MWP

Chapter 02 Description of the Proposed project

Brittas Wind Farm Project

Brittas Wind Farm Ltd

November 2024

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2. Description of the Proposed Project

2.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents a detailed description of the proposed development along with information on the elements that constitute the entire project, as set out in Chapter 1 of this EIAR. The Project Description details the characteristics and operations involved in the project. The purpose is to present an appropriate level of detail to provide the basis for Environmental Impact Assessment (EIA). The chapter describes the site location, the main characteristics and components of the project and details the activities and operations required to construct, commission, and operate the wind farm development and connect it to the National Grid. Decommissioning of the project is also discussed.

Details of the project are further supported by the following documents:

- EIAR Chapter 3 Civil Engineering
- Construction Environmental Management Plan (EIAR Volume III, Appendix 2D)
- Turbine Delivery Route Assessment (TDR) (EIAR Volume III, Appendix 2B)
- Planning Application Drawings

For the purpose of the planning application and the analysis conducted in this EIAR, the Applicant is proposing three slightly different turbine options with a tip hight of 180m. Details of these are provided in section 2.4.1.

2.2 Project Summary

Brittas Wind Farm Ltd. (the Applicant) propose to develop a wind farm (named Brittas Wind Farm) comprising ten (10) No. wind turbines approximately 3km to the north of Thurles, Co. Tipperary.

For the purposes of this SID planning application and EIAR, the proposed Brittas Wind Farm project is referred to hereafter as the “proposed project”.

The main components of the proposed project and associated planning application include:

- The Wind Farm Site which includes ten (10) wind turbines (see details in section 2.4.2 below), associated tracks and infrastructure, an on-site 110kV electrical substation and A Grid Connection Route (GCR) which consists of an underground electrical grid connection from the Wind Farm Site to the existing Thurles 110kV substation,
- A Turbine Delivery Route (TDR) which is the route between the Port of Foynes and the Wind Farm Site along which turbine components will be transported. This will include temporary accommodation works along the public road to allow for the delivery of wind turbine components.

Should it become operational, this wind farm will be capable of providing between 57 and 66 megawatts (MW) of renewable electricity to the National Grid.

The development description as per the statutory newspaper notice and the application form for which consent from An Bórd Pleanála (ABP) is being sought is as follows:

- 10 No. Wind Turbines with a blade tip height of 180m, hub height range from 102.5 to 105.5m and a rotor diameter range from 149m to 155m;
- 10 No. Wind Turbine foundations and Hardstand areas and associated drainage infrastructure;
- 1 No. Permanent Lidar unit and associated foundation, hardstand area and compound for Meteorological Monitoring;
- 1 No. 110kV Electrical Substation including 2 No. control buildings, electrical plant and equipment, welfare facilities, carparking, water and wastewater holding tanks, security fencing, lightening protection and telecommunications masts, security cameras, external lighting and, all associated infrastructure;
- Installation of medium voltage underground electrical and communication cabling connecting the wind turbines to the proposed onsite substation and associated ancillary works;
- Installation of approximately 7km of underground electricity and communication cabling between the proposed onsite substation and the nearby existing Thurles 110kV substation in the townland of Ballygammane, Co. Tipperary. The cabling will be laid primarily within the public road and will connect the proposed wind farm to the national grid;
- 4 No. Site Entrances from the public road and associated fencing and signage;
- Construction of new permanent site access tracks, turning heads and associated drainage infrastructure;
- The upgrading of existing access tracks and associated drainage infrastructure;
- 2 No. Temporary construction site compounds and mobile welfare facilities;
- 1 No. Borrow pit and associated drainage infrastructure to be used as a source of stone material during construction;
- Spoil deposition areas;
- Associated surface water management systems;
- Tree felling and hedgerow removal to accommodate wind farm infrastructure;
- Temporary accommodation works at 2 no. locations adjacent to the public road to facilitate delivery of turbine components to site within the townlands of Brittas and Brittasroad, Co. Tipperary. The works primarily relate to trimming and clearing of vegetation, temporary removal of street furniture and fencing, and installation of temporary stone hard standing; and
- All related site works and ancillary development;

The applicant is seeking a ten-year permission and an operational period of no less than 35 years from the date of commissioning of the entire Wind Farm.

Other elements of the project which are assessed throughout the EIAR but are not the subject of this SID planning application are as follows:

- Battery Energy Storage Facility (BESS)
- Rerouting of on-site ESB 38kV overhead powerline (OHL)
- Accommodation works along the turbine delivery route (TDR) which includes temporary removal of traffic signs and lights, electricity poles, bollards and lamp posts, fences, and hedge and tree removal/trimming.

Separate planning applications for the BESS and re-routing of the ESB OHL will be prepared and lodged with Tipperary County Council (TCC) after planning permission has been obtained for the main wind farm project. Accommodation works along the TDR will be completed through road opening licence.

2.3 Characteristics of the Proposed project

This EIAR considers the proposed wind farm project and all additional components of the project as outlined in Section 2.2 including infrastructure and ancillary facilities and elements for construction and consideration as described below. The following section includes both the core wind farm elements of the project and the associated components of the project.

2.3.1 Site Location and Context

The proposed Wind Farm Site is located 3km north of Thurles town, as identified in Figure 2-1 and Figure 2-2 below. The proposed Grid Connection Route (GCR) is located within the public road between the Wind Farm Site and the existing Thurles 110kV Substation. The Grid Connection Route is identified in Figure 2-2 and Figure 2-3.

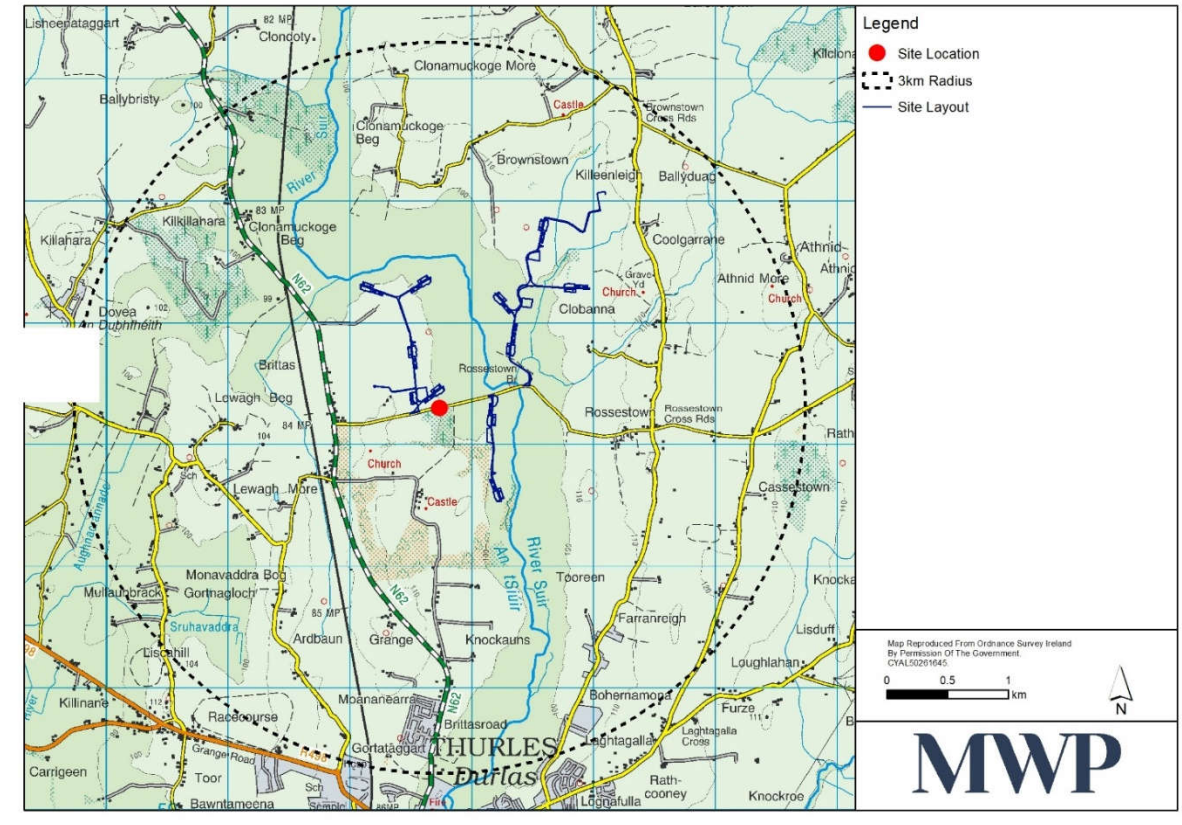


Figure 2-1: Site location map of the proposed Brittas Wind Farm Site

The proposed wind farm and substation are located within the townlands of Brittas, Rossestown, Clobanna, Killeenleigh, Brownstown and Kilkillahara (See **Figure 2-3**). The proposed grid route to the existing Thurles 110kV substation is located within or along the boundaries of the townlands of Killeenleigh, Coolgarrane, Clobanna, Athnid More, Rossestown, Cassestown, Farranreigh, Laghtagalla, Furze, Loughlahan and Ballygammane.

The Turbine Delivery Route (TDR) runs from the Port of Foynes in County Limerick to the Wind Farm Site via the national, regional and local road network. Proposed works associated with the Turbine Delivery Route are located in the Townlands of Brittas and Brittas Road, County Tipperary. The Turbine Delivery Route is identified in **Figure 2-13**. The small section of land in Thurles town needed for the accommodation works for Turbine Delivery is located in the townland of Brittasroad.

The SID planning application development site boundary includes a total land area of approximately 331.98 hectares mapped in **Figure 2-2.**

The lands of the Wind Farm Site are made up of agricultural fields bounded by hedgerows and treelines. An area of broadleaf forestry is located within the southwest portion of the site. The River Suir transects the site from north to south. The N62 is located west of the site, running north to south, connecting Templemore to Thurles. The N62 provides a link to the M6, M7 and M8 motorways. The L8017 local road traverses the centre of site from east to west, crossing the River Suir at a bridge point. There are a small number of recorded monuments within 3km of the project site, including Brittas Castle located in the south of the site that is included in the National Inventory of Architectural Heritage.

During the project EIA and design process, the Wind Farm Site has been substantially reduced in size eliminating areas that were considered unsuitable and concentrating on areas that were deemed appropriate for locating wind turbines and associated infrastructure. The project planning application area is mapped in **Figure 2-2** (see red line boundary). The separate and smaller parts of the red line boundary is a part of the Turbine Delivery Route where substantial works are required.

The project study area which is referred to throughout this EIAR incorporates a larger assessment area than presented in the planning application boundary (see **Figure 2-2**). It will vary from topic to topic depending on the zone of influence and sensitive receptors being assessed. This is reflected accordingly in each chapter. **Figure 2-3** illustrates the site planning application boundary and relevant townlands.

