2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This chapter of the EIAR provides a description of all elements of the proposed Moanmore Lower Wind Farm (The Development). This includes all elements within the Redline Boundary, the wind turbines, an Electrical Substation, site access tracks, Turbine Hardstands and all site infrastructure, the Grid Connection Route (GCR) and Turbine Delivery Route (TDR) works. This chapter also provides a description of the temporary accommodation requirements required along the TDR which are outside the Redline Boundary and which together with the works *within* the Redline Boundary are defined as the Project which form the basis of the assessments presented within Chapters 3 and 5 to 14. This chapter provides details of the construction, operational and decommissioning phases of the Project.

This Chapter includes an overview of the Project followed by a detailed description of the main components and their methods of construction. Measures that have been built into the design of the Project to reduce effects (also known as 'Embedded Mitigation'), are set out in the various technical chapters, and in this chapter. In addition to these Embedded Mitigation measures, chapters 5 to 14 also present mitigation and enhancement measures where specifically relevant to their assessment topic.

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

- Construction Environmental Management Plan (CEMP) in **Appendix 2.1**
- A Grid Route Assessment report and accompanying drawings prepared by BFA Consulting in **Appendix 2.2**; and
- Moanmore Lower Wind Farm Grid Technical Report prepared by Mullan Grid Consulting in **Appendix 2.3**

Common acronyms used throughout this EIAR can be found in **Appendix 1.4**.

2.2 PROJECT DESCRIPTION

The Development will include the following main components:

- Erection of 3 no. wind turbines with an overall ground to blade tip height of 150m, with a rotor diameter of 136m and a hub height of 82m and a total generating capacity of 15MW,
- Construction of turbine hardstand areas and turbine foundations,

- Construction of new internal site access tracks and upgrade of existing site track, to include all associated site drainage,
- Construction of 1. no new site entrance along the turbine delivery route with access onto the adjoining local road network (L6132),
- Construction of 1 no. temporary construction compound with associated temporary site offices, parking areas and security fencing,
- Development of a site drainage network,
- Construction of 1 no. 38kV electrical substation with all associated electrical plant and equipment, security fencing, lightening protection, security cameras and gates, and all ancillary structures and works,
- 1 no. permanent spoil storage area,
- All wind farm internal cabling connecting the wind turbines to the electrical substation,
- All works associated with the permanent connection of the wind farm to the national electricity grid comprising a 38kV underground cable in permanent cable ducts from the proposed, permanent, on-site substation and to the existing Tullabrack 110kV ESBN Substation,
- 2 no. flood compensation areas,
- Vertical realignment of an existing crest curve on the L6132 local road in order to prevent grounding of abnormal load vehicles during delivery of turbine components,
- Ancillary forestry felling to facilitate construction and operation of the development,
- Construction of a blade transfer area off the L6132,
- Provision of 2 no. biodiversity enhancement areas,
- Upgrade of an existing site entrance onto the adjoining local road network (L2034) including the demolition of an existing wall and removal of hedgerow at the site entrance to facilitate abnormal load vehicles during delivery of turbine components and reconstruction of same wall and replanting of hedgerow,
- Landscaping and all associated ancillary works.

A 10-year planning permission and 40-year operational life from the date of commissioning of the entire wind farm is being sought. However, part of the substation and all of the grid connection will be handed over to ESB networks to own and operate. As part of the national grid infrastructure, their life can extend beyond the life of the wind farm. Accordingly, permission is sought for the grid connection and substation in perpetuity.

The EIAR assesses the Project which includes the Development as outlined above; it includes improvements and temporary accommodation requirements to the existing public

road infrastructure to facilitate delivery of abnormal loads and turbine delivery. The red-line boundary and all works assessed as part of the Project are shown on **Figure 1.2a** and **1.2b**.

2.3 SITE LOCATION AND ENVIRONS

2.3.1 Introduction / Existing Land Use

The wind farm Site, as shown in **Figure 1.1**, is located in south-west county Clare, 3km northwest of the town of Kilrush and 6.8km southwest of Cooraclare village. The wind farm Site is located within the townland Moanmore Lower. It is located within an area comprised of agricultural livestock grazing farmland, bog, and scrub land. The wind farm Site is 26.84Ha.

The permanent spoil storage area is located east of the wind farm Site along the L2034 and is 4.04Ha. It is situated within the townland of Moanmore South and is comprised of agricultural livestock grazing farmland.

The townlands through which the proposed Grid Connection will transect include the townlands of Moanmore Lower, Moanmore South, and Tullabrack.

Vertical realignment works will be undertaken on a small section of the L6132 (0.028ha). These works are located in the townland of Gower South.

Construction of new site entrance with access onto the adjoining local road network (L6132) and the Blade Transfer Area are located in the townland of Tullabrack East and the Blade Transfer Area site is (3.85ha).

Temporary works will be required at intervals on the L2036 to accommodate the delivery of the turbine components and HGV vehicles. These temporary accommodation requirements are included as part of this application and are located in the townlands of Moanmore South, Tullabrack and Tullabrack West.

The Redline Boundary extends to approximately 36.77ha. The general area is comprised of agricultural grassland used for livestock grazing and cutover peatland and is in the ownership of 4 local landowners.

There are 183 receptors within a 2km radius of the proposed turbines which includes 181 houses, comprising one off houses and farm holdings, 1 No. school and an old cottage which has been converted to a tack-room. All receptors located within 2km of the proposed

turbines are shown in **Figure 1.3**. A minimum separation distance of 609m from all occupied sensitive receptors has been achieved with the Project design. The closest inhabited dwellings are (H2 and H3) located 609m from the nearest turbine. There is one property (H1) located less than 600m from the proposed turbines. H1 is an old cottage that is being used as a tack-room and is not considered a sensitive receptor in this EIAR.

2.3.2 Removal of Forestry and Replant Lands

The Development contains 3.065 ha of commercial forestry. Tree felling in the townland of Tullabrack East will be required as part of the Development. To facilitate the construction of the Blade Transfer Area, 0.845 ha of coniferous forestry will need to be permanently clearfelled. The felling area proposed is the minimum necessary to construct the Development (2.22ha of coniferous forestry will not be felled) and to comply with any environmental mitigation.

To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will take account of scoping response as provided by Department of Agriculture, Food and the Marine in August 2024 and follow the specifications set out in:

- Forest Service's (Department of the Marine and Natural Resources) Forestry and Water Quality Guidelines (2000)
  - Buffer Zone Guidelines
  - Ground Preparation and Drainage
  - Roads
  - Harvesting
- Forest Service's (Department of the Marine and Natural Resources) Forest Harvesting and the Environmental Guidelines (2000)
  - Harvesting
  - Roading

In this regard, before any felling works commence on site all personnel, particularly machine operators, will be made aware of the following and will have copies of relevant documentation, including:

- The felling plan, surface water management, construction environmental management plan (CEMP), emergency plans and any contingency plans (Please see **Appendix 2.1** and **Appendix 15.1**);
- Environmental issues relating to the site;
- The outer perimeter of all buffer and exclusion zones;

- All health & safety issues relating to the site.

The following specifications, which have been developed by the Forest Service (Department of Agriculture, Food and the Marine (DAFM)) will be followed during the construction of tracks, including the creation of buffer zones and roadside drainage: Forest Protection Guidelines (Forest Service - Department of Marine and Natural Resources)

  - Protecting against future threats – pests and diseases
- Forestry and Water Quality Guidelines (Forest Service - Department of Communications, Marine and Natural Resources)
  - Buffer Zone Guidelines
  - Ground Preparation and Drainage
  - Roads
  - Harvesting
- Forest Harvesting and Environmental Guidelines (Forest Service - Department of Marine and Natural Resources)
  - Harvesting
  - Roading
- Forestry and Freshwater Pearl Mussel Requirements - Site Assessment and Mitigation Measures
- Forest Biodiversity Guidelines
- Forestry and The Landscape Guidelines
- Forestry and Archaeology Guidelines

This forestry to be felled is mostly consisting of Sitka Spruce and the felling is expected to take up to 1 month.

Detailed consideration of the approach to afforestation requirements associated with the Project is included in **Appendix 15.2: Forestry Report,** including consideration of responses received from Department of Agriculture, Food and the Marine August 2024. The permanent clearfelling of trees in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clearfelled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. In light of the foregoing and for the purposes of this Project, the location of any replanting (alternative afforestation) associated with the project will be outside any potential hydrological pathways of connectivity i.e., outside the catchments within which the proposed project is located and also at a distance so as to not

create any potential cumulative effects. On this basis it is reasonable to conclude that there will be no direct, indirect or in-combination effects associated with the afforested lands. The developer commits to not commencing the project until both felling and afforestation licenses are in place and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority."

2.3.3 Wind Farms in the Area (Cumulative)

There are 16 operational, consented, and proposed wind farms for which planning applications are already submitted for determination, within 20km of the Site. **Figure 2.1** shows the location of proposed (relevant projects that have been submitted for pre-application or planning approval), permitted and operational wind farms within a 20km radius of the proposed turbines and **Table 2.1** below provides further information on these wind farms. The nearest operational wind farm is Moanmore wind farm which is located approximately 1.7 km to the northeast of the Site.

