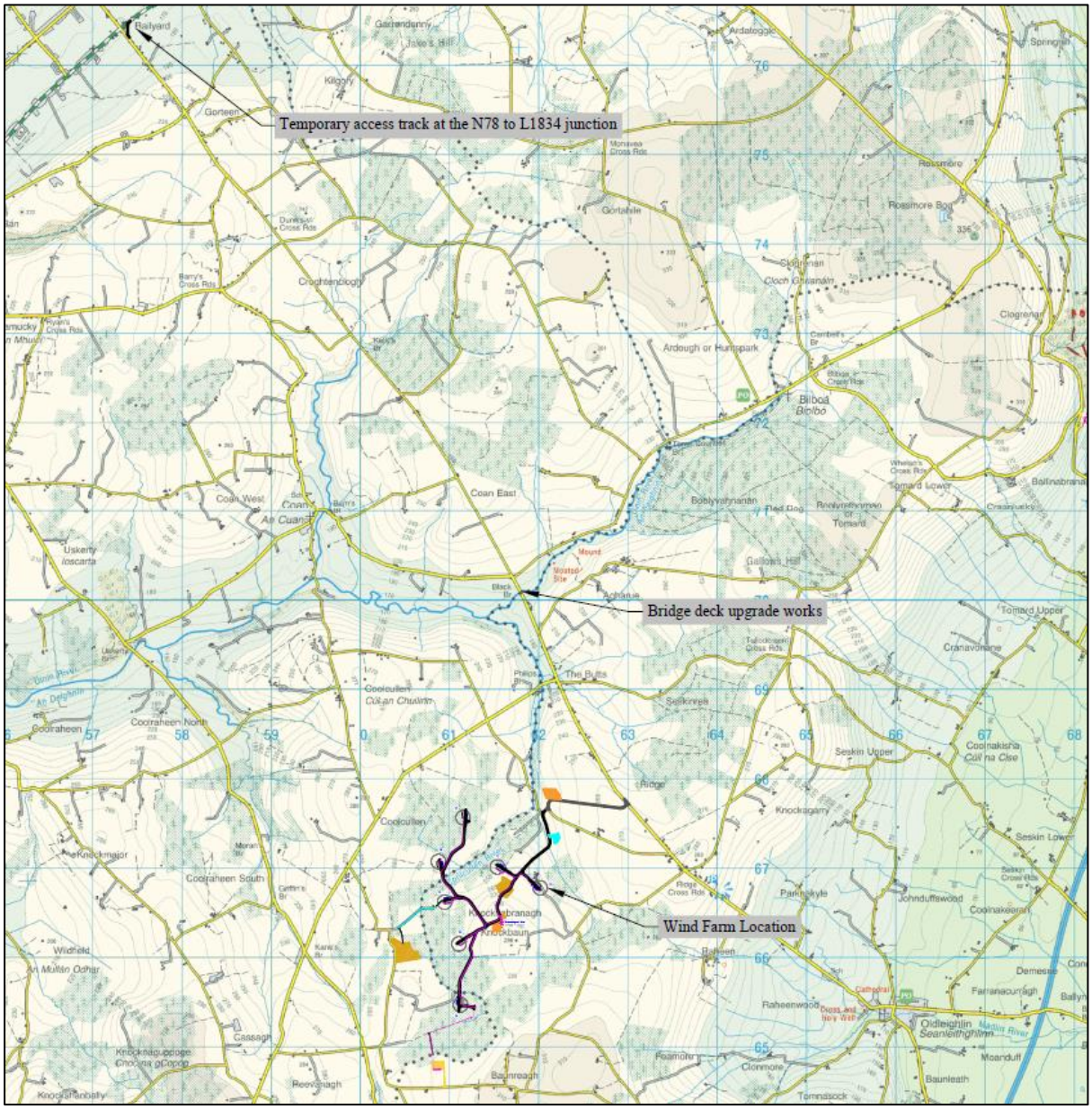

Figure 3.2: Layout of the Project

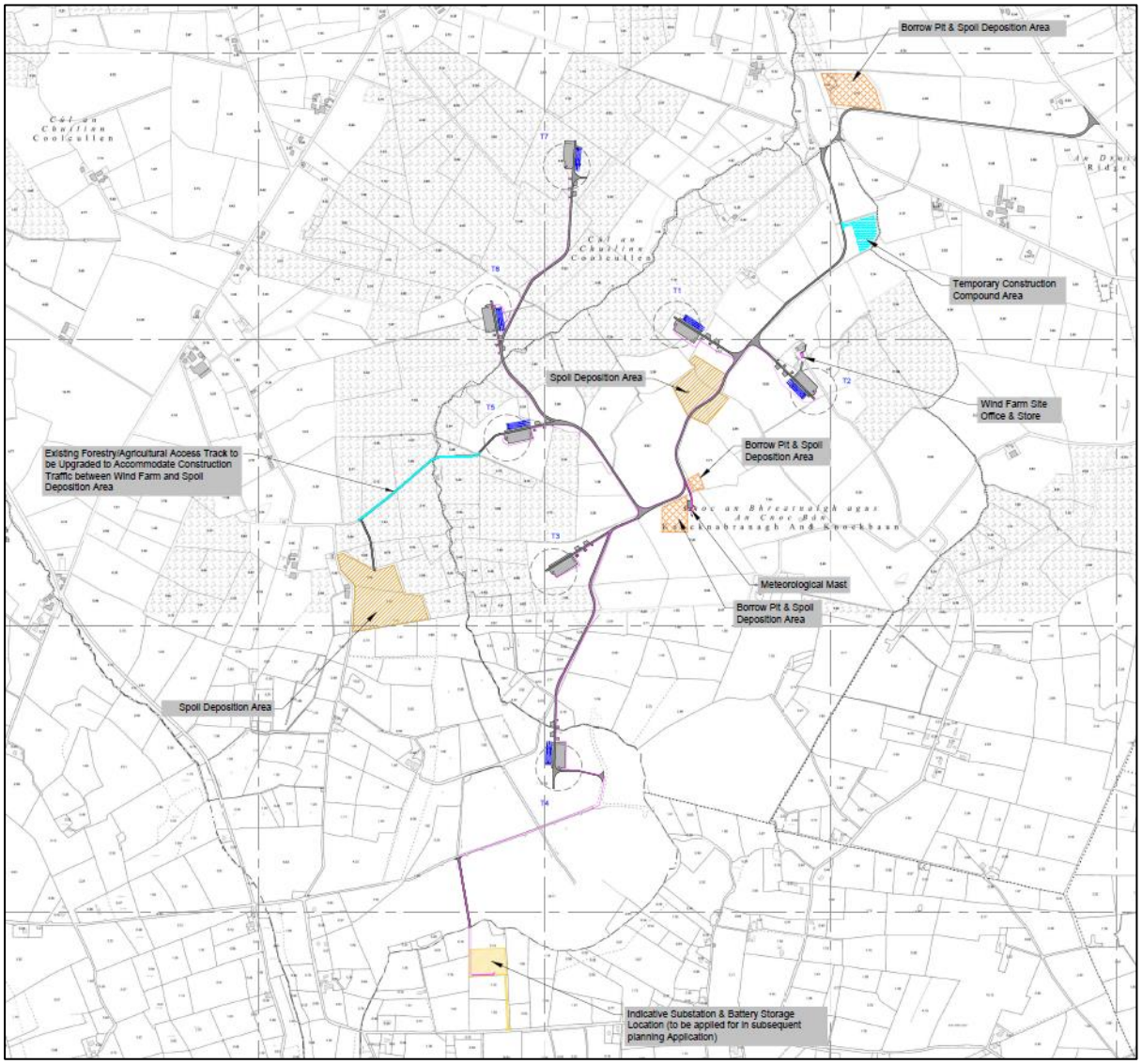

Figure 3.3: Proposed Wind Farm Site Layout (see also Annex 3.2)