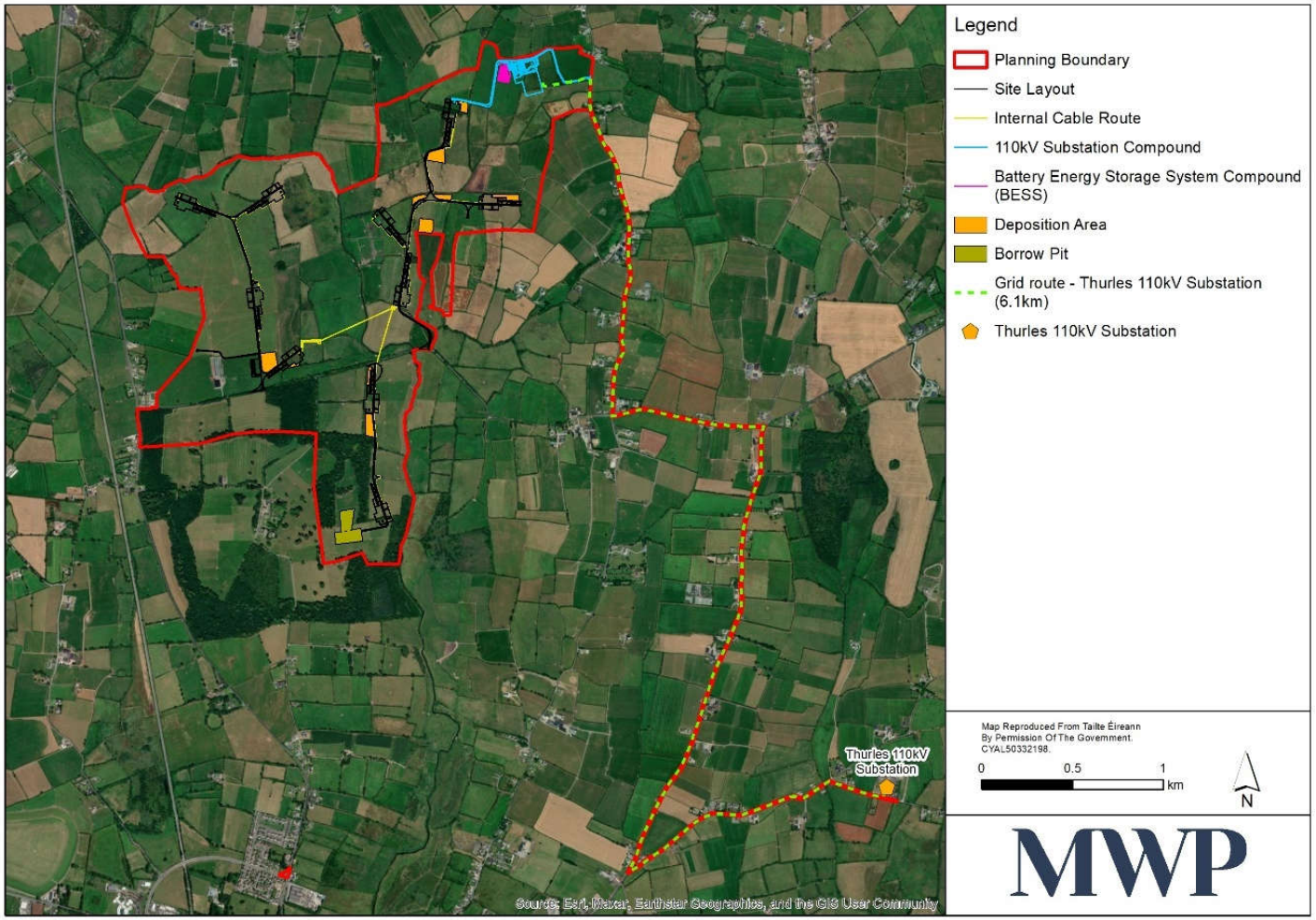


Figure 2-2 EIA Project Area and Red line Site Boundary

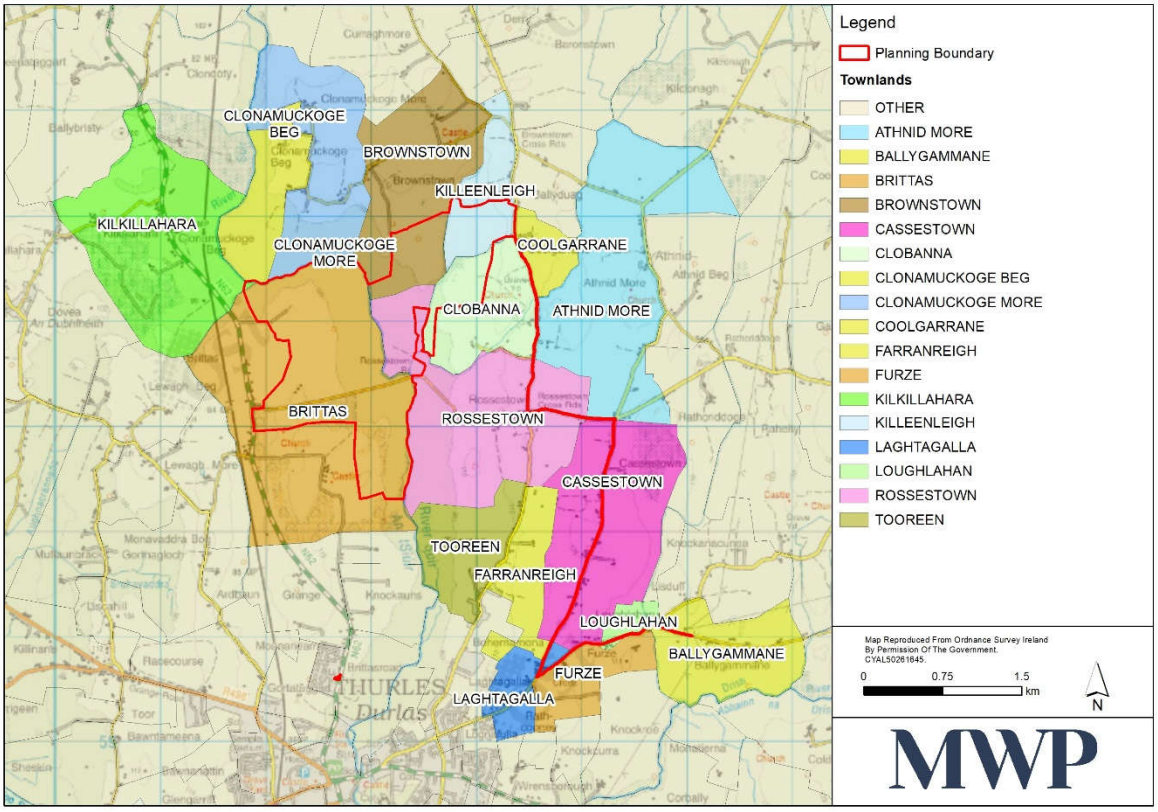


Figure 2-3 Site Boundary and Townlands

2.3.2 Development Lands Ownership

The proposed project lands described in the previous sections are private lands. Consent letters from all relevant landowners are included with the planning application documents.

Road opening licences will also be sought from Tipperary County Council for the grid route and TDR development works within and along the public road network (see details in section 2.4.5 and 2.4.14).

2.3.3 The Wind Farm Site (Core Wind Farm Elements)

The proposed elements of the Wind Farm project are summarised in section 2.2 above and are illustrated in Figures 2-4 and 2-5 below:

Figure 2-4: Proposed Wind Farm Layout

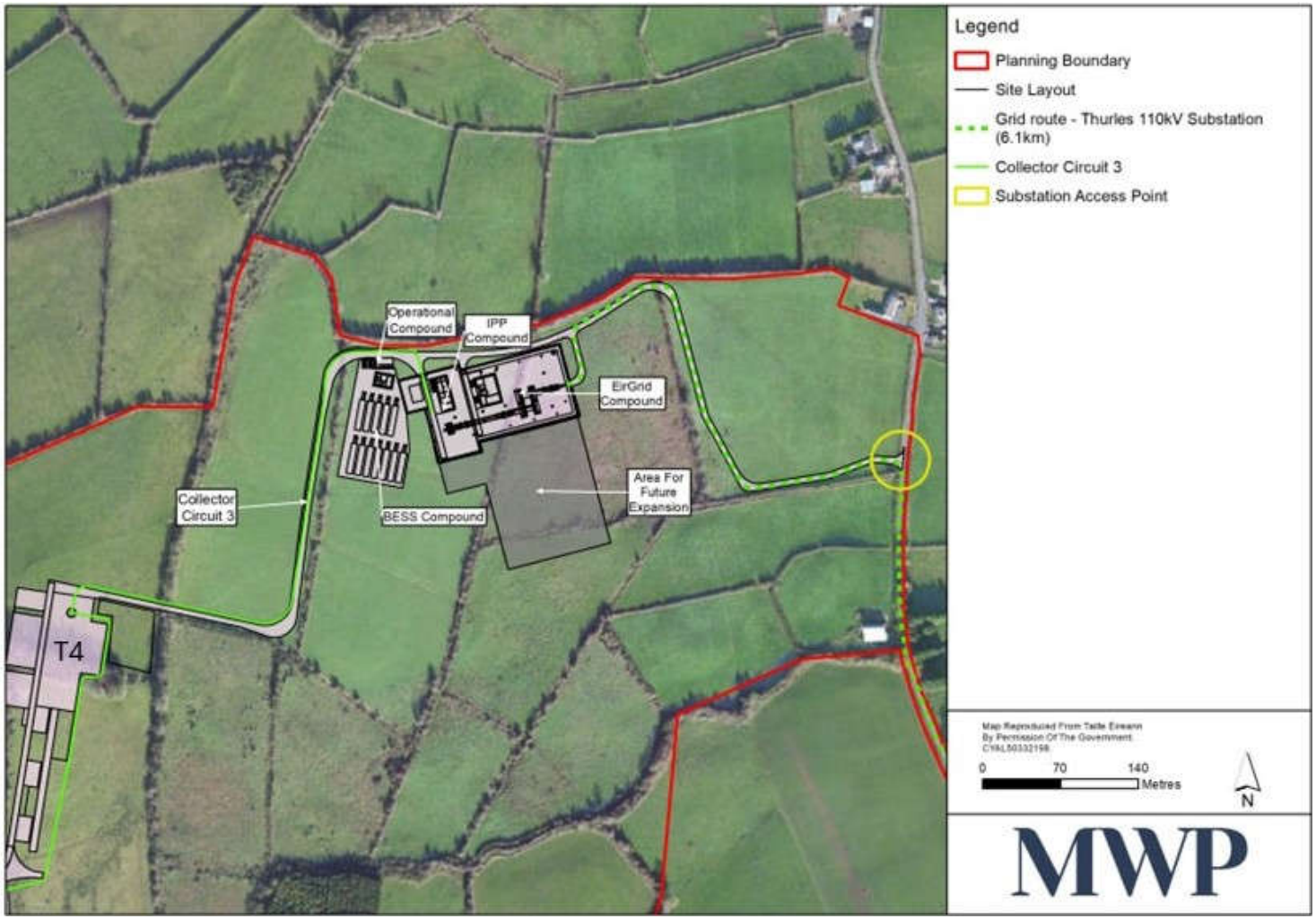


Figure 2-5: Brittas Sub-station layout with connection to T4 and connection to existing roads.

2.3.4 Connection to Substation and Grid Route Connection

The proposed Grid Connection Route will consist of approximately 7km of a 110kV underground cable buried in the public road. The Grid Connection Route will connect the proposed on-site 110kV substation at the Wind Farm Site to the nearby existing Thurles 110kV substation located in the townland of Ballygammane. Alternative grid route options have been assessed in Chapter 4 Alternatives of this EIAR.

The grid route passes through agricultural fields within proposed new access tracks. The route then enters the public road at the Wind Farm Site boundary at the townland of Killeenleigh and heads southeast towards its destination at Thurles 110kV substation in the townland of Ballygammane. The entire route from the Wind Farm Site boundary to the Thurles 110kV substation is located along public local roads. The route is further discussed in section 2.4.14 and illustrated in Figure 2-7.

2.3.5 Turbine Delivery Route

The turbine components are expected to be delivered by sea to the Port of Foynes in County Limerick and transported to site along the national, regional and local road network. A total of 100 deliveries are expected, which will likely take place mostly at night.

It is proposed that the site will be accessed from Junction 25 on the M7 at Knockalton/Nenagh to the site entrance on Rossestown Road L8017. This route will make use of the M7 motorway, the R498, the N62 and finally the Rossestown local road L8017 to the proposed project site. A description of the TDR is provided in section 2.4.5 below. Twenty-two pinch points (see Figure 2-13) have been identified along the route where various works will be required. These works include the following:

- The temporary removal of traffic signs and lights
- The temporary removal of electricity poles, bollards and lamp posts
- Hedges and tree removal or trimming
- Temporary land access/take
- Lowering of some roadside banks
- Temporary Fence removal
- Road widening

Two points have been identified where hardstanding areas are required and these are included in the redline planning boundary for this SID application. Most of the temporary works mentioned above do not require planning permission and can be carried out through road opening licence. Details of the accommodation works required are provided in section 2.4.5 below and Appendix 2A of the EIAR.

2.3.6 Duration of Permission

A ten-year consent is being requested for the proposed project. That is, planning consent for the construction of the development will remain valid for ten years following the grant of permission. It is noted that the Wind Energy Development Guidelines (2006) state that "Planning Authorities may grant permission for a duration longer than 5 years if it is considered appropriate, for example, to ensure that the permission does not expire before a grid connection is granted. It is, however, the responsibility of the applicants in the first instance to

request such longer durations in appropriate circumstances". This text also appears in Section 7.22 of the Draft Revised Wind Energy Development Guidelines (2019).

A 10-year planning permission is considered appropriate for a development of this size to ensure all consents are secured prior to commencement of construction.

The applicant requests the grant of permission is on the basis of a 35-year operational period from the date of full operational commissioning of the wind farm. Permission for the proposed onsite substation is sought in perpetuity given that the substation will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be removed.

2.3.7 Key Project Design Approach and Considerations

There are multiple elements which must be considered in the design of an appropriate wind farm development. Some of the key elements of the project design approach for the proposed project included:

- Wind Farm Constructability
- Environmental Constraints and Iterative Design Process
- Wind Resource Zoning and Designations

2.3.8 Constructability

Site conditions such as topography, hydrology, geology, and access, can affect the 'buildability' of the project. A constructability constraint approach was used integrating the most significant of construction related constraints including ground slope, peat depth (where applicable) and hydrology, providing a constructability ranking based on a qualitative assessment. This has been developed by Malachy Walsh and Partners' Wind Farm Engineering Team and it reflects actual site experience and an understanding of the constraints involved in constructing and delivering wind turbine components and infrastructure. Further detail of the constraints and alternatives considered is provided in Chapter 4 of the EIAR and the construction details are provided in Chapter 3 Civil Engineering.