Sceirde Rocks offshore wind farm submitted a planning application to An Bord Pleanála in January 2025 (Planning Ref 321697). Although the proposed wind turbines are located over 100km north-west of the Development a section (934m) of their proposed onshore grid connection along the L2034 going to Moneypoint substation is located within the Red-Line Boundary of the proposed Development. The Sceirde Rocks application has been considered in the cumulative assessment throughout this EIAR.

Table 2.1: Wind Farms within 20km of the Proposed Turbines

Ballykett	Proposed	4	c. 0.96km	Northeast
Moanmore	Operational	7	c. 1.7km	Northeast
Tullabrack	Operational	6	c. 2.16km	East
Moneypoint	Operational	5	c. 7.36km	South
Leanamore	Operational	9	c. 12.71km	Southeast
Curraghgerrig	Operational	2	c. 12.74m	Southwest
Beale Hill	Operational	6	c. 12.97km	Southwest
Tullahennel South	Operational	9	c. 14.08km	South
Carrownaweelaun	Operational	2	c. 14.12km	West
Lahra	Operational	2	c. 14.22km	South
Tullahennel North	Operational	2	c. 14.28km	South

Crossmore	Under Construction	7	c. 15.19km	East
Cahermurphy	Operational	3	c. 15.64km	Northeast
Kiltumper	Operational	2	c. 15.96km	Northeast
Shronowen	Proposed	12	c. 16.46km	South
Glenmore	Operational	6	c. 18.31km	Northeast

2.3.4 Other Developments (Cumulative)

The only other developments with potential for cumulative effects with the proposed development within 10km are the developments or proposed developments listed below in **Table 2.2**. The 10km radius distance search area selected for other development, other than wind farms, is considered to be reasonable for cumulative impact assessment for EIAR and consistent with the EPA "Guidelines on the information to be contained in environmental impact assessment reports" (2022).

Table 2.2: Other Major Developments or Proposed Developments (bigger than a one off house) within 10km of the Proposed Site.

Other Developments	Status	Planning Reference	Decision Due Date	Approximate Distance to the Site Boundary	Direction from the Development
Construction of Ballroom/Function Room building	Permission	18930	10/10/2019	8.7km	North
Development of a livestock slatted unit, manure pit, horse stables with fenced sand arena, and associated site works	Permission	19775	20/06/2020	3.4km	Southwest
Development of a Sewerage scheme at Skagh Point, Kilrush, Co Clare.	Permission	21203	02/05/2021	3.1km	South
Extend existing graveyard and associated works	Permission	17157	11/05/2017	2.7km	South
New wastewater treatment plant and associated works	Permission	19643	02/10/2019	3.1km	South
Development of two water storage tanks above ground level and an underground pump chamber located	Permission	17809	14/12/2017	8.2m	Southeast

Other Developments	Status	Planning Reference	Decision Due Date	Approximate Distance to the Site Boundary	Direction from the Development
within the Moneypoint generating station complex					
Develop a 9-hole pitch and putt course, reception hut and car parking facilities along with all associated works	Permission	19380	15/09/2019	2.9km	Southwest
Construct a new external refrigeration plant area enclosure	Permission	20506	17/09/2020	2.8km	Southwest
To convert and extend existing Convent structures, to include 30 No apartments, to demolish part of existing outbuilding, to construct 20 No semi-detached dwellings, service road, new entrance and to upgrade/ extend existing ancillary services. The Convent is a protected structure (RPS 861) and associated works	Permission	21239	11/11/2021	2.7km	Southwest
Moanmore Solar PV Energy development	Permission	18679	18/10/2018	1.0km	North/ Northwest
Development coastal erosion management	Permission	161012	21/12/2017	10.1km	North
Construct a cubicle house for cows, extend the existing shed by one bay, construct 2 underground slurry tanks, construct a new milking complex with adjoining drafting system and calf facility. And demolish old store and section of existing parlour to facilitate construction of new milking complex	Permission	20120	12/10/2022	9.8km	Northeast
Construct a new 120m long covered 4 lane sprint track and a new storage shed along with all associated site works	Permission	17107	12/10/2022	9.8km	Northeast
Construct agricultural slatted unit, plus machinery/storage shed, silage	Permission	2030	24/03/2020	10.6km	East/ Southeast

Other Developments	Status	Planning Reference	Decision Due Date	Approximate Distance to the Site Boundary	Direction from the Development
slab, concrete yard plus all ancillary site works					

2.3.5 Land Ownership

The Site is located on lands under the ownership of third-party private landowners who have consented to the application and the Development. In accordance with the requirements of Article 22 of the Planning and Development Regulations 2001 as amended, the written consent of the landowners will be submitted with the planning application.

2.4 WIND RESOURCE

Due to the location in west Clare, and the local elevation, the proposed wind farm Site area experiences high average annual wind speeds. The Irish Wind Atlas produced by the Sustainable Energy Authority of Ireland (SEAI) shows average wind speeds for the country and it shows that wind speeds on the Site (6.3m/sec at 30m, 7.8m/sec at 75m, 8.3m/sec at 100m and 9.1m/sec at 150m) are consistent with a wind farm development being viable at this location.

2.5 SITE INFRASTRUCTURE AND CONSTRUCTION

2.5.1 Proposed Layout Design

The layout of the Development has been designed to minimise the potential environmental effects of the wind farm while utilising the maximum energy yield from the Site's wind resource. The layout design was informed by the following constraints and buffers:

- distance to watercourses of at least 50m;
- distance to land drains of at least 20m;
- distance to archaeological monuments and structures of at least 100m;
- distance from turbines to inhabited houses of at least 600m;
- avoidance of wind turbine rotor blade oversail over 3rd party lands;
- avoidance of existing telecommunications infrastructure;
- avoidance of sensitive habitats e.g., blanket bog.
- Avoidance of Annex 1 habitats or Annex 2 species.

The overall layout of the Site is shown in **Figure 1.2a** and **1.2b**. This figure shows the locations of the wind turbines and associated hardstanding areas, Electrical Substation,

Temporary Construction Compound, internal access tracks and the site entrance. The ITM coordinates of the wind turbines are listed in **Table 2.3**.

Table 2.3: Turbine ITM Coordinates

Turbine No.	ITM Easting (m)	ITM Northing (m)
T1	497742	658147
T2	497347	657950
T3	497795	657771

2.5.2 Wind Turbine Generator

The proposed turbines will be of typical design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will be 150m.

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

Each turbine will have a generator with a maximum capacity of 5MW giving an overall capacity up to 15MW.

The applicant is seeking consent for a turbine with a blade tip height of 150m, rotor diameter of 136m and a hub height of 82m. A schematic drawing of the candidate turbine is shown on **Drawing 6778-JOD-MM-XX-0403**.

For the purposes of the assessments, the dimensions of the candidate turbine is presented in **Table 2.4**.

Table 2.4: Turbine Parameters

Turbine Parameter	Dimensions
Turbine Blade Tip Height	150m
Rotor Diameter	136m
Hub Height	82m

2.5.3 Turbine Foundation and Turbine Hardstands

All turbine suppliers have a requirement for a Turbine Hardstand area to be constructed beside each turbine. The general layout of the Turbine Hardstand is designed to accommodate the delivery, laydown, and assembly of turbine components (in particular rotor assembly) prior to turbine lifting and assembly and is shown on **Drawing No. 6778-JOD-MM-XX-DR-C-0401**. The Turbine Hardstands are needed to support the cranes during turbine construction, the operational and maintenance phase, and for decommissioning. The Turbine Hardstands will be constructed in advance of the Turbine Foundation and will be used to facilitate foundation construction, such as steel reinforcement delivery and pouring of concrete.

Construction of the turbine hardstands will require the excavation of overburden material to the area and depth noted below, the laying of a geotextile material on the formation surface and placing engineered stone and a top dressing. Each Turbine Hardstand will have a surface area of 4,907m^2. The main permanent Turbine Hardstand will be 2,110m^2 and will be a maximum of 0.5m in depth depending on the local bedrock profile and the varying soil depth. The temporary secondary crane hardstand will be 430m^2, 0.5m in depth and the temporary set-down will be 2,367m^2 and 0.5m in depth.

The Turbine Foundations will be 25.8m in diameter and have a depth of 3.5m at their centre. The central part of the foundation will be raised from the main Turbine Foundation below ground level and will encompass cast-in bolts to connect to the bottom of the turbine tower and reinforced bar structural elements.

As T1 and associated hardstanding is located within flood zones A and B the top of the plinth of the foundation for T1 will be 9.6mOD flood height as detailed in **Appendix 9.7 Flood Risk Assessment**.

The volume of concrete and steel required for each Turbine Foundation will be 650m³ and 50 tonnes respectively. The area around and above the Turbine Foundation will be backfilled with compacted granular material and the only portion exposed in the long term will be the central foundation section.

There will be a maximum of 38,465m³ of rock required during the construction phase as detailed in **Chapter 16 Traffic and Transport**.

Material imported to site will be sourced from a local quarry(s), such as one of those identified in **Table 2.5** below.