Each element of the project is discussed in turn below and all relevant technical plans, drawings and other particulars are included in the accompanying planning application. This EIAR should, therefore, be read in conjunction with the plans and particulars of the relevant planning application as; as discussed at **Chapter 1** (**Section 1.19**); not all elements of the overall project are included within a single planning application.

3.4.1 Wind Turbines

As discussed in **Chapter 2**, the 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 wind turbines are set out in **Table 3.1** below. As illustrated in **Figure 3.2** above, the wind farm site traverses the administrative boundary between counties Carlow and Kilkenny, 4 no. turbines are located in County Carlow and 3 no. turbines are located within County Kilkenny.

ID	Easting*	Northing*	Overall Tip Height (m)	Approximate Ground Level (mAOD)
T1	661462	667051	185	250
T2	661941	666818	185	258
T3	661032	666188	185	268
T4	661051	665506	185	276
T5	660870	666656	185	255
T6	660802	667111	185	241
T7	661078	667603	185	239

Table 3.1: Proposed Wind Turbine Coordinates and Existing Ground Levels

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

***Note: Micrositing and any immaterial deviations to the proposed turbines within an overall development envelope (overall height or red line boundary) are fully assessed and incorporated into this EIAR.*

The wind turbines will have an overall tip height of 185m. The rated output for each turbine, based on the model selected, is 7.2MW, resulting in a total rated output of 50.4MW for the project.

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 otherwise determined by An Bord Pleanála. The typical components of a standard wind turbine are illustrated in **Figure 3.4**.

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 25m/s. At the cut-out speed, the turbine will automatically shut down.

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 and on-site electrical cables will connect the turbines to the electrical control building within the electricity substation.

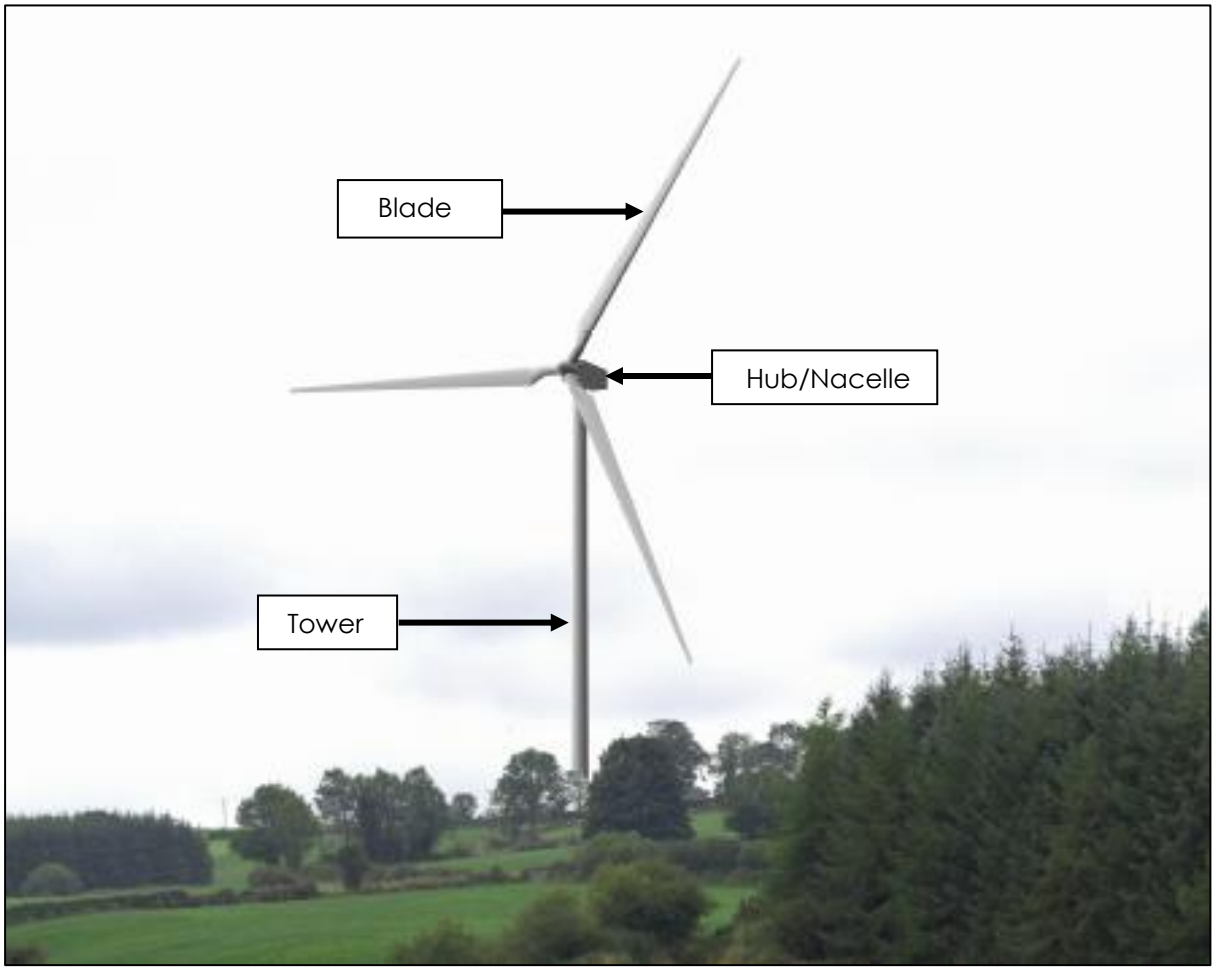

Figure 3.4: Typical Wind Turbine Components

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

Turbine Model	Output (MW)	Hub Height (m)	Rotor Diameter (m)	Overall Tip Height (m)
Vestas V162-7.2MW	7.2	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 turbine make, model and dimensions, as set out above.