2.3.9 Environmental Constraints and Iterative Design

An iterative analysis approach was adopted during the wind farm design process based on the detailed baseline studies, which included detailed constraint mapping and iterative modelling, as required, for environmental aspects. 'Mitigation by avoidance' and iterative design was a critical component of the wind farm design process. The objective of the iterative design process was to achieve the optimum, or the most suitable and environmentally sensitive wind farm infrastructure layout, that most complemented the particular environmental and physical characteristics of the project site. Refer to Chapter 4 Alternatives in the EIAR for discussion of the iterative design process.

2.3.10 Wind Resource Zoning and Designations

The proposed wind farm is located within areas identified as 'Open to Consideration for New Wind Energy Development' in the Tipperary County Development Plan 2022-2028 Renewable Energy Strategy. See **Figure 2-6** below.

All turbines have been subject to the same robust constraints, buffers, and environmental studies regardless of location.

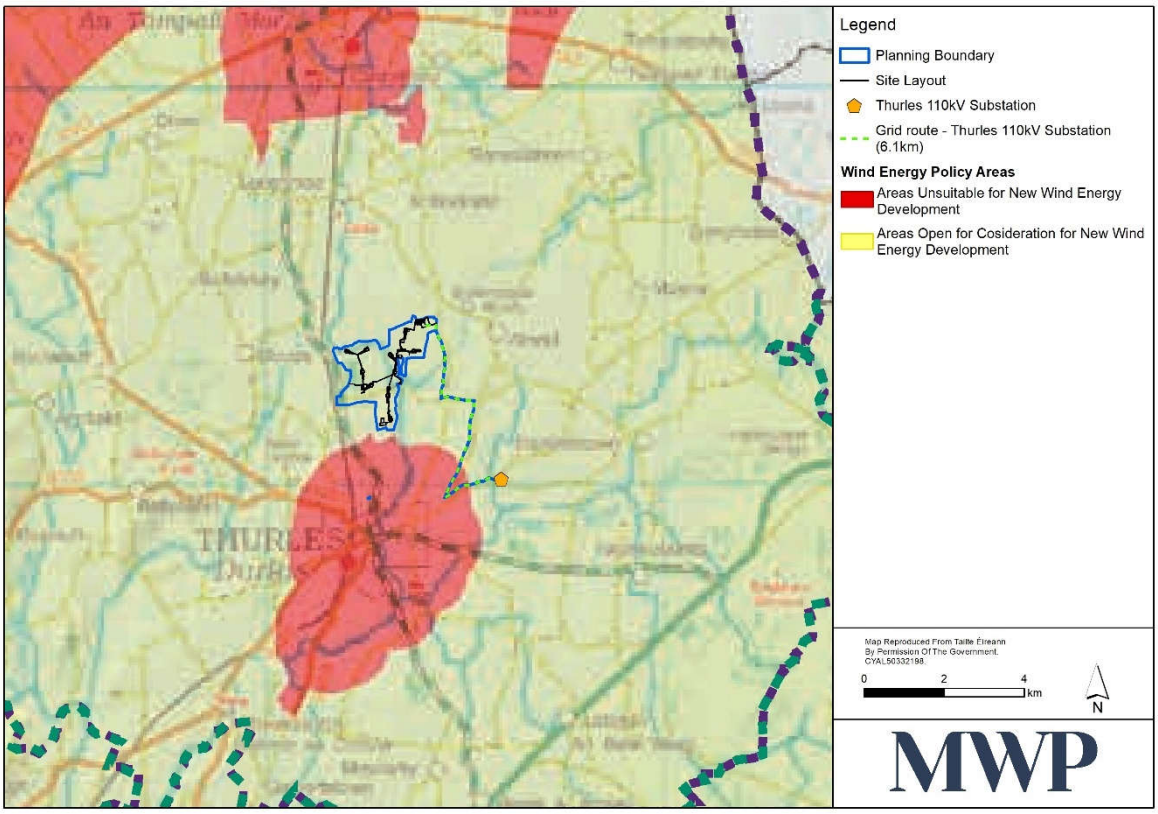


Figure 2-6 Wind Energy Zoning in relation to the project boundary

2.3.11 Community Benefit Fund

Under the renewable Electricity Support Scheme (RESS) all renewable electricity generation projects must establish a Community Benefit Fund to be used for the wider economic, environmental, social and cultural well-being of the local community. The contribution is set at €2 per Megawatt hour of generation of the RESS Project. This means there are real and quantifiable funds being made available annually for the benefit of the local community. The Fund will be aligned to incentivise investment in local renewable energy, energy efficiency measures and climate action initiatives.

The key stakeholders involved in the Community Benefit Fund are the Community, the Fund Committee, the Developer and the Administrator. For the proposed Project, the community benefit funds under RESS is

expected to deliver approximately €250,000 a year which will contribute to a near neighbour scheme and sustainable community initiatives in line with the latest RESS guidelines.

2.4 Size, Design and Appearance of the Proposed Project

The figures presented in the following sections are for illustrative purposes only. Refer to **Planning Drawings 23318-MWP-00-00-DR-C-5001 to 23318-MWP-00-00-DR-C-5431** for details.

The proposed project site boundary included in the SID planning application is outlined in **Figure 2-7**. The area within this boundary is 331.98 ha.

Figure 2-7 shows the proposed Wind Farm Site layout for which planning permission is being sought and illustrates the positions of the turbines, access tracks, crane hardstand areas, internal underground cabling, route of the grid connection, substation, permanent meteorological lidar, borrow pit, material deposition areas and temporary construction compounds. The development footprint for the road, hardstands and other facilities within the application area is approximately 20.4 ha. The battery energy storage system/facility (BESS) is not part of this planning application but is assessed in the EIAR.

The layout reflects the outcome of the iterative engineering and environmental analysis approach adopted during the wind farm design process which considered a number of factors including minimising any risk in terms of poor ground conditions, negative influences on the existing drainage, avoidance of sensitive ecological habitats and high flood risk areas, and any known archaeological features. The design rationale and evolution is described in **Chapter 4** of this EIAR.

The project also includes additional components outside the boundaries of the project planning application area including temporary works along the turbine delivery route which do not form part of the planning application.

2.4.1 Turbines

It is proposed to install ten (10) no. wind turbines each with a tip height of 180 metres (refer to **Table 2-1** for turbine dimension details). The precise turbine model has not yet been determined and the developer has been granted flexibility to consider three different types of turbines with variable designs, blade lengths, and hub height (see **Appendix 1A**). The power output of the proposed project will range from 57-66MW depending on what turbines are chosen prior to construction. The characteristics of the three turbine types are presented in **Table 2-1** and **Figure 2-8** below and shown on planning drawings **23318-MWP-00-00-DR-C-5401** and **23318-MWP-00-00-DR-C-5402** . A single turbine type will be taken forward for construction. The final turbine type is subject to a procurement process.

Table 2-1: Characteristics of the three types of turbines proposed and assessed in the EIAR.

Turbine Type	Rotor Diameter	Tip Height	Blade length	Hub Height
A (1)	150m	180m	73.7m	105m

Turbine Type	Rotor Diameter	Tip Height	Blade length	Hub Height
B (2)	155m	180m	76m	102.5m
C (3)	149m	180m	73m	105m

The turbines ultimately selected will be certified under the International Electrotechnical Commission IEC 61400-1 safety standards and will be designed to withstand the environmental conditions encountered on site. The proposed turbines will be of a modern design, incorporating tubular towers and three blades attached to a nacelle. The tower supports a nacelle and rotor hub. It is proposed that the wind turbine hubs and towers will be made of steel, while the blades will be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or a similar composite material. The turbines will be designed in accordance with the requirements for finish and colour that are detailed in the 2006 Department of Environment, Heritage and Local Government Wind Farm Development Guidelines (DoEHLG 2006 Guidelines) as follows:

- Turbines shall be finished to a white, off-white, or grey colour to correspond with the colour scheme of existing turbines.
- All surfaces will have a matt non-reflective finish.

It is proposed to install lighting on the turbines in a pattern that is acceptable to the Irish Aviation Authority (IAA) for aviation visibility purposes, subject to agreement with the IAA. Agreement with the IAA will be sought during the post-consent period and prior to construction. The dimensions and co-ordinates of the proposed turbines are set out in Table 2-2.

Table 2-2 Proposed Turbine Heights and ITM Co-ordinates

Turbine No	Height	X Coordinate	Y Coordinate
T1	180m	612041	663334
T2	180m	612606	663390
T3	180m	613136	663262
T4	180m	613561	663879
T5	180m	613713	663346
T6	180m	612472	662850
T7	180m	613279	662778
T8	180m	612712	662499
T9	180m	613093	662195
T10	180m	613167	661578

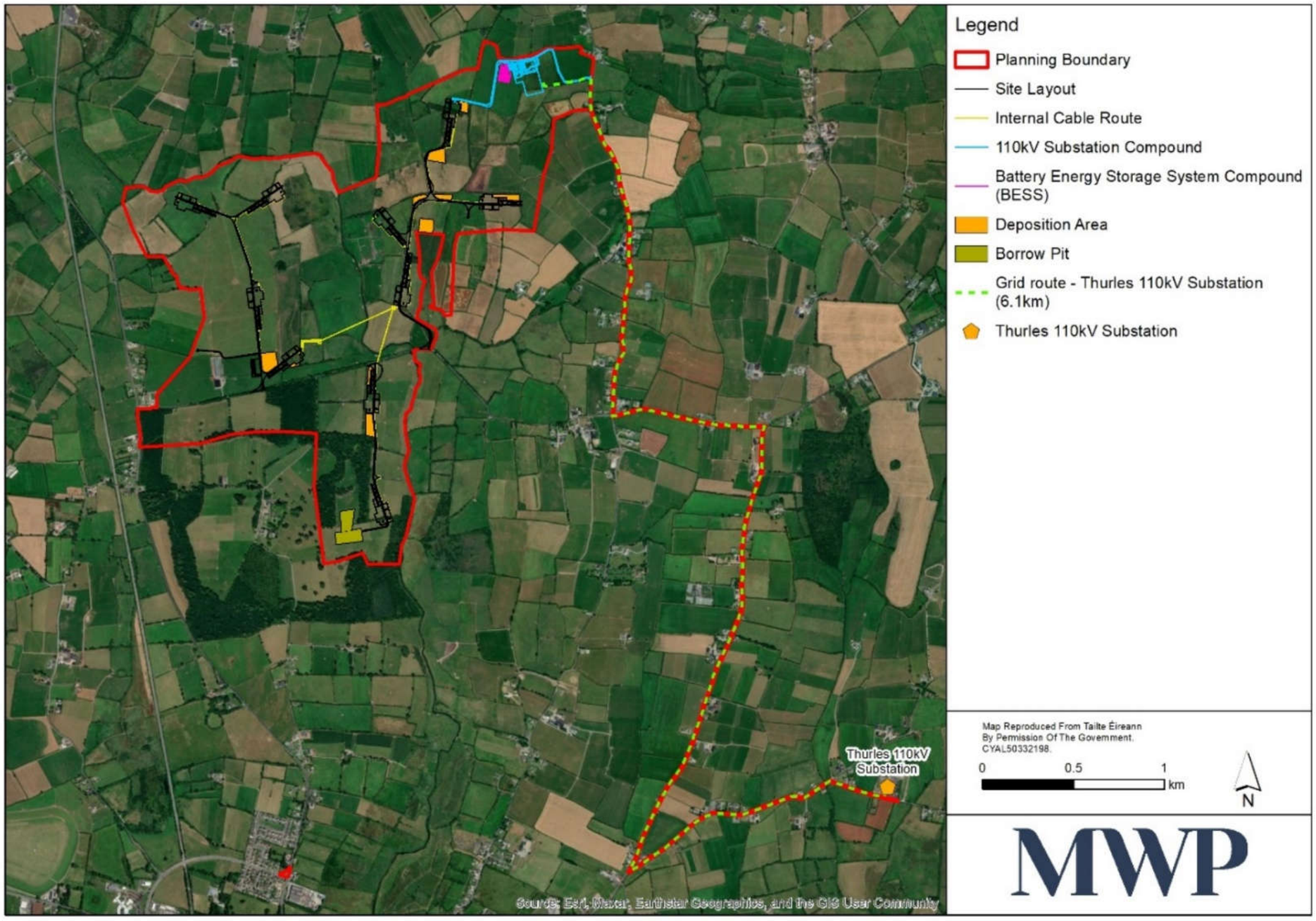


Figure 2-7: Proposed layout of Wind Farm Infrastructure within the Planning Application Boundary