Table 2.5: Local Quarries and Concrete Suppliers

Quarry	ITM (Easting)	ITM (Northing)	Distance (km)	Direction	Comments
Rock Aggregates					
Tullagower Quarry	501156	657438	2.8	SE	Sandstone, flagstone, stone paving and slab extraction.
Derrynalecka Quarry	513400	657028	15.0	E	Aggregates for concrete, hardcore, farm drainage, earthworks/fill. Coal stone, sandstone
Glenmore Quarry	514193	669493	19.5	NE	N/A
Hehir Quarry	518484	671278	24.1	NE	Natural gravel, pencil gravel fine and coarse. Drainage/hardcore/fill, road-making (farm roadways, tracks, etc.), forest roads.
Letterkelly Quarry	512110	678581	24.5	NE	(Shale) Gravel, stone, pencil gravel, earth
Liscormick Quarry	524882	659265	26.5	E	Green stone or shale, used for roads and fill
Nagle Stone Quarry	503427	6905554	32.4	N	Flagstone, unsawn, stone paving. Liscannor flagstone. Farm/forest road foundations, earthworks/fill
Luogh and Lisacannor Stone Company Ltd. Luogh Quarry	505317	693594	35.8	N	Sandstone, limestone, greenstone

Quarry	ITM (Easting)	ITM (Northing)	Distance (km)	Direction	Comments
Ryans Quarry (Roadstone Ltd.)	530275	683853	40.9	NE	Aggregates for concrete, hardcore, farm drainage, earthworks/fill (Limestone)
Bunratty Quarry (Roadstone Ltd.)	544215	661536	45.9	E	Aggregates for concrete, hardcore farm drainage, earthworks/fill (Limestone)
Bobby O'Connell and Sons Ltd. Ballycar Quary	556239	664430	58.1	E	Aggregates for concrete, hardcore, farm drainage, earthworks/fill
Esker Readymix, Athenry	554489	726233	88.5	NE	Concrete
McGraths Quarry	514093	756055	98.0	NE	Concrete, limestone rock and aggregates

Based on the results of peat probing and geotechnical assessments to date, peat depths are not deep enough to require piling for Turbine Hardstands. Therefore, the construction method for all the turbine hardstands will be via the excavated approach.

The feasible construction methodologies have been set out and assessed below and in this EIAR, in order to avoid a further planning application being required. Turbine Foundations will need to be taken down to competent bearing strata by excavating through the peat / soil, subsoil and rock if necessary.

A method of construction for gravity turbine foundation is described as follows:

- Set out Turbine Foundations and required finish levels etc.
- Construct formation and/or supporting structures e.g. rock upfill.
- Construct drainage as required.
- Provide a minimum of 100mm concrete blinding.
- Place bottom mat of steel reinforcing.
- Place free issue turbine base insert or anchor cage.
- Fix cable ducting and foundation earthing.
- Complete reinforcing steel.
- Fix shuttering to base sidewalls.
- Fix ducts and earthing wires between insert and walls of base.
- Carry out any corrective works as directed by engineer.

- Check weather conditions and schedule concrete deliveries.
- Place concrete and take quality control slumps and cubes.
- Concrete surface finishing.
- Apply curing and protection of concrete.
- Strip formwork.
- Placing of any earthing wires around and over the base.
- Backfill base sides and place overburden.
- Confirm that cube results are satisfactory.
- Grout the top flange.

A method of construction for rock anchor turbine foundation is described as follows:

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

2.5.4 Access to the Site

The Site access will be from an existing entrance on the L2034 road. The existing site entrance will be upgraded to allow abnormal load turbine delivery vehicles to safely access and exit the wind farm Site as well as achieve the required sightlines. This entrance will be used for delivery of both turbine components and building materials such as rock and concrete. The location of the site entrance is shown on **Figure 2.2**.

It is proposed that the turbine nacelles, towers, hubs and rotor blades will be landed at the port of Foynes Co. Limerick. West of Limerick City loads (except for nacelles and lower tower sections) will continue on the N18/M18 northbound before turning left to join the N85 westbound. Loads for nacelles and lower tower sections will continue on the R510 and onto the R527 and continue to the R445 at the Coonagh Roundabout and then onto the N18. This is due to height restrictions in the Limerick Tunnel under the River Shannon.

To facilitate the delivery of turbine components through Tullabrack Cross a Blade Transfer Area will be constructed in the Townland of Tullabrack East along the L6132. Here the turbine components will be transferred to a blade lifter. The current preferred route is from the L6132 onto the Tullabrack Cross at the R483. From here, it will be transported along the L2036 local road linking Tullabrack Cross to the L2034 and on to the Site.

Road widening and strengthening has previously been carried out on the local road network in order to facilitate the transportation of turbine components to other wind farm sites in the vicinity. All other traffic, including civil works related construction traffic and personnel vehicles will follow the construction haul route shown in **Chapter 16 Traffic and Transport (**Figure 16.4) to access the Site.

The delivery of the turbines will require co-ordination with a number of statutory bodies including Clare County Council, and An Garda Síochána. An agreed programme of work will be established in the Traffic Management Plan which will be prepared by the Contractor ahead of any construction work commencing on the wind farm Site. The proposed Turbine Delivery Route is shown on **Figure 2.3**.

A wall (5.9m in length) and hedgerow (25m) will be removed at the Site entrance to facilitate the delivery of abnormal loads. The wall will be reconstructed, and the hedgerow replanted following the delivery of abnormal loads.

2.5.5 Turbine Delivery Route Works

Road widening and verge strengthening, of the L6132 along its length up to the junction with the N68 road at Derreen cross is required to facilitate the delivery of turbine components using abnormal load vehicles. Vertical realignment of crest curve on a small section of the L6132 (0.028ha) in the townland of Gower South will be required to prevent abnormal load vehicles from grounding.

Road widening along the L2036 between Tullabrack Cross and the junction with the L2034 will be carried out to accommodate increased volumes of HGV vehicles associated with the construction of the wind farm. There will be a small section of widening works on a section of the L2034 close to the junction with the L2036 to facilitate the delivery of turbine components and shown on Drawing No. 6778-JOD-MNWF-XX-DR-C-HR-0250, Appendix 16.4.

The road widening and verge strengthening are temporary accommodation requirements. The verge will be reinstated by removing approximately 150mm of granular material from widened sections and replaced with topsoil.

The verge strengthening and widening of the L6132 and the widening of the L2036 and L2034 will be carried out in the existing road verge to increase the running width of the L6132, the L2036 and the L2034 local roads to 4.5m (and 5.5m at passing locations). It will be constructed to withstand wheel loading from abnormal load vehicles delivering turbine components to the wind farm site. The works will involve excavating a trench in the verge, placing geotextile and geogrid at the base of the trench and backfilling the trench with granular material compacted in layers.

There are three watercourse crossings along the L6132 as shown on Drawing No. 6778-JOD-MNWF-XX-DR-C-HR-0250 Appendix 16.4. At these three locations, steel plates will be placed on the verge for 10m each side of watercourse crossings to avoid excavation and disturbance of the existing ground. Upon completion of the wind farm construction, the L6132 verge will be reinstated by removing approximately 150mm of granular material from widened sections and replaced with topsoil, steel plates will also be removed from the verge at this stage.

Vertical realignment of the L6132 will be required at one location between the N68 and the wind farm site entrance. Realignment works will involve reducing the road level by approximately 150mm at an existing crest curve to reprofile the road for abnormal sized

vehicles, maintain axle loading and prevent grounding. Realignment works will be carried out in the existing road boundary with surfacing to match the existing L6132. Realignment works at this location will remain in-situ following the construction of the wind farm therefore will bepermanent and are included within the redlined boundary for the proposed Project.
A Blade Transfer Area including access track (160m) and blade set-down area (3,820m^2) will be constructed to allow turbine components to be transferred to a blade handler to allow the turbine blades to pass through Tullabrack Cross. Forestry removal (0.85ha) as discussed in **Section 2.3.2** will be required to facilitate construction of the Blade Transfer Area. To facilitate the construction of the site entrance to the Blade Transfer Area the removal of a section of hedgerow of approximately 70 m in length will be required. This hedge adjoins conifer plantation and is no longer managed as a field boundary.

All works along the TDR are assessed in **Chapter 16: Traffic and Transport** and shown on drawings attached as **Appendix 16.1**.

2.5.6 Construction Haul Route Works

Road widening along the L2036 between Tullabrack Cross and the junction with the L2034 will be carried out to accommodate the increased volumes of HGV vehicles associated with the construction phase of the wind farm. The road widening and verge strengthening are temporary accommodation requirements.

Road widening works will be carried out in the existing road verge to increase the running width of the L6132 local road to 4.5m and 5.5m at passing locations. The road widening will be constructed to withstand wheel loading from HGV delivery vehicles. The works will involve excavating a trench in the verge, placing geotextile and geogrid at the base of the trench and backfilling the trench with granular material compacted in layers. These will be removed and the area reinstated following the completion of the works.

All works along the Construction Haul Route are assessed in **Chapter 16: Traffic and Transport** and shown on drawings attached as **Appendix 16.1**.