It is important to note, however, that turbine technology advances rapidly 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 turbine model is no longer available in the market. Accordingly, while this EIAR assesses the likely significant environmental effects of the above turbine and its principal dimensions, as described above, it also fully incorporates an assessment of any immaterial deviations thereof (in terms of hub height and rotor diameter). Any proposal to immaterially deviate from the above dimensions will 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 demonstrate that the subsoil conditions are generally benign and suitable for the construction of standard turbine raft foundations (see **Chapter 6**). Accordingly, complex construction engineering methods, including piled foundations, are unlikely to be necessary. However, this will be confirmed during further post-consent investigations. Again, it is established EIA practice that such details may be left over for agreement post consent, on the proviso that the results to be achieved by any mitigation measures are specified and the project cannot proceed unless those results are fully achieved.

The depth of excavation required for each wind turbine foundation will vary depending on precise ground conditions. The diameter of a standard gravity raft foundations will be c. 22m; while the diameter of a piled foundation would, if deemed to be required, be c. 19m. Foundation depths will range between 3m and 5m in depth depending on ground conditions at each turbine location.

Excavations will be undertaken by conventional mechanical methods and no blasting will be required. The total volume of excavated material at each foundation will be approximately 1,000m^3 depending on local ground conditions. Vegetation, soil, subsoil and rock removed during the construction of turbine foundations will be side-cast and 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, firstly, for reinstatement purposes elsewhere within the project site (e.g. landscaping of hardstands and access tracks or reinstatement of borrow pits) or, as required, deposited at the dedicated spoil deposition areas.

Once the turbine foundation has been excavated, 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 foundations shall be sourced locally, which will reduce the total distance travelled by heavy goods vehicles (HGVs) hauling construction materials to the subject site (see **Chapter 13**) and associated emissions (see **Chapter 8**).

Figure 3.5: Typical Turbine Foundation

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 typically be 94.5m x 36m 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 3.4.10**).

The crane hardstands will be retained *in situ* during the operational phase of the project to accommodate any crane activities in the event of a major component change-out and during the decommissioning phase.

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 project 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.

It should be noted that, due to the presence of habitats of 'higher ecological value' (see **Chapter 5**) in the vicinity of T3, temporary blade component set-down/storage areas will not be constructed at this location and turbine components for T3 will be delivered on a 'just-in-time' basis.

3.4.4 On-Site Access Tracks

A total of c. 7.5km of on-site (wind farm) access tracks will be required for construction purposes and for site access during the operational phase. The vast majority of these access tracks (c. 7km) shall be newly constructed; however, the alignment will generally follow routes which are regularly trafficked during current agricultural operations. Approximately 500m of existing agricultural/forestry access track shall also be upgraded (re-surfaced) to accommodate construction traffic.

The access tracks shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 5m (wider at bends to accommodate turbine component delivery vehicles). Access tracks will be unsealed and constructed of crushed stone material to allow for permeability. Initial site investigations indicate the presence of rock at a number of locations within the project site. Consequently, it is likely that significant volumes of material for the construction of access tracks will be sourced on-site; however, it should be noted that access track capping aggregates (CL804) will be imported to the project site from local quarries (see **Chapter 13**).

A geotextile layer may be needed in some locations to avoid any subsequent vehicle access problems. Some cut/fill in the construction of the access tracks will be necessary to ensure that horizontal and vertical alignments are suitable to accommodate abnormal HGV loads and to provide adequate drainage. The wind turbine manufacturer shall be consulted during the post-consent detailed 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 the 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 of this ancillary infrastructure, it will be utilised in the construction of trackside berms or disposed of at the dedicated spoil deposition areas.

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

No major watercourses are present within the site. However, a number of drainage ditches and lower order watercourses/streams do exist, such as the Coolcullen River (also known as the Knocknabranagh and Knockbaun stream). 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], etc.) 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.

[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.

Figure 3.6: Typical Access Track

A total of 3 no. bellmouth site entrances (excluding those described at **Section 3.5.1.3** and **Section 3.5.3** below) will be required to facilitate access throughout the proposed wind farm site. 2 no. existing agricultural access point adjoining the L7122 will be upgraded to accommodate construction traffic and abnormal HGV loads while a further 1 no. new site entrance will be constructed from the L3037.

The site entrance from the L3037 will be constructed in accordance with the requirements of the Planning Authority regarding the provision of appropriate site visibility splays to ensure traffic safety[3].

Due to the narrow profile and existing alignment of the L7122 local road in the townland of Ridge, it will not be possible to provide full visibility splays as required by the Planning Authority. However, Section 16.10.7 of the *Carlow County Development*

[3] Visibility splays will be provided in accordance with Table 16.5 and Section 16.10.7 of the *Carlow County Development Plan 2022-2028*.

Plan 2022-2028 states that where full visibility splays are not achievable, a reduced sightline may be permissible where a road safety audit has been completed and demonstrates that there will be no adverse effect on road safety as a consequence of the reduced visibility. Accordingly, a Road Safety Audit has been prepared in respect of works at this location and is enclosed at **Annex 13.1** (**Volume II**).

At this location, it is proposed to remove c. 200m of hedgerow to provide for an increase in the width of the public road carriageway (to c. 5m to accommodate abnormal loads) and increased roadside verges to maximise the achievement of sightlines. The proposed carriageway and verge widening works will significantly increase the level of visibility for construction and operational phase traffic accessing and egressing the project site. While the upgraded site entrances will be reduced in size to standard agricultural access points following the delivery of turbine components, it is also proposed that the public road upgrade works (carriageway and verge widening) at this location will remain *in situ*, permanently, thus resulting in a long-term improvement in public road safety.

Following the construction phase, the specifications of the site entrances will no longer be needed to accommodate abnormal-sized loads. Accordingly, they will be reduced in size to standard agricultural access points and appropriately fenced off and gated to prevent unauthorised access. The reinstatement of site entrances 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.

3.4.5 Meteorological Mast

A temporary meteorological (anemometry) mast currently exists within the project 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). Planning permission has been granted, pursuant to Carlow County Council Planning Register Reference 21/316, for its extension to 100m in height. At the time of writing, the mast has not yet been extended but it is anticipated that these works will be undertaken later in 2022.

The meteorological mast has recorded an average wind speed for the site of approximately 7.8m/s at 104m (adjusted).

It is proposed that this mast will be removed and replaced with the permanent (permanent as per the lifespan of the wind farm) mast; the details of which are provided at **Table 3.3** below.

ID	Easting*	Northing*	Overall Height (m)	Approximate Ground Level (mAOD)
Permanent Meteorological Mast	661509	666404	30	290

Table 3.3: Meteorological Mast Coordinates

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

The permanent mast to be installed will be 30m in height and will consist of a guy-wired 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 project; while the recorded data will also be utilised in the forecasting of electricity generation. 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 anchors, will be required to erect the proposed permanent mast. Mast components will be brought to site by 4x4 vehicles which will utilise the proposed access tracks and site entrances referred to at **Section 3.4.4** above.

3.4.6 Electrical Cabling & Communications Cabling

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 depth of the cable trench will be 1m with a width of 0.5m. The excavated material from the cable trenches will be side-cast alongside the trench and reinstated following the laying of cable ducts.