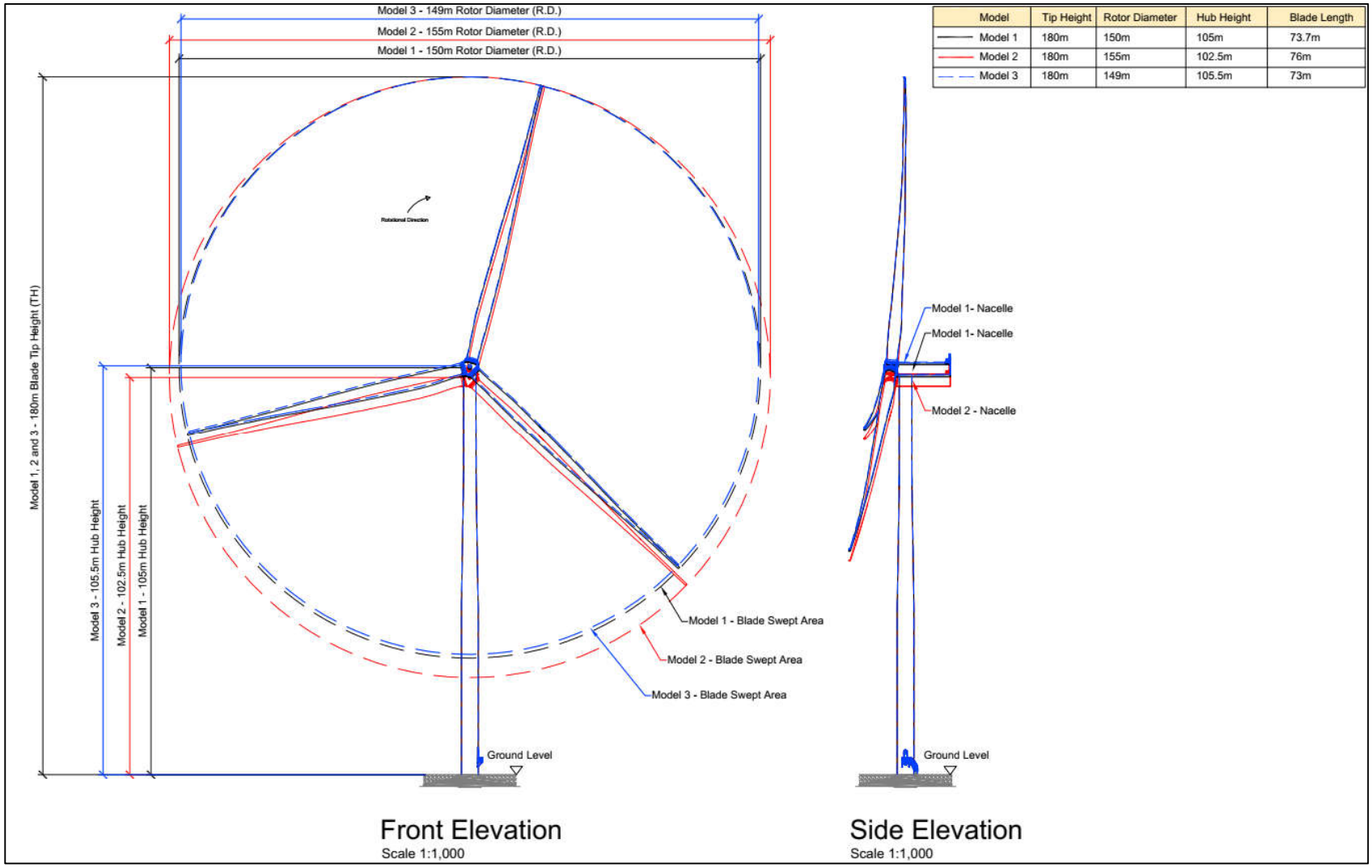


Figure 2-8: Diagram illustrating the differences between the three types of turbined being considered and applied for in the planning application.

2.4.1.1 Power Output

As part of indicating the likely beneficial environmental effects on the climate, it is considered that the proposed wind turbines will have an assumed rated electrical power output of between 5.7 and 6.6 MW, resulting in an overall output of between 57 and 66MW. The final power output will be determined as a result of procurement of the final turbine type over the period leading up to construction.

Based on the above, the proposed wind farm has the potential to produce approximately 139,809 to 161,884 MWh (Megawatt hours) of electricity per year[1] depending on the type of turbine used, based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year where:

A is the number of hours in a year: 8,760 hours

B is the capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc: 28%

C is the rated output of the wind farm: minimum 57 MW, maximum 66 MW

The capacity factor of a wind farm takes into account the intermittency of the wind and is based on average wind speeds. The capacity factor of 28% is based on SEAI's average published in Onshore Wind Community Energy Resource Toolkit[2]. The capacity factor is subject to weather conditions over a full year period.

2.4.1.2 Turbine transformers

Each individual turbine will generate electricity at a nominal voltage. Each turbine will also have its own transformer to step-up to an on-site distribution voltage. The transformer and associated switchgear will be located within the turbine tower.

2.4.1.3 Communication links

There will be communication links between the wind turbines, meteorological Lidar, and the substation. The links will use ducted fibre optic cables laid in the same trench as the network of underground electrical cables around the site. Further details on this are provided in section 2.4.17 and in Chapter 3, section 3.6.

[1] The 139 809, 147 168 and 161 884 MWh of electricity produced by the proposed wind farm will be sufficient to supply the equivalent of between 28 808, 30 325 and 33 357 Irish households with electricity per year. This is based on the Sustainable Energy Authority of Ireland "Energy in Ireland 2021 Report" from December 2021, which details domestic consumption values for electricity customers in 2020. This report updates the average annual dwelling electricity consumption figure to 4,853 kWh per annum.

[2] Community-Toolkit-Onshore-Wind.pdf (seai.ie)

2.4.1.4 Wind Turbine Foundations

Each wind turbine will have a reinforced concrete base pad foundation with a central plinth above the base, which will support the tower. The foundations are anticipated to be circular in shape and approximately 32m in diameter and 4m in depth. The turbine foundations shall be constructed using standard reinforced concrete construction techniques. Detailed of foundation designs are provided in **section 3.5.3** of Chapter 3 (Civil Engineering). Turbine foundations will be designed to Eurocode Standards. Foundation loads will be provided by the wind turbine supplier, and factors of safety will be applied to these in accordance with European design regulations. See planning application Drawing No. 23318-MWP-00-00-DR-C-5403 for foundation details.

2.4.1.5 Hardstands and Lay Down Areas

Turbine hardstands are required to accommodate the delivery of the turbine components prior to their erection, to support the cranes during erection and to provide a safe working area during construction, operation and decommissioning. Each wind turbine will have an associated turbine hardstand area adjacent to the foundation. The footprint of each turbine hardstand is detailed in Figure 2-9. The hardstand areas will be excavated and bear onto rock (or other suitable bearing stratum) with a foundation of 0.5-1.5m depending on the local bedrock profile. In the decommissioning phase, the hardstands will be left in situ and covered over by soil and revegetated. See planning application Drawing No. 23318-MWP-00-00-DR-C-5404 for the hardstand details.

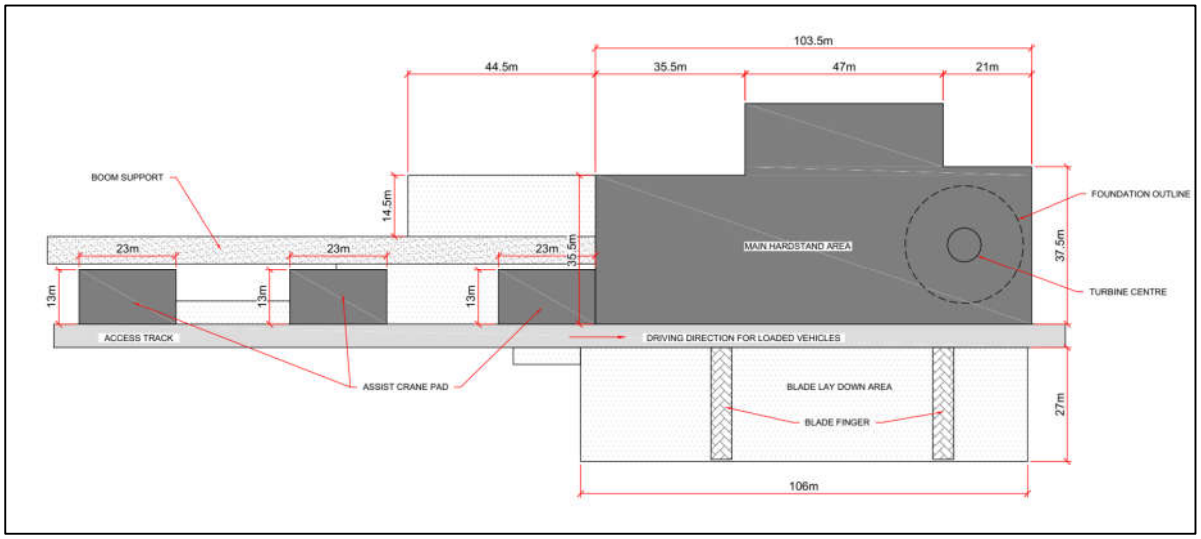


Figure 2-9: Proposed Hardstand Layout

2.4.2 Permanent Meteorological Lidar Monitor

A permanent meteorological lidar monitor will be erected within the wind farm to monitor the local wind regime while the wind farm is in operation. This is to be located west of T8 and T6 close to the large existing farm shed (see Figure 2-10 below). The lidar will have a base foundation and hardstanding area as well as its own access track. The meteorological lidar will be surrounded by a galvanised steel palisade fence, 2.4m in height. The meteorological lidar will have an antenna for internal radio communications for the SCADA (Supervisory Control and Data Acquisition) equipment on site. An illustration of the lidar and palisade fencing is shown in Plate 2-1

below. Further details are provided in **section 3.10 of Chapter 3**. See planning application **Drawing No. 23318-MWP-00-00-DR-C-5405** for details.

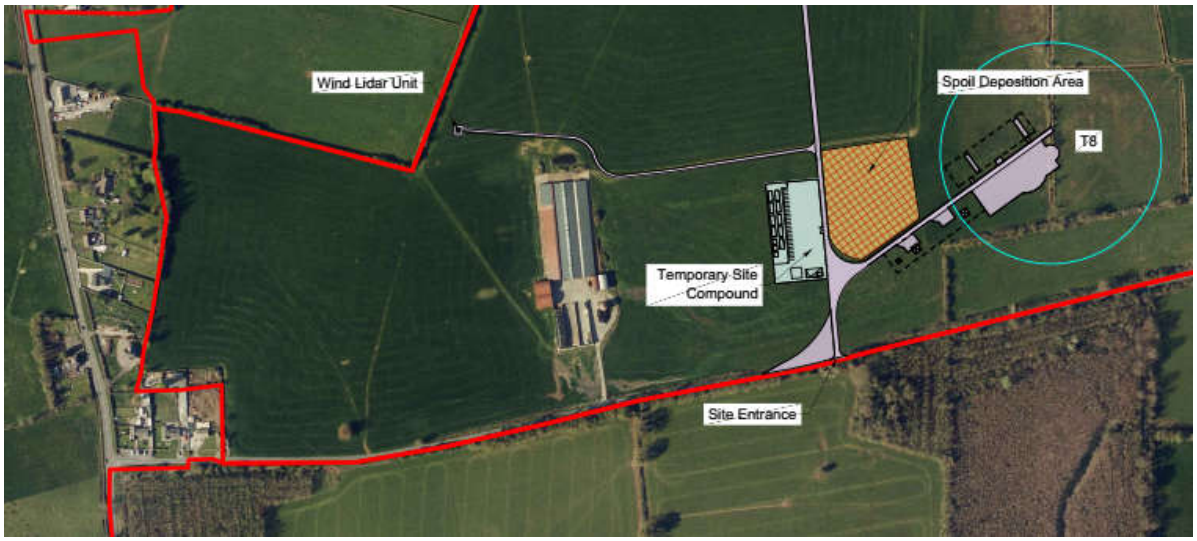


Figure 2-10: Lidar site location.

Plate 2-1: Photograph of a typical meteorological lidar facility on a wind farm with palisade fencing

2.4.3 Internal Site Access Tracks and Roads

Internal site access tracks are required to connect elements of the site and allow access to all wind turbines and wind farm infrastructure. Existing tracks will be upgraded, and new tracks will be constructed to access each of the turbines, substation compound and meteorological lidar. The routing of internal site service tracks is shown in **Figures 2-4 and 2-5**. Overall, a total of 6.83 km of track infrastructure will be constructed within the proposed

project site. This is comprised of 6.4 km of new internal access tracks and 353 m of existing internal farm tracks being upgraded and widened. These access tracks will have a standard running width of circa 5.5m with surface water collection drains on either side. These will be constructed using excavated and floating road techniques depending on the ground conditions. See planning application **Drawing No. 23318-MWP-00-00-DR-C-5406** for details. The methods of construction are outlined in EIAR **Chapter 3 Civil Works**.