2.5.7 Site Access Tracks

The Site access tracks are necessary to allow access for cranes and delivery trucks during construction of the Development. Also, they will be used during any potential servicing/repairs to the wind turbines during the operational lifespan of the Development. A new entrance will be created on the L2034 road.

The Site access tracks will be upgraded and constructed so that the width will be 4.5m but will be wider at passing locations where a width of 5.5m is to be provided. The Development area is relatively flat in nature and maximum gradient on the Site will not exceed 5%. A stone layer will be provided to provide a good grip during wet weather on any inclines. Approximately 420m of the existing site access track length will be used for the Development. Site access tracks are shown on **Figure 1.2a**. The upgraded Site access tracks will be approximately 1,890m^2 in surface area.

The site access track layout follows the existing access track into the Site as far as possible and follows the natural contours of the land, avoiding local environmental constraints. Every effort has been made to minimise the length of additional Site access tracks.

The existing Site access tracks will be upgraded to carry a minimum 12 tonne axle construction loading. The design will consist of 150mm of 50mm Down Quarried Rock / Gravel Pavement on an average of 400mm Down Crushed Run Rock. The proposed Site access track construction detail is shown on **Drawing No. 6788-JOD-MM-XX-DR-C-0301-0302.**

There will also be 1,625m of new Site access tracks required for the Development. These will be constructed to provide a width of 4.5m and will cover an area of 7,315 m^2 and require c. 3,390m^3 of stone. New Site access track will be excavated to firm bearing strata and constructed using stone imported to Site from a nearby quarry outlined in **Table 2.5** and shown in **Chapter 16: Traffic and Trasport - Figure 16.5**, The new Site access tracks across the remainder of the Site will be of a floating road construction type. Site access tracks across peat greater than 1m deep will be floated using layers of geosynthetic materials and aggregates. Site access tracks on peat less than 1m deep will generally be constructed using traditional cut and fill methodology. Stone won from the Turbine Foundation excavation areas, flood compensation areas or imported to Site from a nearby quarry will be utilised for the construction of floating roads.

The surface of the Site access tracks will have to be maintained during the construction phase. All imported stone to the Site will have undergone appropriate quality testing to Transport Infrastructure Ireland (TII) specifications.

Mitigation measures outlined in **Chapter 9: Hydrology and Hydrogeology - Section 9.7** and the **CEMP Appendix 2.1** will be implemented on site to prevent sediment and hydrocarbon release to the environment and potentially impacting water quality. There will

be no change in hydrology regime, and no impact on the peatland hydrology as outlined in Chapter 6: Biodiversity and **Chapter 9: Hydrology and Hydrogeology.**

2.5.8 Electrical Substation, Control Building and Associated Compound

It is proposed to construct an Electricity Substation on the Site, as shown on **Figure 1.2a**. This will provide a connection point between the proposed wind farm and the existing grid connection at Tullabrack 110kV substation.

The Electrical substation will serve two main functions:

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

The construction of the substation and related electrical components will comply with ESBN specifications. The area of the substation compound will be approximately 1,650m^2 and the foundation will be up to 0.45m in depth and will be constructed from engineered stone material, using similar construction techniques as for the Turbine Hardstands. The overall compound will be enclosed by a 2.65m high fence and will contain one building, ancillary equipment, including the transformer, switchgear, fault protection, metering, car parking and other ancillary elements necessary for the operation of the Project.

The control building will be a single story pitched roof structure with traditional rendered finishes and measure approximately 17.49m x 7.33m with a floor area of approximately 128m^2. Details of the substation building are shown on **Drawings 6778-JOD-MM-XX0701-0702**. The appearance and finish of the substation building will be similar to an agricultural building with a slated roof and nap plaster finish. It will have a footpath around it, and an adjacent parking area. The final finish of the control building will be an off-white or grey colour.

There will be two lightning monopole protection masts which will be approximately 17m in height and associated site works. Warning / health & safety signage will be displayed as is normal practice for such installations. Only motion-sensitive lighting will be used.

A telecommunication antenna will be fixed externally to the substation control building for communication and control purposes (e.g., for the Supervisory Control and Data Acquisition (SCADA) System) for the Developer, turbine suppliers and ESB Networks.

There will be a small area (122m^2) outside the compound, and adjacent to the access track, that will be a hard-surfaced for operational and maintenance and includes four parking spaces.

2.5.9 Transformers and Internal Cabling

The power generated by each wind turbine will be transmitted via underground Wind Farm Internal Cabling to the new 38kV Electrical Substation also, the communications fibre optic cabling will be installed in the same trench. The trenches will measure 0.6m wide and one metre (1m) in depth. There will be500m of Wind Farm Internal Cable trenching (giving a surface area of 900m^2). The electrical and fibre-optic cables running from the turbines to the substation compound will be run within the Site access tracks and/or their verges. The cable ducting will be installed to ESB Networks requirements specifications as show on the Grid Route Connection Drawings – **6778-JOD-MM-XX-DR-C-1001-1008**.

The Wind Farm Internal Cabling routes will be bedded in surplus excavated soil material. Danger tape, incorporating a metallic strip, will be laid during backfilling. Where the Wind Farm Internal Cabling is to cross Site access tracks, suitable electrical ducting will be provided. Permanent posts up to approximately 0.5m in height will mark the trenches at regular intervals and at all changes in direction. An as-built layout plan showing the location of underground Wind Farm Internal Cabling will be on permanent display within the control building.

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

Transformers will be located inside each turbine.

Excavated material will be stored uphill of the trench excavations which will prevent any sediments from being washed downhill. Silt fences will be installed down gradient of the excavations to prevent silt runoff. The Peat Spoil Management Plan for the Project is outlined in **Appendix 2.1 CEMP - Appendix C**.

2.5.10 Grid Connection Route (GCR)

Connection will be sought from the grid system operators by application to ESB Networks Limited. Moanmore Lower Green Energy has assessed a number of possible grid connection options for the Project. Following detailed assessment, it was concluded that a

2.76km 38kV connection to Tullabrack 110kV substation is the most optimal route, having considered environmental and commercial aspects; however, this is subject to the substation having grid offtake capacity. The Grid Connection can be summarised as follows:

- Underground Cable (UGC) single 38kV circuit from Moanmore Lower wind farm utilising sections of primarily public roads and private lands (within the site) to Tullabrack substation [approx. 2.76km].

The Grid Connection Route (GCR) is shown in **Figure 2.4**, and **Appendix 2.2** contains a copy of the Grid Connection Route Assessment report undertaken by BFA Consulting.

The three conductors (one for each electrical phase) for the GCR will be laid in separate ducts as required by the ESBN functional specifications for 38kV Networks Ducting/Cabling (Minimum Standards). The 38kV cable trench with a trefoil formation will measure 600mm wide, and 1.22m deep.

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

- All relevant stakeholders including ESB Networks Limited, Gas Networks Ireland, Eir, Clare County Council, and Uisce Éireann, will be contacted for up-to-date drawings with regards all existing services to ensure the GCR works do not damage or interfere with them. This will be verified by the Contractor prior to excavations taking place.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CATSCAN (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- A silt fencing filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse see **Chapter 9: Hydrogeology and Hydrogeology - Section 9.7.2** and **Appendix 2.1 CEMP – Surface Water Management Plan.**
- A 13-tonne rubber tracked 360-degree excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.22m deep.
- Once the trench is excavated, a 50mm depth base layer of sand (in road trench) or 15 Newton CBM4 concrete will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.

- uPVC ducts will be installed on top of the compacted base layer material in the trench.
- Once the ducts are installed, couplers (a device used for joining pipes) will be fitted and capped to prevent any dirt entering the unjointed open end of the duct.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts.
- The co-ordinates will be plotted on as-built record drawings for the Grid Connection cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and will be compacted.
- Timer spacer templates will be used during installation so that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route as per ESB Networks specifications.
- A layer of Lean-mix CBM4 (CL1093) (in road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.
- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road will then be reinstated on a temporary basis to the requirements of the Guidelines for Managing Openings in Public Roads, 2017 (Department of Transport).
- When trenching and ducting is complete, the installation of the Grid Connection cable will commence between the Electrical Substation and the existing 110kV substation at Tullabrack.
- The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable will be pulled through.
- The cables will be joined together within the precast concrete cable junction box (Joint Bay).
- The finished surface above each cable joint bay is reinstated on a permanent basis to the requirements of the *Guidelines for Managing Openings in Public Roads* (Department of Transport, 2017).

2.5.10.1 Joint Bays

Joint Bays are pre-cast concrete chambers where individual lengths of cables will be joined to form one continuous cable. A joint bay is constructed in a pit. Each joint bay typically will

be 6m long x 2.5m x 2.3m deep. A reinforced concreted slab will be constructed on top of the bay.