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 arterial access track (see planning application drawings) and will have an approximate area of 7,000m^2 (0.70 hectares) comprising:-

- Temporary cabins to be used for the contractor's 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, construction vehicles, and visitors;
- 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, and hand washing etc.) will be supplied on-site by water dispensers and this 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 reinstated. 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 Earthworks

Earthworks will largely arise at the project site from the excavation of topsoil, subsoil, peat/peaty topsoil, and rock (where present) at the locations of proposed infrastructure; while it is also proposed to develop a number of borrow pits and spoil deposition areas (see below).

During construction; excavated topsoil, subsoil, peat/peaty topsoil, and rock material will be side cast, separately, for re-use in the reinstatement and landscaping of the site or, in the case of rock, in the construction of access tracks and hardstandings. It is estimated that approximately 107,000m^3 of material will be excavated to facilitate the construction of wind farm infrastructure.

During preliminary site investigations, it was identified that significant volumes of rock are present within the project site either at or near the surface and a substantial volume of rock will be encountered during excavations. Accordingly, it has been decided to utilise this local material in the construction of the proposed crane hardstandings and access tracks. The presence of rock is a significant environmental benefit as it will substantially reduce the volume of construction traffic volumes on the public road network thus significantly reducing vehicular exhaust emissions during the construction phase.

A preliminary Spoil Management Plan (enclosed within the Preliminary Construction & Environmental Management Plan at **Annex 3.4**) has been prepared in respect of the project and incorporates proposals regarding the appropriate management of material which may arise from the construction of the project. 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 project.

3.4.8.1 Borrow Pits

While it is estimated that sufficient rock material will be encountered and will be available for the construction of access tracks and hardstands (excluding the topping layer which will be imported from a local quarry (or quarries); 3 no. suitable borrow pit locations, which are illustrated at **Annex 3.2** (**Volume II**), have been identified and may be utilised to provide rock/stone. These borrow pits will only be utilised where sufficient rock cannot be extracted from excavations elsewhere within the wind farm. Rock will be extracted from the borrow pit by standard means of excavation and rock breaking. On the basis of site investigations undertaken (see **Chapter 6**), blasting is not assessed as likely to be required.

Where a borrow pit is opened and following the extraction of required material, it will be reinstated with surplus material generated from excavations elsewhere within the project site. Subsoil will be graded to match the surrounding ground profile, topped with topsoil, re-seeded and returned to agricultural pasture.

Works at the borrow pits will be monitored, on a weekly basis during the construction phase and, monthly, for a 6-month period thereafter by an appropriately qualified geotechnical engineer.

3.4.8.2 Spoil Deposition

In the first instance, surplus excavated material will, as described in the preceding sections, be utilised in the reinstatement and landscaping of the wind farm infrastructure or the borrow pits (if developed). While it is estimated that the above reinstatement and landscaping processes will account for substantial volumes of surplus material; it is proposed to develop 2 no. dedicated spoil deposition areas (see **Annex 3.2**) where excess material, which cannot be utilised for reinstatement or is unsuitable for landscaping purposes, will be stored permanently.

The location of the deposition areas have been selected due to the absence of any particular environmental constraints, separation distance to watercourses and generally flat or gently sloping gradient. Spoil will be transported to the selected areas where it will be placed in layers in accordance with best-practice methods. Appropriate drainage management measures will be implemented to ensure that the deposited spoil does not become waterlogged and to avoid any pollution of nearby surface water features.

Following the completion of construction, the deposition areas will be graded to match the profile of surrounding land and will be reseeded. Works at the spoil deposition areas will be monitored, on a weekly basis during the construction phase and monthly for a 6-month period thereafter, by an appropriately qualified geotechnical engineer.

In the event that material is generated which is unsuitable for storage within the deposition areas (e.g. tarmac cuttings from site entrance construction), this shall be removed from site and disposed of at a licensed waste disposal facility.

3.4.9 Site Office

While, once operational, the project will be operated remotely; the wind farm will be visited on 1-2 no. occasions per week by service and maintenance personnel. In order to provide adequate welfare facilities to the operatives, it is proposed to change the use of an existing residential dwelling (Eircode: R93 TX86); located adjacent to T2; to a site office. No internal or external alterations to the dwelling; which is already served by electrical, water and wastewater infrastructure; are required or proposed. The existing septic tank system will be regularly inspected and de-sludged by a licensed waste collector, with waste material being removed to a licensed wastewater treatment plant.

It is proposed to construct a short access track, c. 50m in length, to facilitate internal access from the wind farm to the site office.

During the construction phase, the site office will also be utilised by the Developer's appointed Project Manager and community liaison personnel.

3.4.10 Micrositing

The immaterial micrositing of elements of the project, following post-consent detailed site investigations and geotechnical analysis, also forms part of the project.

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*[4]. It is anticipated that the agreed micrositing distance will form a

[4] Flexibility regarding wind turbine positioning is also referred to at Section 7.5 of the *Draft Revised Wind Energy Development Guidelines 2019*.

condition accompanying a grant of planning permission. It is also proposed that hardstands, access tracks, meteorological mast, and underground cables 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 effects on the substantive conclusions of this EIAR.

3.5 Off-Site & Secondary Developments

3.5.1 Turbine Component Delivery Route

While the final turbine component haul route has not been selected and will be entirely dependent on the turbine supplier and the chosen port of entry, it has been determined that turbine components will, most likely, enter via the Port of Waterford[5]. It is envisaged that, from here, the turbines will then be transported by specialised HGVs for the transport of turbine components along the N29, N25, N9, M9, N78, L1834, L1835, and L3037 before accessing the site via a proposed site entrance.

In order to facilitate the delivery of turbine components, however, some works (both permanent and temporary) will be required at various locations along the above route. A total of 12 no. locations have been identified where works to the public road network will be required, 11 no. temporary works locations and 1 no. permanent works location.

3.5.1.1 Port of Waterford to M9/N78 Junction

From the Port of Waterford to the junction of the M9 and N78, 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 and emplacement of hardcore. Further details of the required temporary works are included in the Route Access Study (see **Annex 3.5**).

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.

3.5.1.2 M9/N78 Junction to N78/L1834 Junction

From the junction of the M9 and N78, the haul route follows the N78 to immediately east of its junction with the L1834. Along this section of the route, which passes through the town of Athy, the temporary removal of street furniture and pruning of roadside vegetation will be required at a number of locations; however, the extent of works will be minimal and street furniture will be reinstated immediately following the delivery of turbine components.

[5] A number of other ports may be used to import turbine components including Dublin Port, Port of Galway, and Shannon-Foynes Port. Turbine components travelling between any of the above-named ports and the M9/N78 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.