2.4.4 Site Access

Primary access to the proposed project site will be provided from the local public Rossestown road (L-8017). There will be four site entrances. Three of these are located along the L-8017 road (see **Figure 2-11**) and will provide site access during the construction, operational and decommissioning phases. The most westerly of these three site entrances provides access to turbines 1, 2, 6 and 8 as well as the Lidar and the main construction site compound to the north of the public road. The middle entrance provides access to Turbines 9 and 10 and the borrow pit to the south of the L-8017. The third eastern entrance on the L-8017 provides access to turbines 3, 4, 5 and 7 as well as another construction compound and the proposed substation. The fourth entrance (see **Figure 2-12**) is to the substation only and will only be used for operations and maintenance access during the operational phase. This entrance is located along the section of the L-4120 road in the townland of Killeenleigh, located at the north-east of the Wind Farm Site.

Further details are provided in **section 3.3 of Chapter 3** and in planning application **Drawing No. 23318-MWP-00-00-DR-C-5034** and **23318-MWP-00-00-DR-C-5035**.

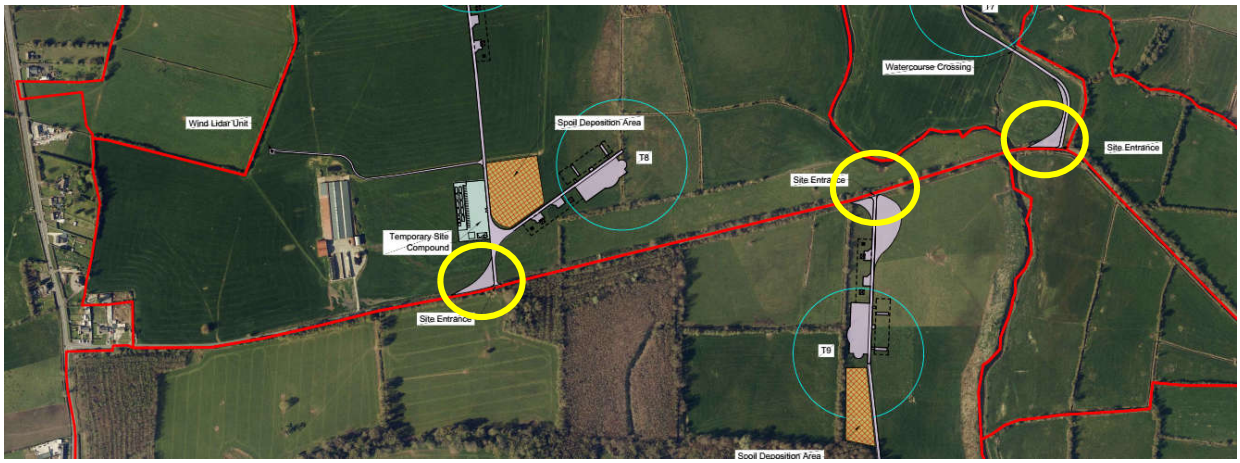


Figure 2-11 Three Construction Site Access Points (circled in yellow)

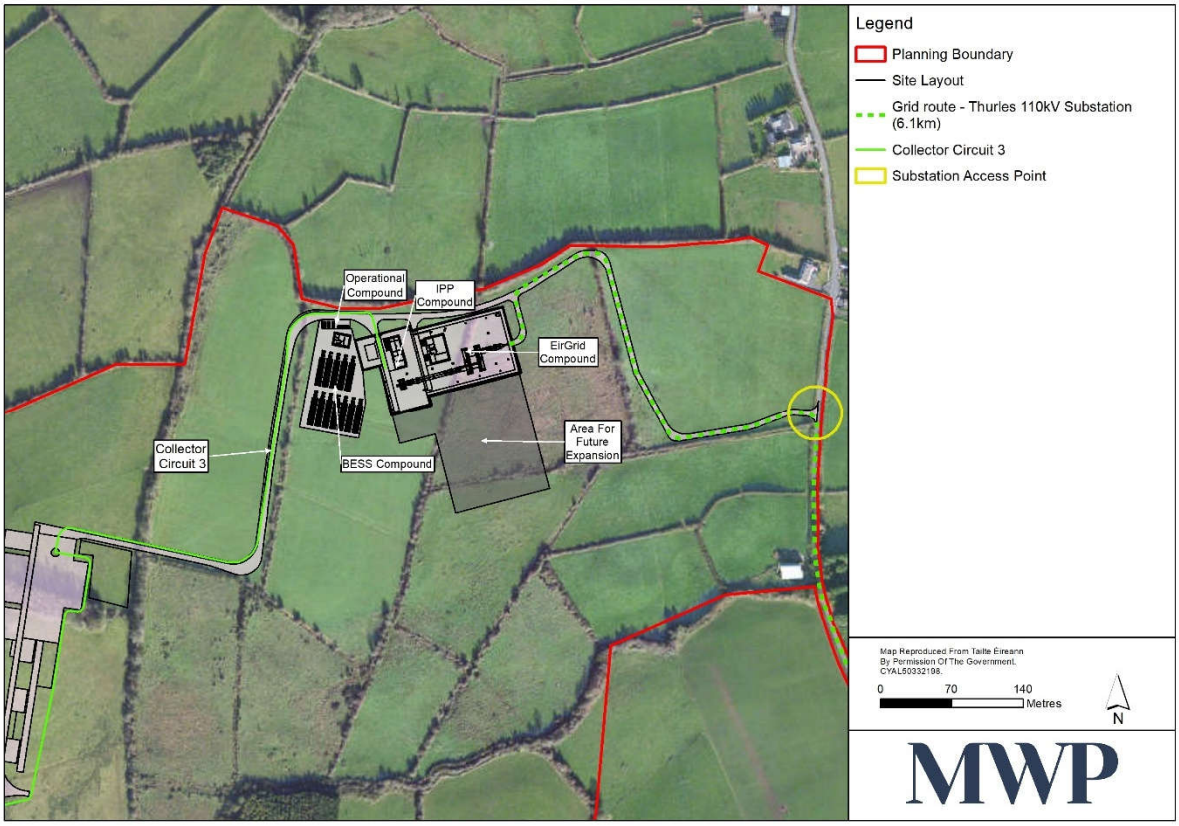


Figure 2-12 Access point for substation during the operational phase (circled in yellow).

2.4.5 Turbine Delivery Route

The components for each turbine are expected to be delivered in approximately 100 No. deliveries in total. Due to their abnormal size, blades and towers will be delivered at night to avoid disruption to daytime traffic. The turbine blades will be the longest components to be transported from port to site at approximately 76m in length. The components are expected to be delivered by sea to the Port of Foynes in County Limerick and transported to site along the national, regional and local road network.

The first section of the proposed route to the site will be along the M7 from the Port to Junction 25 (Nenagh Centre). A description of the rest of the turbine delivery route is provided below, and an overview of the proposed section is shown in Figure 2-13.

- Exit M7 at Junction 25
- M7/R498/ Roundabout, Exit travelling southeast
- Travelling southeast along R498 to Borrisoleigh
- Travelling southeast along R498 to Thurles
- R498/Jimmy Doyle Rd Roundabout, 1st Exit travelling northeast
- Turn left at Jimmy Doyle Rd/N62 (Brittas Rd) junction
- Travelling north along N62 (Brittas Rd) to Brittas
- Turn right at N62 (Brittas Rd)/L-8017 Rossestown Rd junction
- Travelling east along L-8017 Rossestown Rd

- Turn left at site entrance for wind turbines 1 - 8
- Turn right at site entrance for wind turbines 9 – 10

Twenty-two pinch points have been identified along the route where various works will be required. These include the following:

- The temporary removal of traffic signs and lights
- The temporary removal of electricity poles, bollards and lamp posts
- Hedges and tree removal or trimming
- Temporary land take
- Lowering of some roadside banks
- Temporary Fence removal
- Road widening

Two points have been identified where hardstanding areas are required and these are included in the redline planning boundary for this SID application. Most of the temporary works mentioned above can be completed through road opening licence. Details of the accommodation works required are provided in Appendix 2A of Volume 3 of the EIAR. A permit for moving abnormal loads to the wind farm site will be sought from An Garda Síochána and Tipperary County Council on the proposed haulage route. A detailed transportation plan with a breakdown of the timing of deliveries will be established at construction stage.

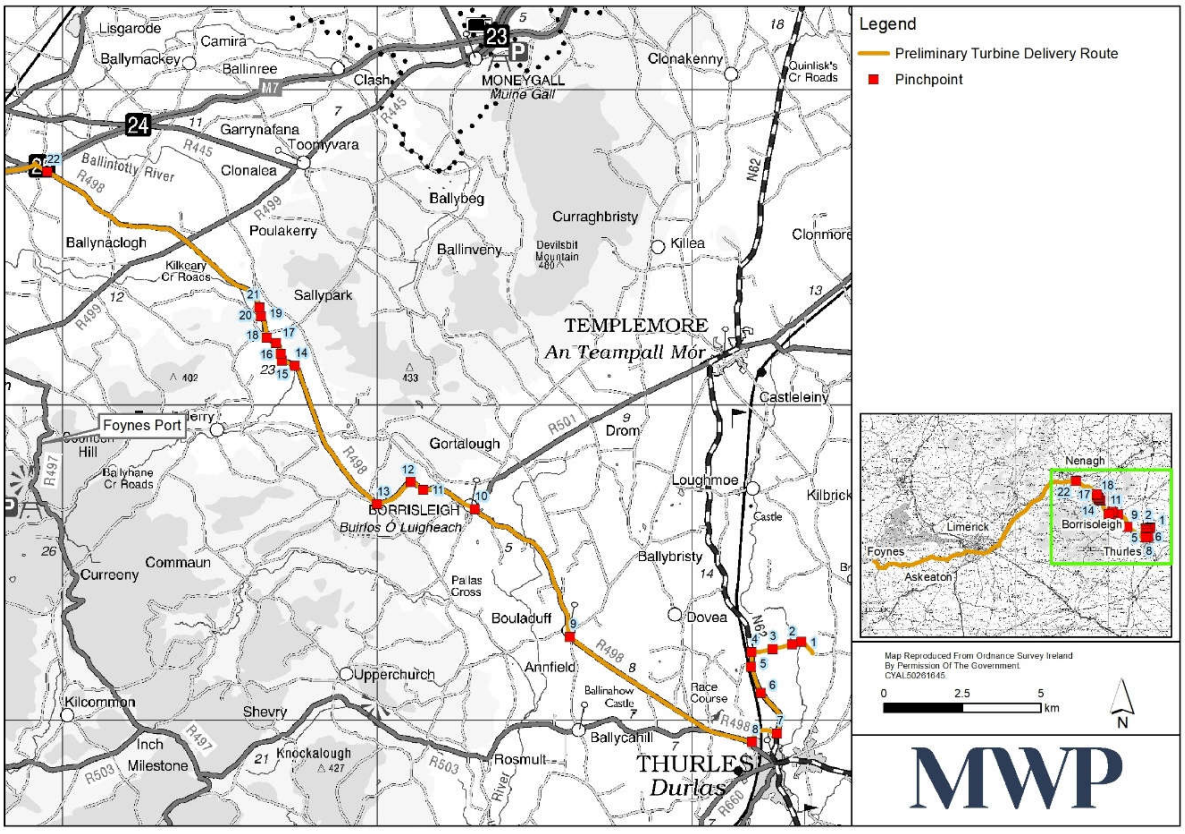


Figure 2-13 Proposed Turbine Delivery Route and Pinch Points

2.4.6 Haul Route for Heavy Goods Vehicles (HGV)

Besides the turbine components, other construction materials such as stone, gravels and other fill and excavation materials as well as concrete will be transported to and from the project site via the Rossestown road (L-8017) and other roads in the locality such as the N62, R498, N75, and M8. The roads used will depend on the location of the suppliers, however, the majority of HGV deliveries will approach the site from the N62 and enter the L8017 from the west (N62, L8017 junction). There are three quarries located within 10-15km of the project site and 2 concrete suppliers within 12 and 20km of the site.

2.4.7 Traffic Management

Reasonable efforts will be made to minimise the impact of the works on local residences and users of the public road networks. A Traffic Management Plan (TMP) outlining the required traffic management procedures to be implemented on the public roads during the construction of the proposed project and delivery of the wind turbine components is included as Appendix 16A. In the event ABP decides to grant approval for the proposed project, the final TMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by ABP. The Traffic Management Plan will be updated prior to commencement of (or the update commenced during planning compliance stage) in line with the parameters set out in the appended TMP (Appendix 16A) subject to the approval of the local planning authority to ensure controls are in place with all suppliers coming to the project site.