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

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

2.5.10.2 Directional Drilling Works

There is one existing water crossing along the Grid Connection Route (Moyasta EPA Code: 27M04 within Wood_SC_010). This crossing will be constructed by means of trenching within the verge of the Bridge (see **Section 2.5.10**) or by directional drilling technology. Directional drilling is the practice of drilling holes in a horizontal direction for the laying of ducts which contain cables beneath features such as watercourse. The directional drilling commences at an excavated area known as the launch pit which is the entry point for pipes and ducts to be placed. The drill rods are pushed through the ground from the launch pit to the reception pit (similar to launch pit but at the other side of the watercourse). At the reception pit, the pipes are attached to the lead drill rod and pulled back through the ground to the launch pit. The crossings will comprise 4 x 110mm High Performance Polyethylene (HPPE) pipes/ducts. Two separate excavations will be made either side of the watercourse on the existing bridge to a depth of 2 metres to accommodate the directional drilling launch and reception pits. Spoil arisings will not be stored onsite and will be directly disposed at a licenced waste facility. The excavation launch and reception pits will be reinstated with imported stone and road surfacing material on completion of drilling and jointing operations.

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

The drill position is always known to the operator and the drill can be manoeuvred in three planes / axes. A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded. A drilling lubricant will be required. This will be delivered directly to the drill head by hydraulics. The lubricant will be chemically inert bentonite slurry mixture which lubricates the drill head and removes the drilled earth and stone. Once the crossing is drilled, the drill head is exposed at the reception pit and

removed. Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side. The drill rods are connected to the duct pipe and the drill is reversed by pulling the pipe back through the channel.

A spoil volume of 4m³ will be excavated for each 100m run of 4 pipes. This spoil will be largely subsoil material. This material will exit the launch pit within the bentonite slurry mixture. A mobile bunded tank will be located next to the launch pit into which the material/slurry mixture will be pumped. This material will be disposed of at a licensed waste facility.

2.5.10.3 Trench Layout

The trench layout will be as per the appropriate ESB Networks Ltd specifications. The specifications from Clare County Council will be followed for the excavation and reinstatement of the ducted cable trenches which is expected to be in accordance with the requirements of the *Guidelines for Managing Openings in Public Roads* (Department of Transport, 2017).

2.5.10.4 Joining Ducts

All joining ducts shall be laid in straight lines to even gradients. Once the ducts have been installed and backfilled with lean-mix concrete and with Clause 804 stone the duct run will be thoroughly cleaned by pulling the appropriate size of ESB Networks Ltd approved duct brush through the duct.

Details of the construction methodology are summarised below:

- Preparatory Works
  - Preparatory trial pit survey along the cable route
  - Access to the start point and setting out
  - Access to joint bays
  - Silt attenuation features and watercourse set back buffer
  - Joint Bay excavation
- Trenching Works
  - Storage of materials
  - Trench operations
  - Managing excess material from trench works

2.5.11 Turbine Foundation Rock Breaking

Where rock is encountered weaker rock will be extracted using a hydraulic excavator and a ripper. Upon the completion of further site investigations, where stronger rock is encountered and cannot be extracted using an excavator, then rock breaking equipment will be employed. This will involve the use of a 40-60 tonne 360-degree hydraulic excavator with a rock breaker attached and the foundation area will be deepened with broken down / crushed stone being made into the correct grade for use in the civil construction of Site access tracks and Turbine hardstands.

2.5.12 Flood Compensation Areas

Turbine T1 and a section of Site Access Tracks are located within a flood zone. Flood resilience measures have been proposed which include the placing of all infrastructure within the floodplain at an elevation above the 1 in 100-year fluvial flood level plus 30% factor to account for climate change, of 9.3 mOD. The turbine finished base level for T1 within the floodplain will be at an elevation of 9.6 mOD which includes a 0.3m freeboard above the worst case plus climate change flood level. This will ensure that the T1 can still be accessed for essential maintenance during flood events if required.

The Project includes 2 no. flood compensation areas (0.1037ha and 0.3658ha) which involve reducing ground levels in the floodplain to replace the lost flood zone capacity. The flood capacity of the compensatory measures is equivalent to the flood capacity lost due to the proposed permanent infrastructure within the flood zones. Note that these areas have been named as 'flood compensatory areas' to align with the terminology used in the 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009).

In addition, a number of culverts along access tracks within the flood zone will be installed to ensure that flood water flow routes will not be completely impeded. This will ensure that there is no displacement of floodwaters or increase in the downstream flood risk associated with the Project see **Drawing 6778-JOD-MM-XX-DR-C-1402**. The flood compensation areas are discussed in detail in **Chapter 9: Hydrology and Hydrogeology and Appendix 9.1 Flood Risk Assessment.** The topsoil will be stripped, the material excavated and the topsoil reinstated to the final levels.

2.5.13 Biodiversity Enhancement Areas

There are two biodiversity enhancement areas on Site that will mitigate loss of habitat on Site. A Biodiversity Enhancement and Management Plan (BEMP) has been prepared for the Project and is attached as **Appendix 6.11**. The objectives of the BEMP are as follows:

Objective no. 1

To enhance an existing area of cutover bog that has been improved for grazing and is now largely dominated by wet grassland with frequent rushes.

Objective no. 2

To enhance an area of Molinia meadow (Annex I listed) which has been degraded by over-grazing and which has potential to provide habitat suitable for marsh fritillary (Annex II listed).

Objective no. 3

To offset the loss of hedgerows (95m in total) by a replanting programme.

2.5.14 On-site Drainage

The surface water runoff contained within natural and artificial drainage channels includes stream and river waterbodies, drainage ditches, and other minor natural and artificial man-made drainage features. Drainage measures will be provided to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. Details of the drainage system are shown on Drainage Drawings: **6778-JOD-MM-XX-DR-C-0301-0305** and outlined in detail in the Surface Water Management Plan, part of the CEMP attached as **Appendix 2.1** and full details are provided in **Chapter 9: Hydrology and Hydrogeology.** There will be no impact on the hydrology regime or peatland hydrology as outlined in **Chapter 6: Biodiversity** and **Chapter 9: Hydrology and Hydrogeology**.

The wind farm Site is located in the Wood River sub-catchment (Wood_SC_010) and the Moyasta_010 WFD river sub-basin. The Moyasta River (EPA Code: 27M04) is mapped to flow to the northwest along the northern boundary of the wind farm Site, approximately 90m north of the T1. This river discharges into the Mouth of the Shannon coastal waterbody, approximately 1.5km northwest of the Site and flows out through Poulnasherry Bay into the Shannon Estuary. In addition to the EPA mapped Moyasta River which flows along the northern boundary of the wind farm Site, the natural drainage of the wind farm Site is further facilitated by an extensive network of manmade surface water drainage features. These features comprise of several deeply incised drains which flow to the north, draining the cutover bog and the rough agricultural lands which comprise the Site, before discharging into the Moyasta River. Many of these manmade drains are located along existing

hedgerows, field boundaries and along existing site access tracks. These drains provide a hydrological connection to the natural watercourses downstream of the wind farm Site.

All water crossings are shown on **Chapter 9: Hydrology and Hydrogeology – Figure 9.2.**

A buffer zone of at least 50m will be in place for surface water bodies. Additional measures will be put in place for the limited works to be undertaken in the buffer zone (e.g. stream crossings) and are outlined in **Chapter 9: Hydrology and Hydrogeology - Section 9.7.2.1** and **Appendix 2.1 CEMP**. Sustainable Urban Drainage System (SuDS) principles will be employed and these are outlined in detail in **Appendix 2.1 CEMP – Surface Water Management Plan** and are as follows:

Source controls for surface water

- Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, oyster bags filled with gravel, filter fabrics, and other best practice systems.
- Small working areas, covering stockpiles with geotextiles layering to protect against water erosion and runoff in rainy weather, and/or cessation of works in certain areas such as working on a high gradient during wet and windy weather.

In-line controls for surface water

- In-line controls are directly applied to the surface water body, including interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other best practice systems.

Treatment systems for surface water:

- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Silt busters and/or other similar/equivalent or appropriate systems.
- When heavy rainfall is predicted, then works will be suspended or scaled back.

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

2.5.15 Key Project Infrastructure Metrics

The key project infrastructure metrics are summarised in **Table 2.6** and provides a reference for the reader(s) of this EIAR.

Table 2.6: Key Project Infrastructure Metrics

Description	Length [m]	Width [m]	Depth [m]	No.	Approximate Area [m²]
Moanmore Lower Site					
New & Upgraded Site Access Track (Floated)	420	4.5	0	-	1,890
New Site access track (Excavated) site entrance	1,225	4.5	0.45	-	5,515
Upgrading Existing Roads	400	4.5	0.45	-	1,800
Vertical realignment of a section of the L6132	40	3	0.15	-	120
Temporary Road Widening (L2034)	-	-	0.45	-	50
Road Widening Works (L2036)	-	-	0.45	-	3,895
Temporary Verge Strengthening (L6132)	5,160	1	0.75	-	5,160
Temporary Road Widening (L6132)	-	-	0.45	-	526
Internal Cabling (power & communications)	1,500	0.6	1	1	900
Turbine Hardstands – including secondary crane areas	-	-	0.5	3	14,721
Turbine Foundations (25.8m diameter)	25.8m Diameter		3.5	3	1,570
Turning Heads	-	-	0.45	2	730
Junctions	-	-	0.45	2	780
Electrical Substation	-	-	0.45	1	1,650
Site Compound	-	-	0.5	1	1,165
Flood Compensation Areas (1,037m² and 3,658m²)	-	-	0.65	-	4,695

Description	Length [m]	Width [m]	Depth [m]	No.	Approximate Area [m²]
Moanmore Lower Site					
Permanent Spoil Storage (including the rock berm)	-	-	-	1	26,201
Drainage	-	-	1	30	801
Access Track – (Townland Tullabrack East)	160	4.5	0.45	-	1,230
Blade Handover Area– (Townland Tullabrack East)	-	-	0.5	1	3,820
Blade Transfer Area– (Townland Tullabrack East)	-	-	-	4	6,345
Grid Connection					
Grid Connection - 38kV	2,760	0.6	1.2	-	1,656

Taking the above figures into consideration, the permanent land take from the Project will be 53,192m^2 which is the sum of the figures above which are to be retained following construction e.g., Site access tracks, Turbine Foundations, Turbine Hardstands, Permanent Spoil Storage Area and Electrical Substation. Temporary land take areas within the Site will be 10,456m^2.