It is proposed to temporarily remove the pier caps associated with the northern parapet wall of 'Crettyard Bridge' to allow turbine blades navigate the bend. For the duration of the removal of the pier caps, a temporary hand-rail will be installed to maintain public safety. No works will be undertaken to the bridge parapet wall; however, the upper section of an adjoining privately-owned wall will be lowered to a height of 950mm prior to the delivery of turbine components. Following the completion of component deliveries, the pier caps and wall will be reinstated to their pre-existing condition. It is important to note that it will not be necessary to undertake any works to the bridging structure/arch or to the road carriageway.

Road signage and street furniture will also be temporarily removed to accommodate the passage of turbine blades.

3.5.1.3 N78/L1834 Junction to Wind Farm Site

The junction of the N78 and L1834 has been assessed as incapable of accommodating abnormal-sized loads (turbine components). It is, therefore, proposed to construct a temporary 'link road/track' between the N78 and L1834 to the east of the existing junction and adjoining properties.

The construction of this 'link road/track' will require the creation of 2 no. temporary bellmouth access points/site entrances and c. 150m of temporary access track. The site entrances and access track will be similar, and constructed in a similar manner, to those described at **Section 3.4.4** above. Visibility splays will be provided in accordance with Section 13.22.1 of the *Kilkenny City & County Development Plan 2021-2027*; with sightlines of 215m being provided at the access point which interfaces with the N78 and 90m for the entrances which interface with the L1834.

It is important to note, however, that the temporary access points and access track will only be utilised by turbine component delivery vehicles travelling to the wind farm site. Once the delivery of components has been completed by each individual vehicle, the extendable blade/tower-section trailer will be retracted to a shorter overall length. Therefore, delivery vehicles leaving the site will not be required to utilise the temporary access points and access track and will utilise the existing N78/L1834 junction. Notwithstanding that traffic will not, therefore, access the N78 from the proposed 'link road/track', appropriate visibility splays onto the N78 have been provided regardless.

It is also proposed to undertake minor permanent works at 'Black Bridge' on the L1835. The bridge traverses the Dinin River at the county boundary between counties Kilkenny and Carlow. The bridge also represents the interface between the L1835 (in Co. Kilkenny) and the L3037 (in Co. Carlow).

Following the completion of a detailed structural assessment of the bridge in accordance with *BA 16/97: The Assessment of Highway Bridges and Structures*, using the modified 'Military Engineering Experimental Establishment' ('MEXE') method; it was identified that the bridge was not capable of supporting the maximum axle-loadings associated with typical wind turbine component delivery vehicles.

It is, therefore, proposed to place a layer of concrete, 175mm deep, across the carriageway over a distance of c. 18m (i.e. the entire span of the bridge archway) to increase the structural integrity of the bridge. Following the placement of the concrete, the carriageway will be re-surfaced to the satisfaction of the respective planning authorities. Existing rubbing strips, adjacent to the parapet walls, will be

reinstated. It should be noted that the bridging structure itself will remain unaffected, with no works being undertaken to the archway or to the parapet walls.

3.5.1.4 Summary

A full description of the necessary works at each location along the route between the Port of Waterford and the project site is provided at **Annex 3.5**; while a summary of key locations, where more notable works are required, are provided at **Table 3.4** and **Table 3.5** below.

As described, all temporary works will be fully reinstated, and permanent works completed, to the satisfaction of the relevant local authority.

Location ID (per Route Access Study)	Description of Temporary Haul Route Works
Location 5.6.1: Exit Port of Waterford onto 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	Temporary removal of road signage and street lighting and the temporary hardcoring of the roundabout island.
Location 5.6.5: N25/N9 Roundabout	Temporary removal of road signs and street lighting.
Location 5.6.6: N9/M9 Roundabout	Temporary hardcoring of roundabout island and temporary removal of road signage.
Location 5.7.1: M9/N78 Roundabout	Temporary hardcoring of the roundabout island and temporary removal of road signage and street lighting.
Location 5.7.2: N78/R418 Roundabout	Temporary hardcoring of roundabout island and removal of road signage. with pruning of roadside vegetation.
Location 5.8.1: N78 Splitter Island	Street furniture to be temporarily removed
Location 5.8.3: Crettyard Bridge	Temporary removal of road signage and street lighting, pruning of roadside vegetation, and temporary removal/lowering of parapet wall pier caps and adjoining privately-owned wall.
Location 5.8.4: N78/L1834 Junction	Creation of temporary 'link road' to avoid current junction. Works will include the development of 2 no. temporary site entrances.

Table 3.4: Temporary Haul Route Upgrade Works

Location (per Route Access Study)	Description of Permanent Haul Route Works
Location 5.9.7: Black Bridge	Placement of 175mm of concrete atop the existing bridge archway to ensure its structural integrity, followed by reinstatement (including

	a 20mm layer of mastic asphalt binder [SMA]) to the satisfaction of the respective planning authorities.

Table 3.5: Permanent Haul Route Upgrade Works

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 it will be necessary to temporarily close junctions as the components pass through.

As part of the design process, it has been estimated that c. 609m^3 of material will be excavated to complete the haul route upgrade works. As all works (other than at Black Bridge) are temporary, excavated material will be fully re-used in the reinstatement of each works location. At Black Bridge, it is estimated that 11m^3 of road cuttings will be removed, and disposed of at an approved facility, in preparation for the emplacement of concrete atop the bridge archway.

3.5.2 Aggregates Sources, Haul Routes & Quantities

As described at **Section 3.4.8.1**, preliminary site investigations have identified that rock is present within the project site which can be utilised in the construction of access tracks and crane hardstandings. It is estimated that c. 56,000m^3 of usable material will be generated on site which will significantly reduce the volume of material to be imported to site. However, it should be noted that additional aggregates, including access track and crane hardstanding topping material and concrete, will be imported from local 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 2.4** and the likely haul routes to the project 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**.

On the basis of the design process undertaken to date, the estimated volumes of construction materials/aggregates (rock and concrete) required in the construction of wind farm infrastructure are detailed at **Table 3.6** below.

Infrastructure ID	Rock/Stone sourced from On-Site Excavations (m^3)	Rock/Stone sourced from Local Supplier (m^3)	Concrete sourced from Local Supplier (m^3)	Tarmacadam/ Tar & Chips sourced from Local Supplier (m^3)
Wind Farm Site	56,000	10,000	4,550	10
Haul Route Upgrades	-	878	14	17

Table 3.6: Estimated Wind Farm Material (Aggregates) Volumes

3.5.3 Grid Connection Infrastructure

The *Wind Energy Development Guidelines for Planning Authorities 2006* state that:-

> *"it is not always possible due to reasons outside the applicants control to provide details of the grid connection and in these instances details of indicative and feasible options for grid connection lines and facilities should in general be adequate for a planning authority to consider a wind energy application as the precise capacity required for connection will not be known until planning permission is obtained."*

However, a High Court judgement of December 2014 (*O'Grianna & Ors v An Bord Pleanála*) determined that, for the purposes of EIA, a wind farm's grid connection cannot be separated from the balance of a project, and therefore the cumulative effect of both the wind farm and its grid connection must be assessed in order to comply with the EIA Directive. It should be noted that the *O'Grianna* case does not require that the project and its connection to the national grid be part of a single planning application, but assessed in a single EIAR. As described in **Section 3.4** above, in this case, the grid connection does not form part of the planning application and will be subject to a separate future consenting/licensing process.