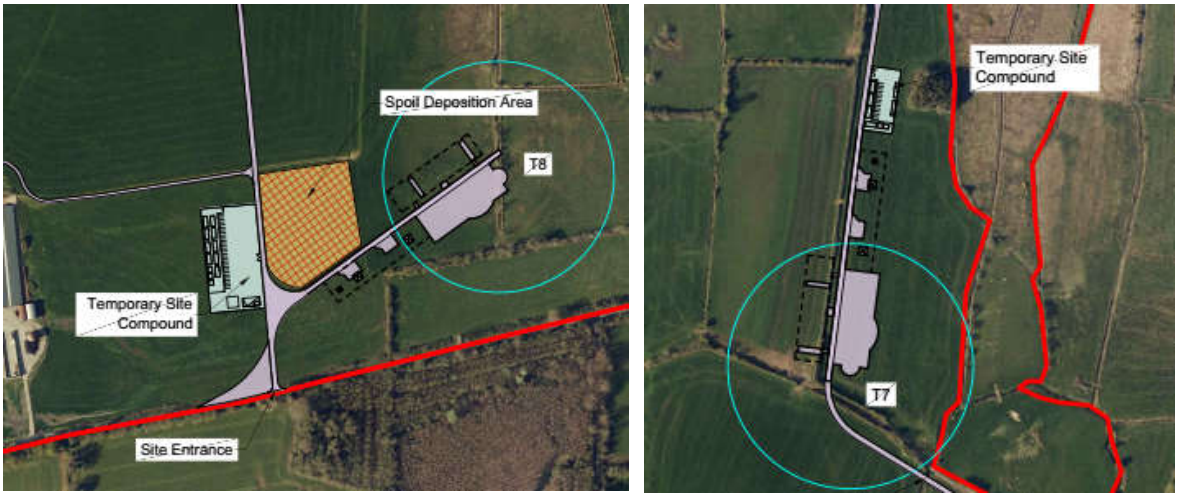
2.4.8 Temporary construction compounds and welfare facilities

Two (2) No. temporary construction compounds will be set up upon commencement of the construction phase. The location of these temporary compounds is shown in Figure 2-14.

The main construction compound (located to the north of the western site entrance of the wind farm site adjacent T8) will have a footprint of 4,750m² (0.48ha)

The supplementary construction compound will be located north of T7 and will be 1,375m^2 (0.38ha) in size. See planning application Drawing No. 23318-MWP-00-00-DR-C-5411 and 23318-MWP-00-00-DR-C-5412 for details.

The compounds will be used as a secure storage area for construction materials and will also contain temporary site cabins to provide welfare facilities for site personnel. Facilities will include office space, meeting rooms, canteen area and mobile sanitary facilities. The proposed project will include an enclosed wastewater management system at the temporary compounds capable of handling the demand during the construction phase. Two holding tanks are proposed at each compound for wastewater management. The holding tanks will be emptied by a licensed permitted contractor only. Upon completion of the project the compound will be decommissioned by backfilling the area with the material arising during excavation and landscaping with topsoil.



Main Construction Compound in light green shaded area (95m x50m)

Supplementary Construction Compound in light green shaded area (55m x 25m)

Figure 2-14 Location of Temporary Construction Compounds

2.4.9 Borrow Pits and Material Storage Areas

There is one (1) no. proposed on-site borrow pit location which has been identified to provide fill material for internal roads, passing bays, hardstands, foundations, and temporary compound. It is estimated that this will provide 15.5% of the fill material required for the development. The location of this proposed borrow pit is shown in Figure 2-15.

It is estimated that approximately 22,319 m³ of aggregate will be won from this borrow pit. The extraction of rock from the borrow pit is proposed to be undertaken by a combination of rock breaking, ripping, and blasting.

During the construction period, and post-excavation, the borrow pit area and the other deposition areas will act as material storage areas for the management of excess material generated on the site during construction. See planning application Drawing Nos. 23318-MWP-00-00-DR-C-5009 and 23318-MWP-00-00-DR-C-5415 for details. Post-construction, the borrow pit will be filled with excess material generated on the site during construction and thereafter topped with topsoil recovered from construction areas and stored for later use in landscaping. The borrow pit site will then be revegetated and restored to its current use as pasture.

Figure 2-15 Borrow Pit/Material Storage Location west of Turbine 10

2.4.10 Water Crossings

Seven water crossings will be required for the internal access roads and underground cables, five at the Wind Farm site (see Figure 2-16) and two along the grid route (see Figure 2-19).

Where an open drain or watercourse is encountered during the installation of the internal site cable trenches; the cable trenches will cross the open drain or watercourse within the road carriageway via new or existing road crossing points to minimise the requirement for in-stream works. Refer to Figure 2-16 for the location of these watercourse crossings. Figure 2-16 shows five watercourse crossings within the wind farm site. Two additional underground cable crossings are located along the grid route and shown in Figure 2-19.

2.4.11 Surface Water management

A site surface water management system will be constructed on the site to attenuate run-off, guard against soil erosion and safeguard downstream water quality. The drainage system will be implemented along all work areas including all internal site access roads, storage areas, crane hardstand areas and temporary site construction compound. Details of the proposed site drainage system are described in Chapter 3 (Civil Engineering) of this EIAR.

The following gives an outline of drainage management arrangements along internal services roads:

- The surface water run-off drainage system will be implemented along all internal access routes, to separate and collect 'dirty water' run-off from the roadway and to intercept clean over land surface water flows from crossing internal roadways.
- To achieve separation, clean water drains will be positioned on the upslope and dirty water drains positioned on the downslope of roadsides, with road surfaces sloped towards dirty drains.

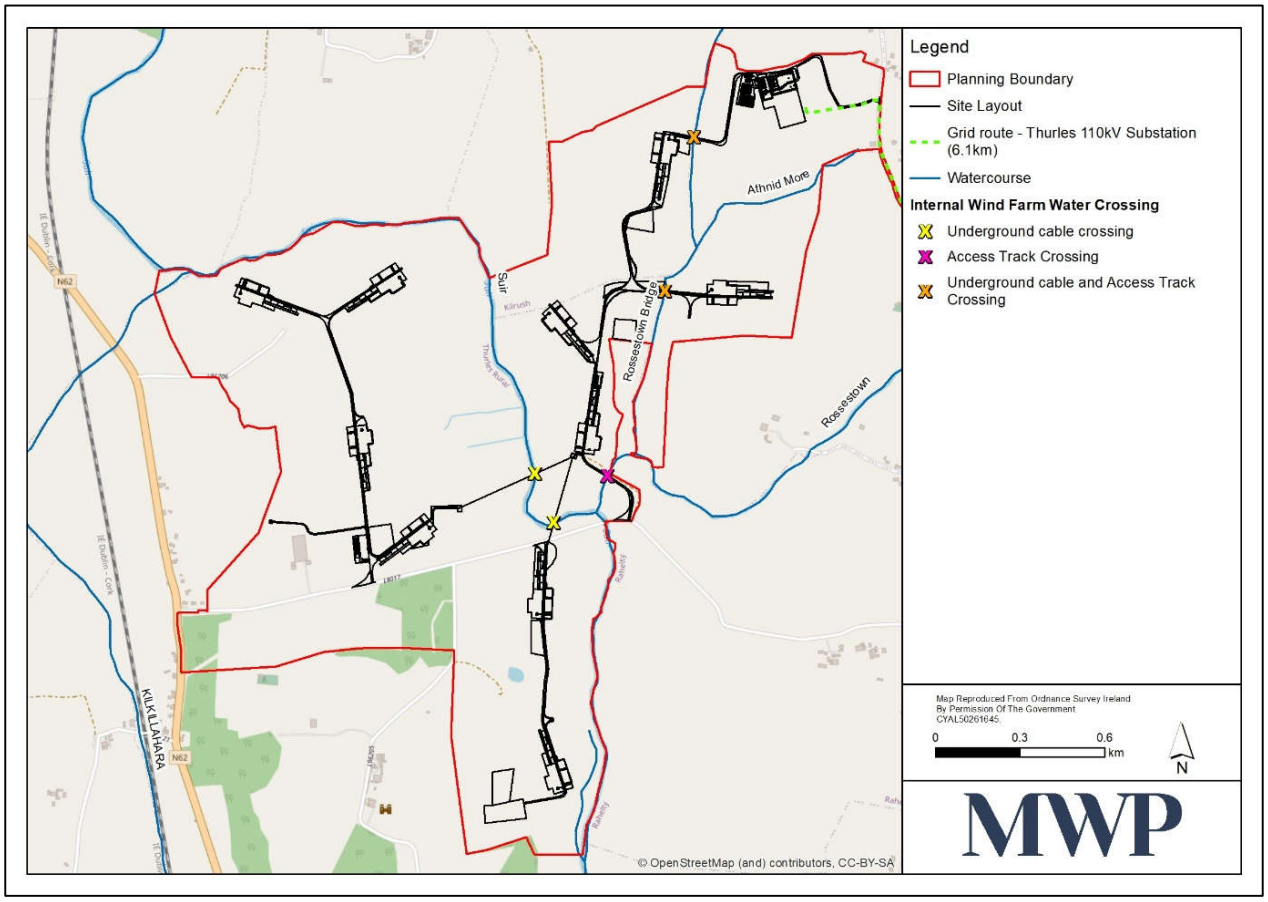


Figure 2-16: Windfarm Watercourse Crossing Locations

- Clean water will be piped under both the access roads and downslope collection drains to avoid contamination. Piping the clean water under the service road allows the clean water to follow the course it would have taken before construction thus mimicking the existing surface water over land flow pattern of the site and thus not altering the natural existing hydrological regime on site.

See planning application Drawing No. 23318-MWP-00-00-DR-C-5025 to 23318-MWP-00-00-DR-C-5033, 23318-MWP-00-00-DR-C-5429 and 23318-MWP-00-00-DR-C-5430 for details.

2.4.12 Tree Felling and Hedge Removal

Felling of some hedgerows and portions of existing woodland is required within and around wind farm infrastructure to accommodate the construction of the turbine foundations and associated hardstands, access tracks, and turbine assembly and turbine delivery routes. Trees in a radius of 105m around each turbine will be felled as part of the project. Two core sections of forestry and treeline that will be felled for this purpose are indicated in Figure 2-17. One additional section of forestry felling will be needed on the south side of the junction between L-8017 Rossestown road and the N67 for the delivery of the turbines (see Figure 2-17). Additional tree line and hedge removal will be needed in some areas for the new access roads and construction areas. Overall forestry felling of 1.4ha and 4086m of hedgerow removal which will be undertaken in accordance with a tree

felling licence, using good working practices as outlined by the Department of Agriculture, Food, and the Marine (DAFM) Standards for Felling and Reforestation (2019) and will follow the specifications set out in Forest Service's 'Forestry and Water Quality Guidelines' (2000) and 'Forest Harvesting and Environmental Guidelines' (2000). These standards deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel, and machine oils. All conditions associated with the felling licence will be complied with. A felling licence application will only be submitted once planning permission is received for the proposed development.

Tree Felling area (purple shaded) at Turbine 4 and bat buffer

Tree Felling area (purple shaded) at Turbine 10 with bat buffer

Tree Felling area for Turbine delivery route at junction between N62 and local Rossestown Road. (Area between the blue lines and the roads)

Figure 2-17 Three Areas where forestry is to be felled

2.4.13 Replanting Areas

Replacement replanting of forestry in Ireland is subject to license in compliance with the Forestry Act 2014 as amended. The consent for such replanting is covered by the Forestry Regulations 2017 (S.I. No. 191 of 2017). The total amount of forestry felling proposed for the project is 1.4 ha. It should be noted that the clear-felling of forestry in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear felled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food and the Marine is Ireland's national forest authority and is responsible for all forest licensing.

The forestry replanting license application for this wind farm will propose to replant in areas around existing plantations within the project site. The Applicant commits to not commencing the forestry felling activities until both licences are in place. The felling and afforestation licence applications will be submitted closest to the time when these activities are proposed to occur to enable the identification of optional lands and to comply with the relevant standards at that time

The removal and replanting of hedgerows is not subject to a forestry licence but the potential biodiversity and ecological effects of removal and replanting are assessed in Chapter 6 of the EIAR. This chapter also proposes mitigation measures to ensure non-significant effects across the site.

2.4.14 Grid Connection and Associated Infrastructure

Following a grid connection route study, one grid connection route and associated connection point for connecting the proposed Project to the National Grid is proposed and assessed in the EIAR as shown in Figure 2-19 and described below. See planning application Drawing No. 23318-MWP-00-00-DR-C-5013 to 23318-MWP-00-00-DR-C-5022 which shows the grid route layout and Drawing no. 23318-MWP-00-00-DR-C-5427 to 23318-MWP-00-00-DR-C-5429 for details. The Grid Connection will connect the proposed on-site substation to the nearby existing Thurles 110kV substation located approximately 4.3km straight line distance south-east of the proposed on-site substation at the wind farm site. Alternative grid route options have been assessed in the alternatives chapter (4) of the EIAR.