The GCR will involve works on 1,656m^2 of area on the public roads, to be reinstated following the laying of the ducts and so is classed as temporary land take. The works along the TDR (9,751m^2) are also considered temporary land take. At the Blade Transfer Area there will be 10,165m^2 of temporary work and 1,230m^2 of permanent works (access track). Therefore, the total land take required for the Project will be approximately 85,220m^2 of which 53,192m^2 is permanent.

The total volume in **Table 2.6** does not equate to the total volume of spoil generated on site. The expected volume of spoil to be generated is approximately 52,847m^3. For further detail on the calculation of spoil volumes see **Appendix 2.1 CEMP – Peat and Spoil Management Plan.**

2.5.16 Site Signage

Signs will be placed on the R483 showing directions to the Site. Additional signage will be placed on the R483, L2034 and L6132 road, for road safety, warning of construction vehicles entering and egressing the Site. Signs will be placed on the N68 on approach to the junction with the L6132 warning of vehicles turning. The Site entrances on the L2034 and L6132 road will have a sign confirming that it is the entrance to the Site and the speed limit of 25km/h will apply within the Site. There will also be additional signs during the construction phase confirming that construction works are taking place, and proper precautions must be taken by anyone entering the Site. There will be no entry to unauthorised persons or the general public during construction. Additional details can be found in **Chapter 14: Traffic and Transport**.

2.5.17 Peat and Spoil Management

2.5.17.1 Spoil Quantities

The quantities of spoil likely to be generated at the Project have been calculated by Jennings O'Donovan & Partners. It is estimated that based on site surveys carried out by RSK Minerex using peat probes that the amount of spoil predicted to be generated during construction of the Project is approximately 52,847m^3. There will be 39,845m^3 reused/stored on site and 13,002m^3 will be disposed of at a licensed waste facility. See **Appendix 2.1** CEMP – Peat Spoil Management Plan for details on the calculation of spoil volumes and how spoil will be managed on site.

2.5.17.2 Landscaping & Reinstatement

Peat excavated during the construction works will be used to reinstate exposed areas around infrastructure such as slopes/graded ground around Site access tracks, Turbine Hardstands and on the Turbine Foundations or where there is degraded cutaway bog that can be infilled by carefully depositing peat within.

Excavated peat will be stored in the permanent spoil storage area. The area will be used to store spoil to a maximum height of 2m and will cover an area of 22,464m^2 which equates to 44,928m^3 of capacity for spoil storage. The peat and soil/spoil will be stored separately. The spoil storage area will be surrounded by a rock berm and silt fences as shown in Drawings No. 6778-JOD-MM-XX-DR-C-1401.

At the permanent spoil storage area cells will be created for the placement of spoil. This area will be topped with the excavated top surface layer of acrotelm peat to encourage rapid revegetation. The cells will measure approximately 45m x 60m and have outfalls blocked

and overflow management with the creation of drainage channels for excess water and sphagnum inoculation. More information can be found in **Chapter 6: Biodiversity, Chapter 8: Soils and Geology, Appendix 2.1: CEMP** and **Peat and Spoil Management Plan (Appendix C of CEMP)**.

2.5.17.3 Non-Peat Spoil

Non-peat spoil will consist of surplus glacial till gleys and bedrock / crushed stone, won on-site. The Project design makes provision for all the non-peat material won on Site to be used as fill (on Site) in the following places:

- Subsoil to be used around the blade laydown areas where load capacities required are less; and
- Rock won from excavations to be used within Site access track and Turbine Hardstand build up.

There will also be spoil generated from the grid connection works (2,020m^3). Some of this will be in the form of tarmacdam/ asphalt, Clause 804 running layer material, compacted rock fill material and subsoils. Spoil generated from works along public roadways will be disposed of at a licensed waste facility. The remaining spoil from grid works located within the site boundary will be disposed of in the permanent spoil storage area. Further information can be found in **Appendix 2.1: CEMP** and **Peat and Spoil Management Plan (Appendix C of CEMP)**.

Where HDD is used a spoil volume of 4m^3 will be excavated for each 100m run of 4 pipes. This spoil will be largely subsoil material. This material will exit the launch pit within the bentonite slurry mixture. A mobile bunded tank will be located next to the launch pit into which the material/slurry mixture will be pumped. This material will be disposed of at a licensed waste facility.

2.6 CONSTRUCTION

The first phase of the Project will comprise the construction phase. This phase will begin with site preparation works and will be completed when the turbines are ready for commissioning, and when all wastes have been removed from the Site. For this Project, it is anticipated that the construction phase will last approximately 36-40 weeks. An indicative construction programme is set out at **Table 2.7**.

Table 2.7: Indicative Construction Programme

Materials	Timeframe (Week)
Site Establishment & Fencing	1
Construction of L2034 Site Entrance	1-2
Construction of Temporary Construction Compound	1-2
Construction of Site Access Roads and Internal Junctions	4-16
Construction of Turbine Hardstands and Turning Heads	8-20
Site drainage	4-20
Ready-mix concrete for Turbine Foundations	12-20
Steel reinforcement for Turbine Foundations	8-16
Foundation bolts	8-16
Verge widening at N68 / L6132 Junction	8
Construction of L6132 verge strengthening on Turbine Delivery Route 5.56km (Tullabrack cross to N68) Spoil Removal	8-20
Vertical realignment of L6132 crest curve on Turbine Delivery Route	8
Removal of Forestry for Blade Transfer Area	8
Construction of Blade Transfer Area	8-20
Construction of L2036 verge strengthening on Turbine Delivery Route (Tullabrack Cross to (2034)	8-20
Construction of L2034 verge strengthening on Turbine Delivery Route	16-20
Substation building materials	8-20
Electrical switchgear	20-34
Electrical cables	20-32
Grid Connection works	8-20
Wind turbine components	20-28
Crane	20
Reinstatement of L6132 verges,	28-38
Reinstatement of L2036 & L2034 verges,	28-38
Construction of Flood Compensation Areas	28-38
General reinstatement and demobilisation	36-40
Total	

2.6.1 Construction and Environmental Management Plan (CEMP)

A CEMP is appended to the EIAR in **Appendix 2.1**. The CEMP includes all the mitigation measures proposed within the EIAR. In the event of a grant of permission, the CEMP will be updated to include any conditional requirements of the permission. A Summary of the mitigation measures is included in **Appendix 17.1**.

In the event that planning is granted for the Development, the CEMP provides a commitment to mitigation and monitoring and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the Project will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later phases, such that there will be a robust mechanism in place for their implementation. The CEMP addresses the construction phase, and will be continued through to the commissioning, operation and final Decommissioning phases (refer to Decommissioning Plan in **Appendix 2.1**).

An Ecological Clerk of Works (ECoW) / Environmental Manager with appropriate experience in overseeing wind farm construction projects will be appointed by the Developer for the duration of the construction phase so that the CEMP is effectively implemented.

Prior to works commencing on site the ECoW/ Environmental Manager will ensure all pre-commencement mitigation measures are implemented see **Appendix 17.1 Schedule of Mitigation Measures** for the full list of pre-commencement mitigation measures. These include:

- Installation of the Flood Compensation Areas
- A 50m stream buffer zone will be implemented at the Site which will result in the avoidance of sensitive hydrological features.

2.6.2 Construction and Management of Site Drainage and Flood Compensation Areas

Drainage measures will be implemented as part of the Project to attenuate runoff, guard against soil erosion, soil compaction, and safeguard local water quality. Details of the proposed drainage system are shown on the Site Layout Plan Drawings: **6778-JOD-MM-XX-DR-C-0100-0108** and the Drainage Detail drawings: **6778-JOD-MM-XX-DR-C-0201-0204.** Further details on drainage management and mitigation can be found in **Chapter 9: Hydrology and Hydrogeology Section 9.5, Section 9.7** and the **Surface Water Management Plan – Appendix 2.1**.

2.6.3 Refuelling

Vehicles will be refuelled off-site where possible. For vehicles that require being refuelled on-site, refueling will be undertaken at the Temporary Construction Compound. Fuels will be stored in the Temporary Construction Compound and bunded to at least 110% of the storage capacity of fuels to be stored. For vehicles that must be refuelled on site (cranes) refuelling will take place via a mobile double skinned fuel bowser. The bowser will be a double axel refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

2.6.4 Concrete

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

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

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

The chutes wash out on-site will require a small volume of water. This water will be directed to the concrete washout area which will be a temporary lined impermeable containment area or a siltbuster type washout unit[1] or similar. The unit catches solid concrete and filters and contains the washout liquid for pH adjustment and solid separation. The residual liquids and sediments will be disposed of at an appropriately licenced facility with adequate capacity.