The point of connection to the national grid will ultimately be decided by EirGrid or ESB Networks, as the independent electricity system operators with statutory competent responsibility. The precise means of connection will be dependent on a range of factors and at the discretion of the system operators.

However, as set out in **Chapter 2**, on the basis of detailed analysis including an assessment of the existing grid network and grid capacity; it is assessed that the existing Kilkenny 110kV electricity substation is the most likely point of connection to the national network. It is further assessed that the most likely method of connecting to the Kilkenny 110kV substation is through the construction of a 38kV substation at the proposed wind farm and the installation of c. 15km of 38kV underground electricity line ('UGL').

Therefore, the construction and operation of a 38kV electricity substation and associated UGL to the Kilkenny 110kV substation has been assessed throughout this EIAR; however, the final selected grid connection will be subject to a separate future planning application and EIAR, as required. Site location plans of the electricity substation and UGL are enclosed at **Annex 3.6**, with further details provided below.

3.5.3.1 Electricity Substation

The 38kV substation, to be located in the townland of Baunreagh, will comprise an electrical switchroom and electrical compound. The proposed substation (switchroom & compound) will extend to an area of c. 7,800m^2. The substation site is located in a relatively flat area of grassland and 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 equipment. As part of the design process, it is estimated that c. 1,300m^3 of material will be excavated to facilitate the construction of the electricity substation. Full details of excavated material volumes, and the management of same, are provided in the Spoil Management Plan enclosed at **Annex 3.4**.

The substation compound will be surfaced with free-draining crushed stone such that rainwater can percolate to ground. It is likely that rock, encountered during

excavations or extracted from the borrow pits, will be utilised during construction; however, topping material will also be imported from local quarries.

The boundaries of the proposed substation are largely surrounded by conifer plantation and existing mature hedgerows. While the substation site is not particularly prominent, it is likely that additional bolstering of existing hedgerows will be provided to further screen the substation from view.

The proposed substation will be connected to the proposed wind farm via underground electrical cabling, as described at **Section 3.4.6** above.

The electrical switchroom will comprise a single storey building, with a gross floor area of 158m^2, constructed of blockwork and finished in sand and cement render, slate roof covering and steel doors. The switchroom will contain electrical apparatus including switchgear, metering equipment, computers, and servers.

The switchroom will not require a dedicated water source due to infrequent use and the low volumes that will be required (toilet facilities and hand washing). Accordingly, the switchroom design will incorporate a rainwater harvesting system. Wastewater from the switchroom will be stored in a sealed tank and will be tankered off-site as required by a local licensed waste collector. Water supply and wastewater management proposals of this nature are common practice for wind farm developments.

Electrical equipment located within the substation compound will include connection points and associated equipment such as incoming and outgoing circuit breakers, earth fault protection devices, the grid transformer, and external lighting (cowled to prevent the illumination of hedgerows or third party lands).

The external electrical apparatus will also incorporate an energy storage system (ESS) which will store electricity generated by the wind farm which cannot immediately be exported to the national electricity grid. Such a scenario may arise, for example, during times of maintenance of the electricity substation or during times of reduced electricity demand on the national grid. The ESS will comprise approximately 300 no. energy storage modules containing battery technology; ancillary heating, ventilation and air conditioning units, and corresponding power conversion systems and transformers; and will be connected to the switchroom by underground electricity cables.

The energy storage modules, which contain the battery storage infrastructure/technology, will measure approximately 2.2m in height, c. 2.6m in length and c. 2.6m wide.

For safety and security reasons, the substation compound will be enclosed by a steel palisade fence of 2.6m in height.

The electricity substation will be accessed via the creation of a new site entrance, from the L7117 local road, and the construction of c. 220m of access track. The access track will be constructed as described above at **Section 3.4.4;** while visibility splays will be provided in accordance with Section 16.10.7 of the *Carlow County Development Plan 2022-2028*.

The layout of the electricity substation, including the positioning of electrical equipment within the substation compound, is illustrated at **Annex 3.7**. It is important to note that this layout has been designed fully in accordance with current ESB Network specifications; however, the Developer may be instructed by ESB Networks

to immaterially alter the precise siting and/or specification of control buildings and/or electrical equipment within the overall substation in a future planning application or during construction. Any such immaterial deviations have been fully assessed and provided for within this EIAR.

On the basis of the design process undertaken to date, the estimated volumes of construction materials/aggregates required in the construction of the electricity substation are detailed at **Table 3.7** below.

Infrastructure ID	Rock/Stone sourced from On-Site Excavations (m^3)	Rock/Stone sourced from Local Supplier (m^3)	Concrete sourced from Local Supplier (m^3)	Tarmacadam/ Tar & Chips sourced from Local Supplier (m^3)
Site Entrance & Access Track	360	120	-	-
Electricity Substation	-	500	105	-

Table 3.7: Estimated Grid Connection Works Material (Aggregates) Volumes

3.5.3.2 Underground Electrical Line

The proposed electricity substation will be connected to the Kilkenny 110kV substation via c. 15km of underground electricity lines (UGL). From the proposed substation, the UGL will be located within the proposed access track before accessing the L7117 local road and following the L5892, L5893, L1851, L6656, L6657, and R712 to the Kilkenny 110kV electricity substation. Due to the characteristics of the road network, the UGL will be located within the confines of the road carriageway and not within any roadside verge.

The UGL will be installed within ducting in excavated trenches of 1.2m deep and 0.6m wide. The UGL 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.

Plates 2 & 3: Typical Trench Construction

Joint bays, which will consist of precast concrete structures set into an excavated area and surrounded by appropriate fill, will measure 4.5m x 1.6m x 1.3m, and installed below finished ground level and reinstated in accordance with ESB Networks specifications and to the satisfaction of the planning authorities. Communication chambers are also required along the proposed route and will include an access cover to facilitate access should it be required.

Following the installation of the UGL ducts, joint bays, and communication chambers; ground levels will then be made up using appropriate material (including excavated material) and finished/reinstated to the requirements of the relevant planning authority (public road) or landowner (private lands). As part of the design of the project, the trench will be reinstated in accordance with ESB Networks specification and to the satisfaction of the respective planning authorities. Further, all local roads within which it is proposed to install the grid connection infrastructure will be subject to a full-carriageway reinstatement thus ensuring that there are no long-term effects on the public road network. Regarding the section of grid connection to be installed within the R712, which will be installed within the hard-shoulder, reinstatement will comprise full reinstatement of the hard-shoulder.

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 (subsoil, topsoil, and aggregates) for use during the reinstatement of the trench/joint

bays/communication chambers or disposal to an appropriate licensed facility as necessary.