This entire route is along local roads. Almost 3km of these local roads from Brittas Substation are narrow one lane roads. Starting from the onsite substation entrance the proposed grid route will follow the L-4120 road south to the L-8017 Rossestown road and turn east. At the next junction it will turn south along the L-4119 road to Thurles town. At the T-junction with the L-8015 road the route will turn east until the fork in the road and will then follow the L-8014 (to the right) to Thurles substation.

The grid connection route is approximately 7km long and is illustrated in Figure 2-18 and 2-19 There are two watercourse crossings along the route. The first is located on the L-4120 in the townland of Clobanna. The second watercourse crossing is located in proximity to the existing Thurles 110kV substation in the townland of Loughlahan. Horizontal Directional Drilling will be used to route the proposed cable beneath each stream.

The grid connection route will include 12 no. joint bays which have been sited at suitable locations along the route and assessed in the EIAR (see Figure 2-19). These are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. 11 no. of the proposed joint bays are located within the public road. 1 no. joint bay is located in private lands in proximity to the proposed on-site substation.

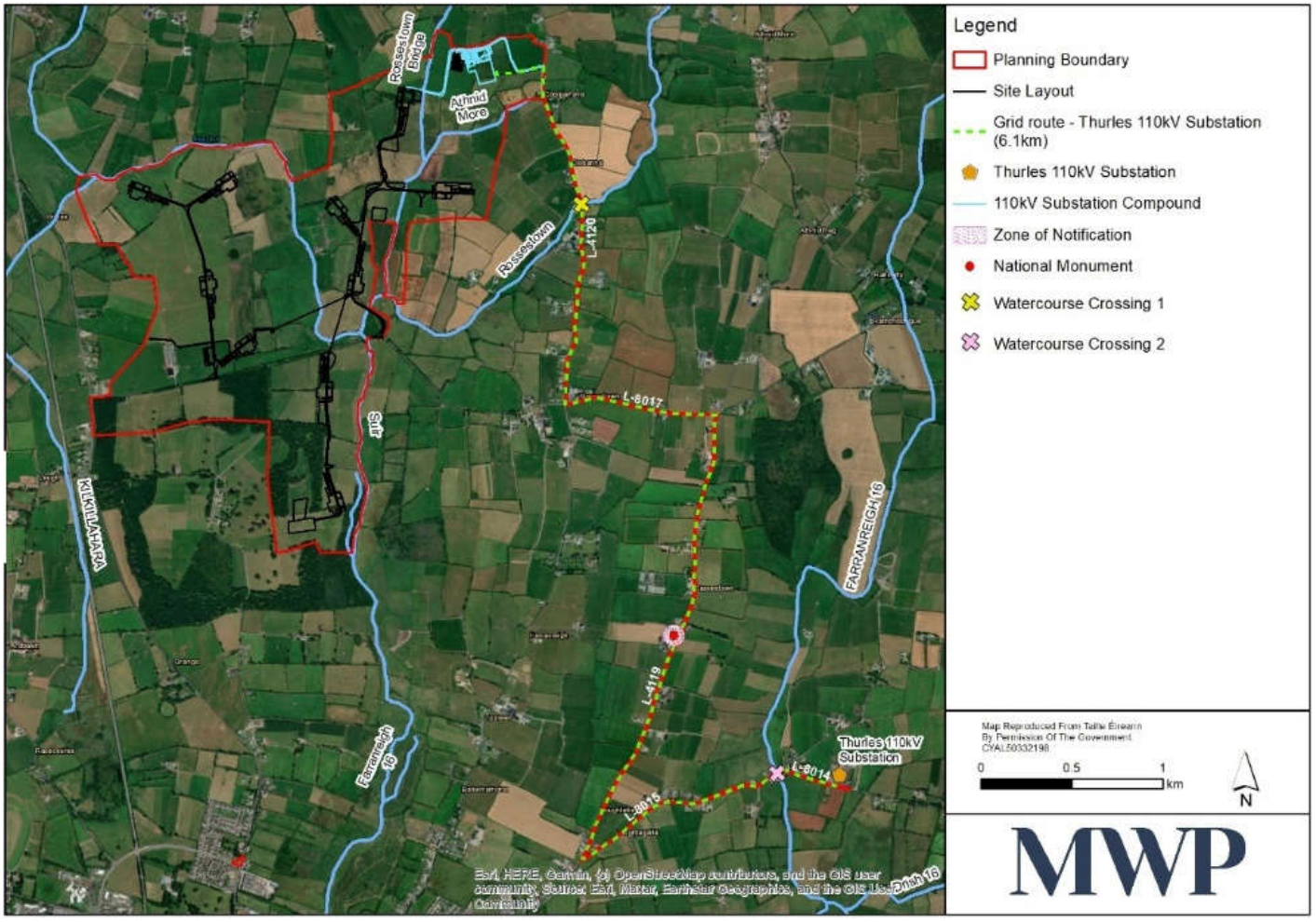


Figure 2-18: Grid Connection Route to Thurles Substation

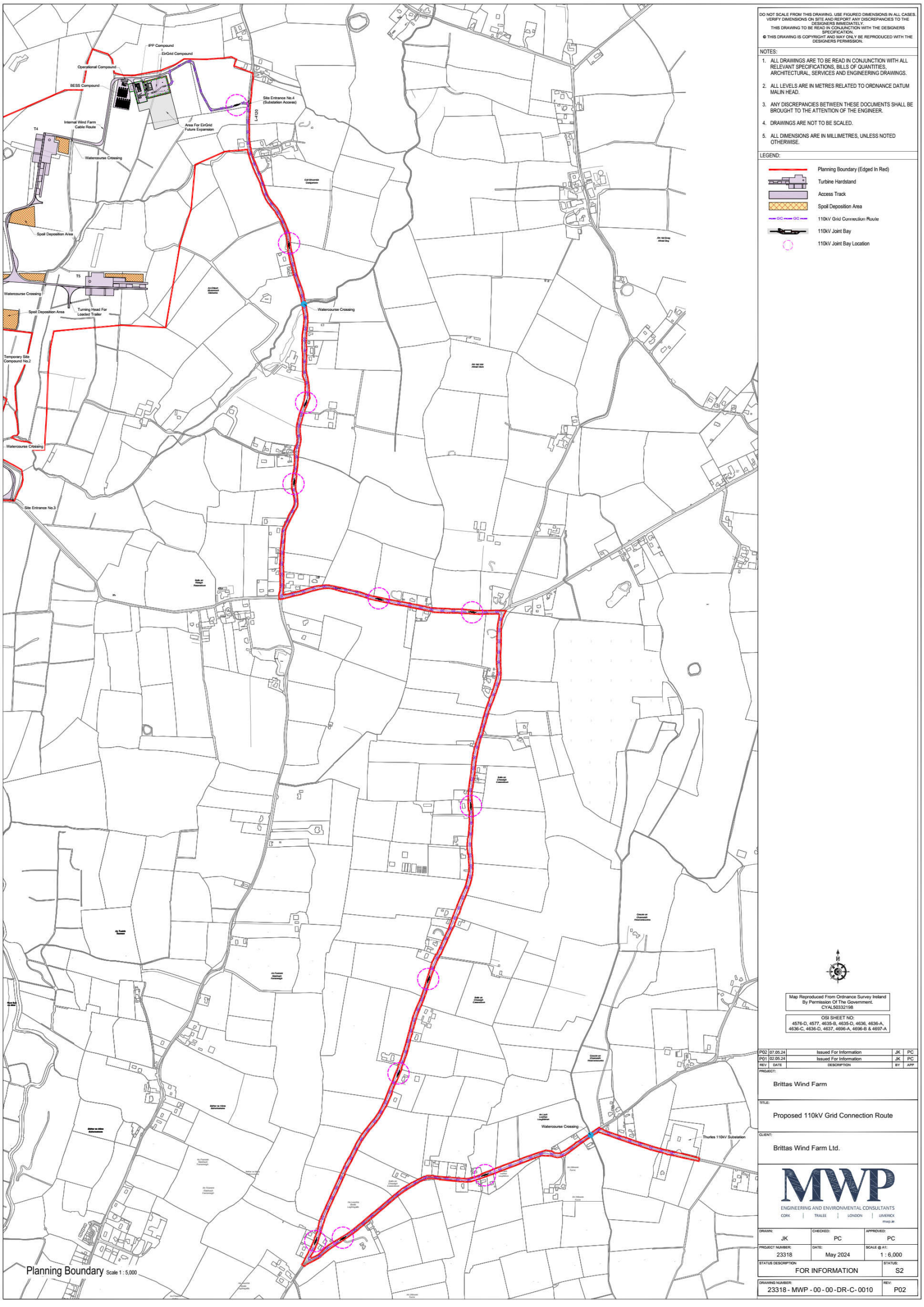


Figure 2-19: Grid Connection Route and 12 No. proposed joint bay locations (see pink circles)

2.4.15 Substation

The proposed 110kV substation (see **Figure 2-20**) will comprise an outdoor electrical yard and two single storey buildings (one for the system operator and one for the wind farm operator). The system operator (Eirgrid) compound and the wind farm operator or independent power producer (IPP) make up the substation compound which measures approximately one hectare in area and is composed of compacted layers of suitable site won crushed rock or granular fill. The Eirgrid building will contain a a control room, a storeroom, an office / canteen, a toilet and four parking spaces. The IPP building will contain a storeroom, a communications room, a control room, a staff room, an office, a switchgear room, a toilet and four parking spaces. The EirGrid substation buildings will be 8.5m in height and the IPP building will be 6.7m in height. Both buildings have pitched roofs and an external blockwork and plastered finish (see further details in **section 3.8** of **Chapter 3** and in **Drawings 23318-MWP-00-00-DR-C-5417** to **23318-MWP-00-00-DR-C-5424**). There will be a very small water requirement for toilet flushing and hand washing for which it is proposed to harvest rain-water from the roofs of the buildings. The discharge from the toilet within each building will go to a holding tank located within the substation compound where the effluent will be temporarily stored and removed at regular intervals by an approved contractor and disposed of in a licenced facility. The four car parking spaces for each building will be located within the compound area. The substation buildings and associated compound will be contained within a 2.6m high galvanised steel palisade fence around the boundary of the substation compound. It is proposed to topsoil and revegetate the cut and fill slopes required for the substation site.

An expansion area has been provided for adjacent to the proposed substation, in line with EirGrid requirements. This expansion area is not proposed as part of this project and will be taken in charge by EirGrid for potential future expansion of the substation. While this is a requirement by EirGrid they have no timeframe or commitment to expand the substation. Such a development would be the subject of a separate EirGrid planning application.

Layout drawings of the proposed substation compound and buildings are provided in **Figure 2-20** below. See planning application **Drawing No. 23318-MWP-00-00-DR-C-5417** for details.

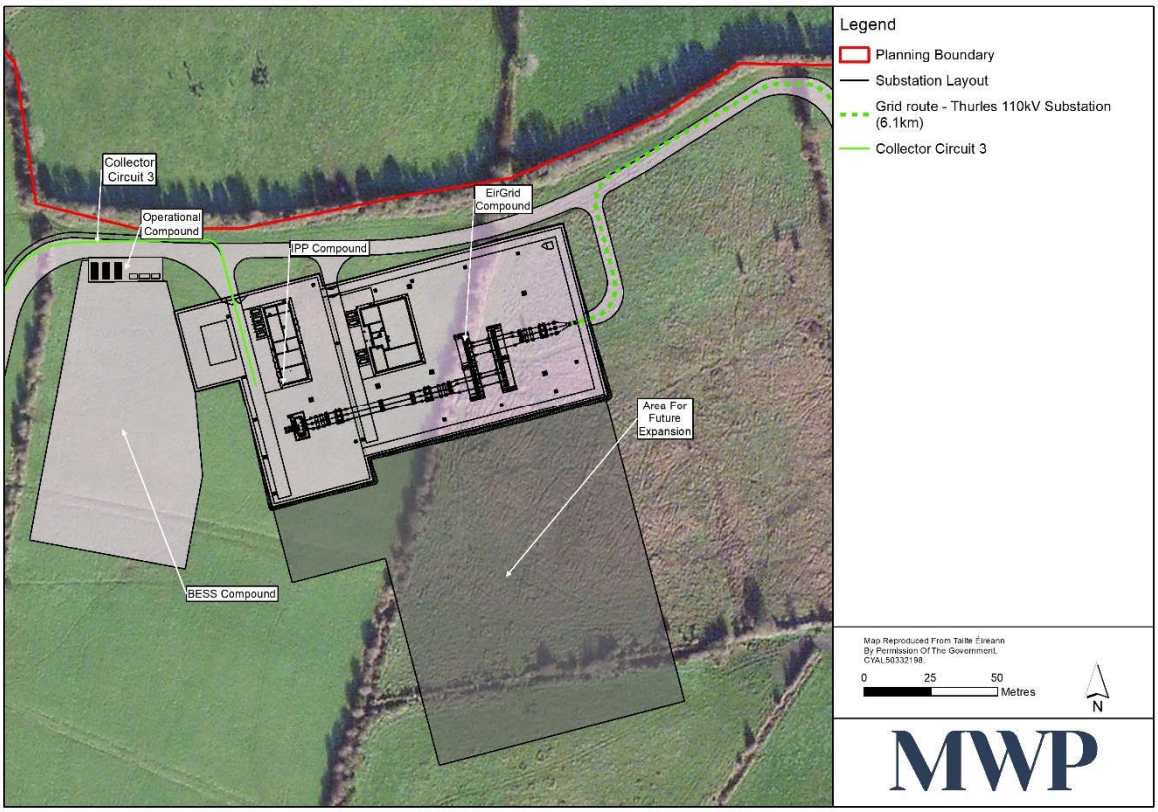


Figure 2-20: Proposed 110kV Substation compound location and Battery Energy Storage System – with future potential expansion area for EirGrid compound.