[1] Siltbuster – Water Quality Matters. [Available at:https://www.siltbuster.co.uk/solutions/concrete-washwater/] [Accessed at 11/07/2024]

If a temporary lined impermeable containment area is used, these are usually constructed using straw bales and lined with an impermeable geotextile membrane. An example is shown on **Plate 2.1**. An alternative construction method would be to dig a hole in the ground and place an impermeable geotextile membrane in the hole so that no wastewater can penetrate the cover and seep into the soil and groundwater.

Plate 2.1: Typical Temporary Concrete Washout Area

The washout area is covered when not in use during periods when wet weather is forecast to prevent ponding of rainwater. During periods of dry weather, the area can be left uncovered to allow evaporation of water. Once concrete pours have been completed, the remaining water will be tankered off site to a licenced facility for disposal. Solid concrete remnants will be disposed of at an EPA waste licenced facility. It can be estimated that there will be approximately 1-2m^3 of solid concrete waste per Turbine Foundation pour that will need to be disposed of, or a maximum of 6m^3 in total in the case of Moanmore Lower Wind Farm.

The Turbine Foundations will be left in-situ during the Project decommissioning and so will not require breaking up and disposal.

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

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

- The concrete trucks will not be washed out on Site but will be washed out on return to the batching plant.
- Site access tracks will be constructed so that all concrete trucks will be able to access all areas of the Site with ease and no concrete will be transported around the Site on open trailers or dumpers to avoid the risk of spillages.
- All concrete for the Turbine Foundations will be pumped directly into the shuttered formwork with rebars from the delivery vehicle. If this is not possible, the concrete can be pumped into a hydraulic concrete pump or into an excavator bucket for transfer to the required location.
- The Traffic Management Plan (**Chapter 16: Traffic and Transport** – **Appendix 16.2**) will specify the exact routes and arrangements.
- Signage will be erected near concrete pour areas to advise drivers that concrete washout on site is not permitted.

2.6.5 Dust Suppression

During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. Damping down (wetting of the surface) may be required to see that dust does not become friable. A wheel cleaning facility will be employed on-site where mud and debris will be removed from vehicles egressing the Site and reduce mud and debris from getting onto the local road network. In particular the L6132, L2034, L2036 and the R483, by which all traffic to the Project will access the Site. Road debris could dry out, become friable and potentially cause a nuisance. HGVs entering the Site carrying rock will be covered to prevent dust generation. A road sweeper will be available for use on the approach roads to the Project in case of any mud or debris making it onto the public road network.

2.6.6 Construction Hours

It is estimated that the Project will have approximately 35 construction workers during the construction phase, increasing to 50 at peak construction. Working hours for construction will be from 07:00 to 19:00 on weekdays, with reduced working hours at weekends, from 08:00 to 16.30 on a Saturday. No work will be carried out on Sundays or Public Holidays.

It should be noted that critical weather-dependent events, such as turbine erection, may take place outside of these hours to ensure safe and efficient operations. During the turbine erection phase, operations will need to take place outside those hours to facilitate Turbine Foundation construction and ensure lifting operations are completed safely. Hours of working for Turbine Foundation construction will be agreed with Clare County Council prior

to commencement. A detailed Traffic Management Plan (TMP) will be implemented for the construction phase, agreed during the planning (compliance) stage with Clare County Council, to ensure all controls described herein are in place with all suppliers coming to the Site.

2.6.7 Construction Compound and Temporary Works Area

The Temporary Construction Compound will be set up upon commencement of the construction phase. The proposed location for the Temporary Construction Compound is west of the site entrance as shown in **Figure 1.2a** and Drawing No.**6778-JOD-MM-XX-DR-C-0501**. The compound will be 1,165m^2 and approximately 0.5 m in depth [583m^3]. The compound will be used as a secure storage area for construction materials and to contain temporary site accommodation units with sealed-type staff welfare facilities. It will include cabins for office space, meeting rooms, a canteen area, a drying room, parking facilities, and similar personnel facilities.

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

During the construction phase, water will be supplied by a water bowser. The maximum wastewater production is estimated to be the same as the maximum water consumption (up to 2,000 litres per day).

The Project will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the construction phase with 50 construction workers on site at peak. A holding tank is proposed for wastewater management. Wastewater which will be removed off-site and disposed of at Kilrush Wastewater treatment plant during the construction phase.

2.6.8 Construction of Turbine Hardstands and Foundations

The construction method for all the Turbine Hardstands will be via excavated approach. Each Turbine Hardstand will have a surface area of 4,907m^2 which includes 2,110m^2 for the permanent hardstand, 430m^2 for the temporary crane set up and 2,367 m^2 for the temporary set-down area. Foundations will be taken down to competent bearing strata by excavating through the soil, subsoil, and rock if necessary.

The method of construction for turbine foundation is also described below:

- Install temporary drainage around perimeter of excavation
- Excavate soil and rock
- Form a level working area to build foundation
- Install formwork and reinforcement
- Pour concrete
- Cure concrete
- Once the concrete has set and the earthing system is in place, backfill the foundation with rock
- Use soil to build up the area around the turbine base

2.6.9 Construction Turbine Assembly

Once on Site, the wind turbine components will follow an approved route to minimise manoeuvring. Components will be placed on Turbine Hardstands prior to assembly. It is proposed that a 'just in time' delivery strategy will be in place for turbine blades to reduce the need for temporary set down areas. Typically, one large crane (750-1,000 tonnes) will be required for erecting the turbines, assisted by a smaller crane (150-200 tonnes). Similar cranes will also be required for maintenance during the operational phase. As with all other vehicles, refuelling of cranes will be carried out in accordance with site procedures to minimise the risk of spillage or pollution.

The towers will be delivered in sections, and work on assembly will not start until a suitable weather window is available, e.g., 10-minute average wind speed of less than $8ms^{-1}$. The bottom tower section will be bolted onto the concrete foundations. The mid tower section will then be lifted into position and bolted to the bottom tower section. Finally, the top tower section will be lifted into position and bolted to the mid tower section. The nacelle, hub and blades are assembled and installed in accordance with the turbine supplier's specific procedure.

2.6.10 Construction Traffic

It is estimated that during civil construction, approximately 4,227 loads (as detailed in **Chapter 16 Traffic and Transport – Section 16.3.1)** will be delivered to Site or take waste material from the main wind farm site to an EPA licensed waste facility. This breaks down to approximately 54 loads per month.

The peak number of deliveries per day will occur during the concrete pour for Turbine Foundation construction. An estimated 75 (assuming a capacity of $8m^3$) concrete truck

deliveries will be required per Turbine Foundation. Some other materials will also be delivered on such days (50 tonnes steel per turbine base), so a realistic estimation of peak deliveries is approximately 153 deliveries per day (for at least 4 separate days in the construction programme when the Turbine Foundations will be poured).

Prior to construction commencing on site, a Traffic Management Plan (TMP) will be developed by the contractor and submitted to Clare County Council for agreement. This Plan will contain details of all proposed signage and temporary traffic control measures on the L2034, L2036, L6132 and N68, as well as warning of the entrance (s) to the construction Site.

2.6.11 Watercourse Crossings

No new watercourse crossings are required over any EPA mapped watercourse. Existing land drains have been consolidated on Site to reduce the number of water crossings. There are eight (No. 8) watercourse crossings of historic drains and mapped drains required for the construction of Access Tracks and Hardstands within the Site. These water crossings will be constructed using pre-cast concrete or pre-formed plastic pipes. The culvert crossings are detailed in **Appendix 2.1 – CEMP - Water Quality Management Plan**.

There is one existing watercourse crossing (Moyasta EPA Code: 27M04) (WC01) along the preferred GCR which is outlined in **Chapter 9: Hydrology and Hydrogeology** - **Figure 9.2**. The cabling will be laid in the carriage of the bridge or will be installed using HDD.

There are three existing watercourse crossings (WC02-WC04) along the L6132 which are outlined in **Chapter 9: Hydrology and Hydrogeology** - **Figure 9.2**. At these three locations steel plates will be placed on the verge for 10m each side of watercourse crossings. This will avoid excavation and disturbance of the existing ground.

2.6.12 Reinstatement and Monitoring

Following completion of construction, all plant and machinery will be removed from the Site. The temporary works areas needed for the construction period such as blade laydown area, will be reinstated using the excavated material removed and stockpiled on site, close to the location from where it was excavated as explained in **Chapter 6: Biodiversity** and **Chapter 10: Soils and Geology**.