The sequence of works is typically as follows:-

- Identify existing underground services prior to excavation;
- Excavate the trench to the required dimensions;
- 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.

Prior to the commencement of construction, 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 3 no. locations along the grid connection route. The HDD will be required to avoid trenching/excavations within bridging structures which traverse 2 no. unnamed local watercourses, and the Kilderry stream. Launch and receptor pits will be excavated at either side of the crossings to accommodate the drilling rig. The bore will be at a depth of 3m below the bridging structures to ensure that there are no impacts on the structural integrity and stability of the bridges. Following the reinstatement of the launch and receptor pits, the HDD activity will have no surface expression. 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 relevant planning authorities.

It is estimated that c. 12,500m^3 of material will be excavated to accommodate the grid connection infrastructure. Of this, it is estimated that 100m^3 of excavated material will be re-used while 11,500m^3 of backfill material (stone and concrete) will be imported from a local quarry (quarries). Full details of excavated material volumes, and the management of same, are provided in the Spoil Management Plan enclosed at **Annex 3.4**.

The estimated volumes of construction materials/aggregates required in the construction of the grid connection are detailed at **Table 3.8** below.

Infrastructure ID	Rock/Stone sourced from Wind Farm Borrow Pits (m^3)	Rock/Stone sourced from Local Supplier (m^3)	Concrete sourced from Local Supplier (m^3)	Tarmacadam/ Tar & Chips sourced from Local Supplier (m^3)
Grid Connection	-	6,250	5,250	1,250

Table 3.8: Estimated Grid Connection Material (Aggregates) Volumes

3.5.4 Tree Felling and Replanting

3.5.4.1 Tree Felling

While the majority of the wind farm is located within pastoral grassland, some infrastructure is proposed to be located within afforested lands. Therefore, it is proposed to permanently remove 15 hectares (ha) of commercial forestry in order to accommodate the construction of turbine foundations, access tracks, and other ancillary infrastructure; and to facilitate the physical operation of the wind turbines.

A felling plan has been prepared for the project and is enclosed at **Annex 3.8**. The felling plan illustrates the areas where forestry will be permanently felled to accommodate the physical infrastructure of the project and to ensure the appropriate protection of bat species present. Further details on the felling requirements for bats are provided at **Chapter 5**.

It should also be noted that, following the post-consent detailed design process and consultation with the turbine manufacturer/supplier, further felling may be required to ensure the efficient and effective operation of the wind turbines. The areas illustrated at **Annex 3.8** are, therefore, the minimum felling requirements and additional areas of forestry; surrounding turbines T1, T3, T4, T5, T6 and T7; may also be subsequently felled.

All felling works, including any felling additional to that illustrated at **Annex 3.8**, will be undertaken entirely in accordance with the mitigation measures, where relevant, as set out in this EIAR; and, therefore, it is assessed that any such additional felling will have no likely significant impacts on the substantive conclusions of this EIAR.

All tree 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 project.

Some minor felling of native tree species will also be required through the project site to accommodate the construction of access tracks.

3.5.4.2 Replanting

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 (i.e. the 15ha of forestry identified at **Annex 3.8**) must be replaced by replanting at an alternative site.

As part of the felling licence application process, it will be necessary for the Developer 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 regime.

For the purpose of this EIAR, the Developer has provisionally identified potential replacement lands at Drumagelvin, Co. Monaghan (illustrated as Option RP2 at **Annex 2.5**) which have been assessed throughout this EIAR, as relevant. While it is highly likely that the identified lands will be progressed through the felling licence consenting process, it is important to note that, subject to approval by the Forest Service, an alternative parcel of land may be selected in due course. Given, as described above, that the eventual replacement lands will be subject to an environmental assessment and technical approval process by the Forest Service as part of the forestry consenting regime, it is assessed that the selection of alternate replacement lands will not materially affect the substantive conclusions of this EIAR. It should also be noted that the forestry replant lands will comprise 15ha which is below the EIA threshold set out in the Forestry Regulations 2017[6].

The identified lands at Drumagelvin are located in rural Co. Monaghan; c. 3.5km east of Castleblayney. The lands comprise a network of small-to-medium sized fields which are predominately agricultural pasture. Access to the proposed replanting lands will be provided by existing agricultural site entrances which will be upgraded, as may be necessary. All works to site entrances will be completed to ensure compliance with the requirements of Table 15.5 of the *Monaghan County Development Plan 2019-2025* regarding the provision of vehicle visibility splays (sightlines).

The Developer can confirm that no felling will take place within the project site until such time as a felling licence has been obtained incorporating the technical approval and environmental assessment of the identified replacement lands to be afforested.

The replanting process, to be completed in accordance with the *Forestry Standards Manual* (Department of Agriculture, Food and the Marine; 2015), will follow best practice methods and will generally comprise the following:-

- Site Preparation & Installation of Drainage Infrastructure;
- Planting;
- Fencing: Installation of stockproof fencing (post-and-wire);
- Vegetation Control: Undertaken throughout the crop establishment period (generally 4-5 years);
- Replacement of Failures: Undertaken throughout the crop establishment period (generally 4-5 years); and,
- Monitoring: Undertaken throughout the crop establishment period (generally 4-5 years).

3.5.5 Landscaping

As described above, trees and hedgerows will be felled and removed to facilitate the physical footprint of the project. The extent of vegetation removal has, by design, been minimised and no vegetation will be unnecessarily removed. As part of the reinstatement process; all trees felled and hedgerow removed in the construction of wind farm infrastructure will be replaced elsewhere within the project site, particularly along arterial access tracks.

[6] S.I. No. 191 of 2017

The replacement of these trees and hedgerows will be conducted in accordance with the wider reinstatement and landscaping proposals for the site. The Ecological Clerk of Works (ECoW), to be appointed to monitor works during the construction phase, will select appropriate locations for the replacement of hedgerows and trees. The siting of this replacement vegetation will be carefully selected to maintain or enhance the ecological connectivity of the site which ensuring that adverse effects (particularly in relation to bats) do not arise as a consequence.

It is proposed that native hedgerow species; such as whitethorn, blackthorn and holly; will be selected for hedgerow replacement and will be supplemented with native woodland trees (where appropriate) including oak, alder, hazel, willow, and scots pine

3.5.6 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 a detailed 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)[7]. 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**.

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

A preliminary Surface Water Management Plan (SWMP) has been prepared for the construction phase of the project (enclosed at **Annex 3.4**, **Volume II**). This SWMP will be further developed prior to the commencement of development, following the post-consent detailed design process, and will incorporate the precise implementation and siting of surface water management infrastructure.

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 electrical switchroom to capture any runoff from roofed or paved areas and 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 project site.