Stockpiles will be restricted to a maximum 2m in height and located outside of the surface water buffer zones. One permanent stockpile, situated near the site entrance will be allowed

stabilise for a period during the construction phase, following which the material will be vegetated and managed in line with other improvement works on site. Promoting the vegetating of the material will aid in binding the material and minimising erosion and improve soil health. The public road infrastructure comprising the GCR will be reinstated to its original condition. However, joint bays installed in the public road infrastructure will remain in-situ. Joint bays within the Site will be reinstated as per the *Forestry Road Manual: Guidelines for the Design, Construction And Management Of Forest Road* (COFORD, 2004), and as per private landowner reinstatement requirements. This work will be carried out in consultation with the landowner and in line with any relevant measures outlined in **Appendix 2.1 CEMP.**

All rubbish and waste/excess materials will be removed from Site to an appropriate EPA licenced facility from where it will be reused/recycled or disposed of accordingly.

Peat and spoil materials excavated during construction of the infrastructure will be used to reinstate any areas of temporary infrastructure such as blade laydown areas and for landscaping around infrastructure such as Turbine Hardstands and Site access tracks. Peat turves will be removed in layers with the vegetated side up. The top vegetated turves will be placed on top of reinstated/ restored areas so that the turves can 'knit' together effectively to form areas of restored peatland habitat in accordance with the Biodiversity Enhancement and Management Plan (see **Appendix 6.6**.)

The on-site installed drainage network will be left in place. This will be periodically monitored to see that it is operating to its stated design purpose. Water monitoring on nearby natural watercourses will be undertaken during and post construction to confirm the efficacy of mitigation and to ensure that no pollution migrates off-site. In the unlikely event that addition measures are considered necessary, these will be agreed with Inland Fisheries Ireland (IFI). Details of this can be found in **Chapter 9: Hydrology and Hydrogeology.**

2.6.13 Construction Supervision and Monitoring

The construction activities will be monitored by a Geotechnical Engineer, a qualified archaeologist and an Ecological Clerk of Works (ECoW). A Geotechnical Engineer will be contracted for the detailed design phase and their services retained throughout the construction and reinstatement phases. They will oversee all earthworks and excavation activities and monitor for potential issues such as ground stability, water ingress into excavations etc.

The ECoW will be employed prior to the commencement of the construction phase and will monitor the working corridor (the area inside which construction works and plant and equipment manoeuvring will take place). Additionally, they will review the pollution control measures and working practices during construction and have input into the Site Reinstatement. The ECoW will have the authority to stop work if, for example, there is a risk that a sensitive habitat feature is encroached upon, or there is the possibility of silt/pollution runoff to natural watercourses.

The potential exists for the presence of unrecorded, sub-surface archaeological features within green field locations in proposed construction areas within the Site. A series of pre-construction and construction phase archaeological investigations under licence by the National Monuments Service will be carried out by a suitably qualified archaeologist. The archaeologist will have responsibility for providing that potential archaeological features are protected should any be discovered during excavations. If any potential archaeological features are discovered, the archaeologist will inform the National Monuments Service (NMS). The site will be accessible to the appointed archaeologist at all times during working hours and the nominated archaeologist will monitor all invasive works.

In the event that any sub-surface archaeological remains are identified during Site investigations, they will be cleaned, recorded and left to remain in-situ within cordoned off areas while the National Monuments Service are notified and consulted in relation to appropriate future mitigation strategies, which may entail preservation *in situ* by avoidance or preservation by record by archaeological excavations.

Regular weekly inspections of the installed drainage system will be undertaken, especially after heavy rainfall events, to check blockages and see that there is no build-up of standing water in any part of the system where is it not designed to be. A report will be produced monthly during the construction phase detailing the results of the water quality monitoring. These results will be available on site for audits and will be submitted to Clare County Council.

Excess build-up of silt will be removed at check dams, attenuation/settlement ponds or any other drainage feature by scraper or excavator and under the supervision of the ECoW during and after construction works on site.

During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSs) will be

undertaken upstream and downstream of the construction works, and specifically following heavy rainfall events (i.e., weekly, monthly and event based).

Once the contractor has been appointed, the CEMP will be updated to take into account conditions imposed by the planning permission, and any additional mitigation required. This will set out the proposed Site organisation, sequencing of works, methodologies, mitigation measures (including these outlined above) and monitoring measures.

Daily monitoring of excavations by the Geotechnical Engineer will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped, and a geotechnical assessment undertaken.

Local roads R483, L2034, L2036 and L6132 used to transport construction materials will be monitored during construction, so that any damage caused by construction traffic associated with the Project can be identified and repaired promptly, depending on the level of damage / inconvenience, to avoid issues for other road users. Where necessary, rock will be sourced from a local quarry and concrete may be sourced from nearby supplier. This is assessed in **Chapter 16: Traffic and Transportation**.

2.6.14 Construction Sequencing

An indicative sequence for the construction phase is as follows:

1. Temporary Construction Compound
2. Site preparation
3. Site access tracks
4. Turbine Hardstands
5. Turbine Foundations
6. Wind Farm Internal Cabling
7. Installation of the Grid Connection
8. Erection of wind turbines
9. Commissioning and energisation programme

The Electrical Substation will be constructed in parallel with Turbine Hardstands, Turbine Foundations and Wind Farm Internal Cabling. The first step will be to construct the Temporary Construction Compound. Access to the area will be via the existing site entrance off the L2034. The next step will be to prepare the areas of the Site where site infrastructure is to be located by marking out the construction works corridor and the relevant environmental buffer zones as required.

Following the Site preparation, the Site access tracks and associated drainage will be constructed according to the turbine manufacturer specifications. The next step will involve construction of the three Turbine Hardstand areas according to the turbine manufacturer specifications. The Turbine Foundations can then be excavated and constructed using reinforcing bar (rebar) and imported concrete. No concrete batching will take place on Site.

Following the construction of the Turbine Foundations, the Wind Farm Internal Cabling from the turbine locations to the Electrical Substation will be laid in trenches along, or in the constructed Site access tracks. The GCR will be constructed from the Site by underground cable duct for a length of 2.76km to Tullabrack 110kV ESBN substation as outlined in **Section 2.5.10 and 2.5.11**.

The last step will be to erect the no. 3 wind turbines on the foundations using two cranes. Commissioning and testing of the turbines can then proceed.

2.6.15 Construction Employment

It is estimated that approximately 35 construction workers will be employed on-site with this number increasing to up to 50 during the peak period of Turbine Foundation construction.

2.7 COMMISSIONING

When the substation is energised the Wind farm commissioning can take approximately two months to complete from the erection of the final turbine to the commercial exportation of power to the national grid. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical and mechanical testing and control measures to check that the wind farm will perform and export power to the national grid, as designed.

2.8 AERONAUTICAL LIGHTING

The Irish Aviation Authority (IAA) will be consulted and upon request, any specified turbine or obstacle 100m or greater have a warning light system installed, under direct specification and in accordance with International Civil Aviation Organisation (ICAO) Annex 15 requirements. In response to the scoping excercise consultations were received from the IAA, Shannon Airport, AirNav Ireland and Dept of Defence as detailed in **Chapter 1 Introduction – Section 1.10 Scoping and Consultation**- it is proposed to fix a warning lights to two (T1 and T2) of the wind turbines. The following data will be supplied to the IAA:

- The WGS84 coordinates (In degrees, minutes and seconds) for each turbine.

- Height above ground level (to blade tip) and elevation above mean sea level (to blade tip) in both meters and feet.
- Horizontal extent (rotor diameter) of turbines and blade length where applicable in both meters and feet.
- Lighting of the wind farm, which turbine(s) is/are lit, and what type of lighting.

2.9 OPERATION AND MAINTENANCE

During the operation of the wind farm, the turbine manufacturer, the wind farm operator, or a service company will carry out regular maintenance of the turbines. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm and Electrical Substation.

2.10 DECOMMISSIONING

The Developer is seeking consent for a period of 40 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; or
- Decommissioning of the wind farm.

Any further operation beyond 40-years would be subject to a further planning application and EIA. This EIAR assumes full decommissioning of the proposed wind farm will take place after 40-years. All structures above ground level shall be demolished and removed from the site for reuse/recycling; however, access tracks are likely to be retained for continued use by the landowners for agricultural purposes.

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.

Hardstand areas will be remediated to match the existing landscape as closely as possible. The Decommissioning Plan specifies that the turbine hard stands will be allowed to naturally revegetate. The habitat that would be expected to develop is likely to fall into a mosaic of semi-natural grassland (GS).

Decommissioning phase effects are likely to be broadly similar to construction phase impacts, in terms of disturbance through ground clearance works, and reinstatement. There will also be the potential for surface water quality impacts from ground disturbance, refuelling and the storage of potentially hazardous materials onsite.

Certain aspects of activities occurring during the construction phase are anticipated to occur at reduced levels during decommissioning, such as excavation of turbine foundations that will be left in situ and covered with soil for reinstatement. Access tracks will also remain for ongoing usage as farm tracks. In addition, the use of building materials, including concrete and aggregates will not be required.

These potential issues will be mitigated through the implementation of the CEMP for the decommissioning phase of the project. A comprehensive Decommissioning Plan (Appendix 2.1 CEMP-Appendix D) has been prepared and it includes all of the mitigation measures detailed in the submitted documentation, including the EIAR and the NIS, save as may otherwise be required by conditions in any grant of permission, to manage and control the component removal and ground reinstatement.