3.6 Construction Phase

The construction phase is likely to last for approximately 15-18 months from commencement 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-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 times 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 and ancillary structures, 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 Method

The construction method will consist of the following general sequence:-

- Preliminary traffic management and surface water protection measures to be implemented;
- Upgrade works to the L7122, together with the creation of the adjacent site entrances, to be commenced and completed;
- Progressive installation of surface water protection measures;
- The construction of the site entrance, from the L3037, ensuring that requisite traffic visibility splays are provided;
- Establishment and continued management of borrow pits and spoil deposition areas;
- Progressive construction of internal on-site access tracks utilising material extracted from the on-site borrow pits and imported from local quarries;

- 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, tree felling will be completed and foundation excavations for the turbines will commence and foundations poured. The hardstanding areas will be constructed as track construction advances;
- 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 of spoil deposition areas, removal of turbine storage areas; erection of post-and-wire fencing around turbines, access tracks and at site entrances; erection of gates and vegetation at site entrances; and decommissioning of the temporary construction compound.

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 entrance (from the L7122) and access track;
- Site preparatory and groundworks associated with the substation compound footprint including control building;
- Construction of the control building;
- 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 building and within compound area;
- Installation of underground electricity line (including joint bays, communication chambers, and HDD works) between substation and Kilkenny 110kV electricity substation;
- Connection of underground electricity to the respective substations;
- Commissioning of electrical apparatus and underground electricity line; 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. A Planning-Stage CEMP has been prepared and is provided at **Annex 3.4**.

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), and Geotechnical Clerk of Works (GCoW), among others; who will liaise closely with the 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 project 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 borrow pits and spoil deposition areas;
- 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:
- 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 above, a total of 3 no. site entrances will be required to facilitate access to the proposed wind farm; comprising upgrades to 2 no. existing entrances and 1 no. newly constructed access point. site entrance to the proposed wind farm and substation.

Following the delivery of turbine components, the scale of the wind farm site entrances will be reduced but will be reinstated such that they remain 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 entrances

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 visibility splays are maintained during the operational phase.

As described at **Section 3.5.1.3**; 2 no. temporary entrances will be constructed, and accompanied by c. 150m of access track, to facilitate the navigation of the junction of the N78 and L1834. Visibility splays will be provided in accordance with Section 13.22.1 of the *Kilkenny City & County Development Plan 2021-2027*; with sightlines of 215m being provided at the access point which interfaces with the N78 and 90m for the entrance which interfaces with the L1834. These sight entrances will be utilised solely for the delivery of turbine components to the proposed wind farm site and, following the delivery of components all transportation vehicles will utilise the public road network[8]. Following the completion of all turbine component deliveries, the temporary site entrances and access track will be reinstated to their pre-existing condition, including the replanting of all removed hedgerows.

A further 1 no. site entrance will be required to accommodate access to the electricity substation. This site entrance will not be required to accommodate abnormal sized vehicles and will, therefore, be constructed to standard specifications. This entrance will be utilised throughout the lifetime of the substation and will be secured with post-and-wire fencing and gated to prevent unauthorised access. Any hedgerow removed will be replanted to allow for future growth while ensuring, at all times, that visibility splays are maintained

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:-

- Topsoil and subsoil will be removed and stored in separate mounds in appropriate areas adjacent to the crane site/access tracks;
- Rock/stone will be laid on a geo-textile mat (where required) and compacted in layers to an appropriate depth. The sub-layers of the hardstanding areas and access tracks will be constructed of rock/stone excavated from the on-site borrow pits, with the upper layer comprising capping material imported from a local quarry (quarries). All such areas of hardstanding will be permeable to avoid significant volumes of surface water run-off;
- Where access tracks are required to cross drainage ditches, these will be piped or 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. 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

[8] As stated at **Section 3.5.1.3**, turbine component transportation vehicles will not utilise the temporary site entrances and access track on their return journey from the wind farm.

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 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. As part of the design process, a 50m buffer has been 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 area.

3.6.6 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 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.

3.6.7 Construction Employment

It is estimated that up to 100 no. people will be employed during the 12-18 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.

3.6.8 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.

Effects 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 authorities. 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.

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 (e.g. along the UGL route) ;
- Construction traffic management – one way systems where possible and strictly enforced speed limits;
- Provision of a designated person to manage access arrangements and act as a point of contact to the public; and,
- All temporary road alterations and public road upgrades to be carried out in full consultation with the Planning Authority.

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.

3.7 Operational Phase

The proposed operational phase of the development is 35-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 will continue as normal. On average, the project will be serviced on 1-2 no. occasions 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 at 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 proposed operational phase of the development is 35-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.

Any further operation beyond 35-years would be subject to a further planning application and EIA. In its scope, this EIAR assumes full decommissioning of the project will take place after 35-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 landowners for agricultural purposes.

A Decommissioning Management Plan will be agreed with the Planning 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.

The turbine blades are constructed of fibreglass which is not readily re-used or recyclable. Due to the large number of turbine blades currently being decommissioned globally, extensive research[9] is being undertaken to find an alternative use for the fibreglass. There are a number of emerging innovations for fibreglass recycling including the re-purposing of fibreglass for other civil engineering

[9] Re-Wind and SusWIND.

projects (e.g. as a component in concrete production, roofs for social housing and incorporation to the construction of electrical powerline masts/structures.) Given the extensive research being undertaken to find a means of recycling decommissioned wind turbine blades, this EIAR assumes that, at the proposed date of decommissioning, all blades will be fully re-purposed and that no disposal, to landfill, will be required.

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 0.5m 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, 200-300mm 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 recycled.

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 Electrical Substation & Grid Connection

The electricity substation and grid connection will, once operational, be 'taken-in-charge' by ESB Networks, who will operate and maintain the infrastructure as part of the national electricity network. As a result, the substation and grid connection do not have a specified operational period and may continue to be operated following the decommissioning of the proposed wind farm (i.e. after its 35-year operational period). However, for the purposes of this EIAR, full decommissioning of the substation and grid

connection have been assumed.

The decommissioning of the substation will involve the strip-out and removal of steel, conductors, switches, transformer and other materials and equipment that can be reconditioned and reused or sold as scrap. A soft strip of the building shall ensure that all fixtures and fittings are removed prior to demolition.

Demolition of the building shall take place using conventional methods. Foundations and building services shall be grubbed up to a depth of 1m below ground level. The demolition waste shall comprise mainly rubble (bricks, block, broken concrete, plaster etc.) and timber. Rubble can be processed to provide an aggregate material to be used elsewhere in construction projects. Alternatively, it could be used on site as fill elsewhere on the subject site.

Timber and other waste shall be segregated according to material type with a view to recycling where possible or disposal. All demolition materials which cannot be reused on site shall be removed off site to a licensed waste handling facility for recycling or disposal. Excavations shall be backfilled with suitable material, soiled over and seeded out.

Decommissioning of the grid connection will involve the removal of the underground cabling. The majority of cables used in wind farm grid connections contain a core of either copper or aluminium, both of which can be recycled. All cables will be removed to an appropriate licensed facility for recycling; while the ducting will remain *in situ* to avoid the requirement for further excavations.

3.8.6 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 Planning Authority.