2.4.16 Battery Energy Storage System (BESS)

A battery energy storage system (BESS) will be developed for the proposed wind farm adjacent to the proposed on-site substation (see Figure 2-20). The Battery Energy Storage System (BESS) is not proposed as part of this planning application and will be subject to a separate planning application to Tipperary County Council. However, the BESS is considered as part of the project and assessed throughout the EIAR.

The Battery Energy Storage System (BESS) consists of 12 no. battery storage units to facilitate on site energy storage and to provide ancillary services to the electricity grid. The purpose of the battery energy storage system (BESS) is to provide greater robustness and security for managing fluctuating loads. During times of high wind, the BESS can store excess energy to be utilised at times where wind is low, allowing for greater use of the natural resource.

The BESS units will be situated next to the onsite substation compound in the north-eastern section of the wind farm site in the townland of Killeenleigh. The storage units will use Lithium-ion battery storage technology, which is a widely available and globally used energy storage option which is utilised to provide storage services to the grid at a local level. The battery storage technology to be used is comparable to the batteries found in domestic electrical appliances such as remote controls, laptops and mobile phones.

The batteries will be located on battery racks and housed within a container where they will be continually monitored and controlled for performance, temperature and other safety factors. Each battery container will comprise high-quality galvanised metal with a separate external Heating, Ventilation and Air Conditioning (HVAC) to provide external climate control. The battery containers are 27m (L) x 5.5 (W) x 2.9 (H) each and will sit on concrete pad foundations above the finished ground level. Technicians can access the containers with full width steps at one end and an emergency exit with steps at the other.

A control and switch room will be located next to the battery containers. The control room acts as the main point of operations of the BESS and is connected to the grid via the adjacent proposed 110kV substation.

The BESS will be constructed along with the adjacent substation. Cabling trenches and access infrastructure will be completed first. The foundations necessary for elevating the battery containers will then be completed and the empty metal containers brought on to the site and accurately placed in their final position by a mobile crane. Following the placing of the containers, they are then filled with battery racks brought to the site by lorry and connected together via wiring. Upon completion of the wiring of the containerized solution, all the ancillary infrastructure (inverter units, step up transformers and cooling units) will then be installed and connected.

The external colouring of the containers will be of a colour that is amenable to the surrounding landscape and does not create a visual intrusion (e.g. colours that would represent more natural background colours and be best absorbed into the existing landscape such as greens, browns or greys). The colour which will be used on the containers from the above options will be agreed with Tipperary County Council prior to commencement of construction. The exact rating and design of the selected BESS units will be subject to a separate planning application to Tipperary County Council.

2.4.17 Underground Cabling within the Wind Farm Site

A network of underground cabling serving each turbine with electrical power and signal transmission will be installed along internal service roads connecting to the sub-station compound. There will be no additional overhead power lines constructed on the site for the wind farm.

Figures 2-21, 2-22 and 2-23 illustrate the proposed underground collector cable routes within the wind farm site. The internal underground cabling route will be split into three sections and will involve open trenching in the verge of the proposed internal access tracks. Details of the construction and size of these cables is provided in section 3.7.4 of Chapter 3. The internal circuit to the north (purple) and the southern circuit (orange) joins at the start of the internal cable circuit to the east (green). All three circuits follow the green route to the substation (see coloured routes illustrated in Figure 2-21, 2-22and 2-23). The internal circuit to the north (blue) and the southern circuit (cyan) joins the eastern circuit (green) by horizontal direction drilling under the L8017 road and River Suir for 350m.

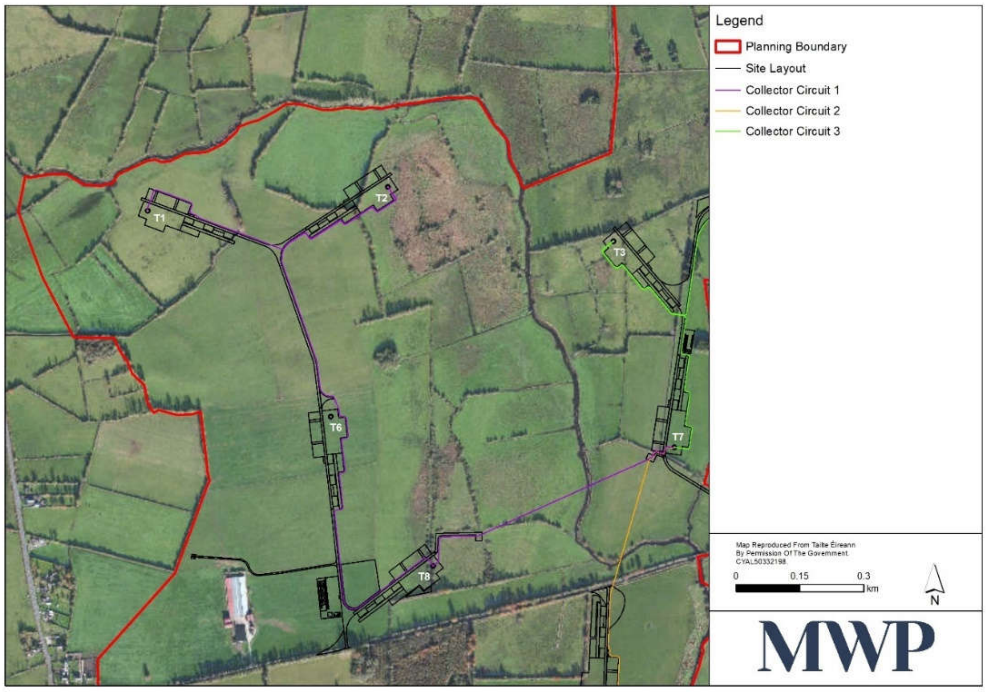


Figure 2-21: Circuit 1 of Underground cabling (purple line) between T1, T2 T6, T8 and T7.

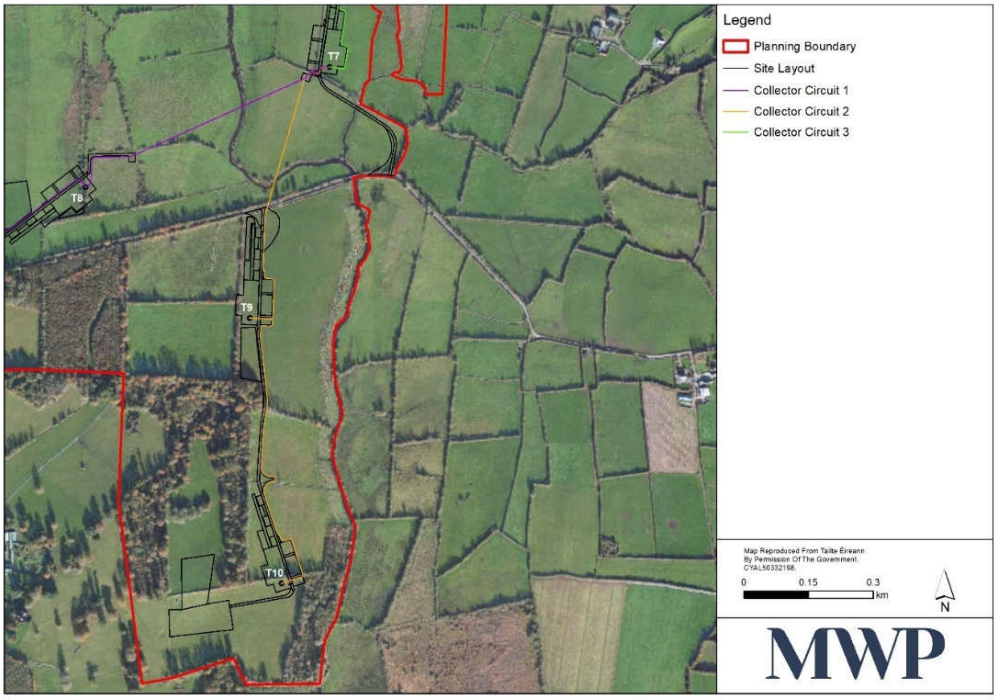


Figure 2-22: Circuit 2 of Underground cabling (orange line) between T10, T9 and T7.

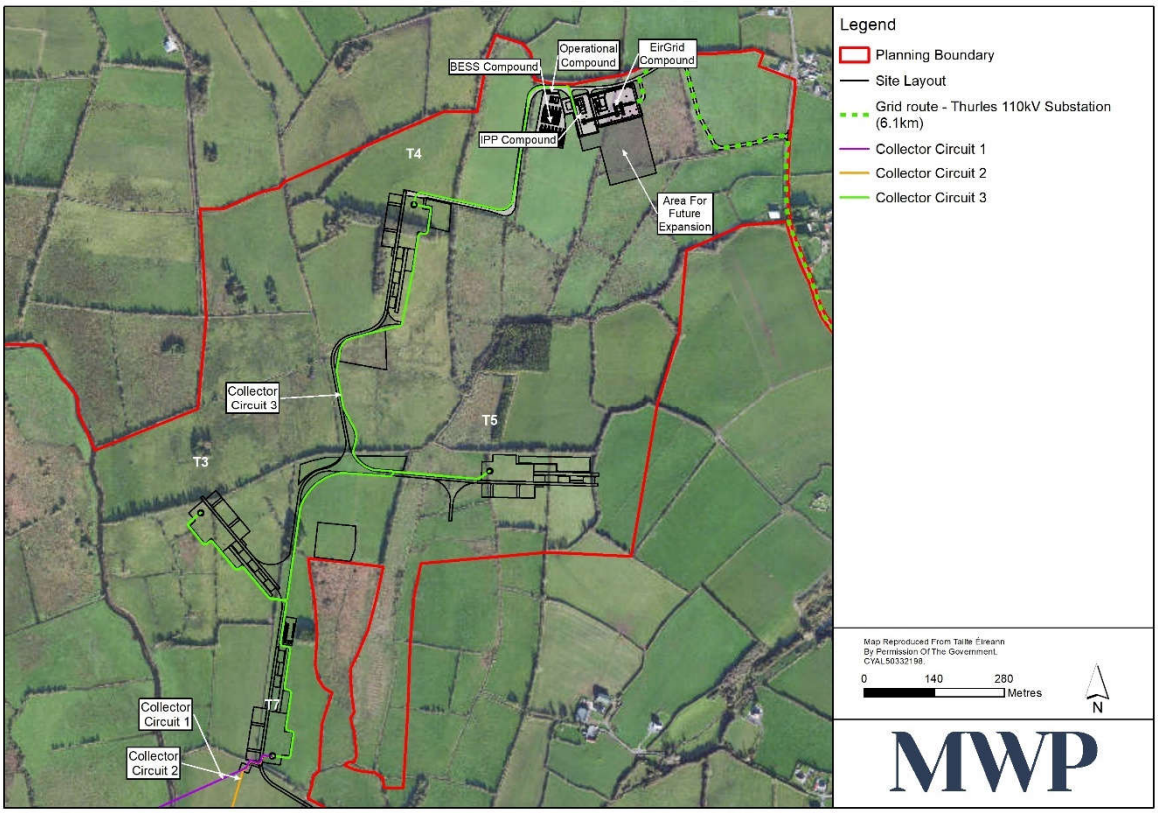


Figure 2-23: Circuit 3 of Underground cabling (green line) between T7, T3, T5, T4 and the substation.

2.4.18 Re-routing the permitted ESB 38kV overhead powerline through the Wind Farm site

At the date of writing this chapter an incomplete but permitted ESB overhead 38kV powerline passes through the proposed wind farm site (see **Figure 2.24**). Completion of this overhead line was permitted in mid-2023. This powerline is expected to be constructed prior to the expected construction period of the proposed wind farm. The section of this powerline which passes through the wind farm will need to be rerouted before the wind farm can proceed. The wind farm developers will submit a separate planning application to Tipperary County Council for the re-routing of this section of the powerline. A number of overhead and underground re-routing options are assessed in Chapter 4 of this EIAR.

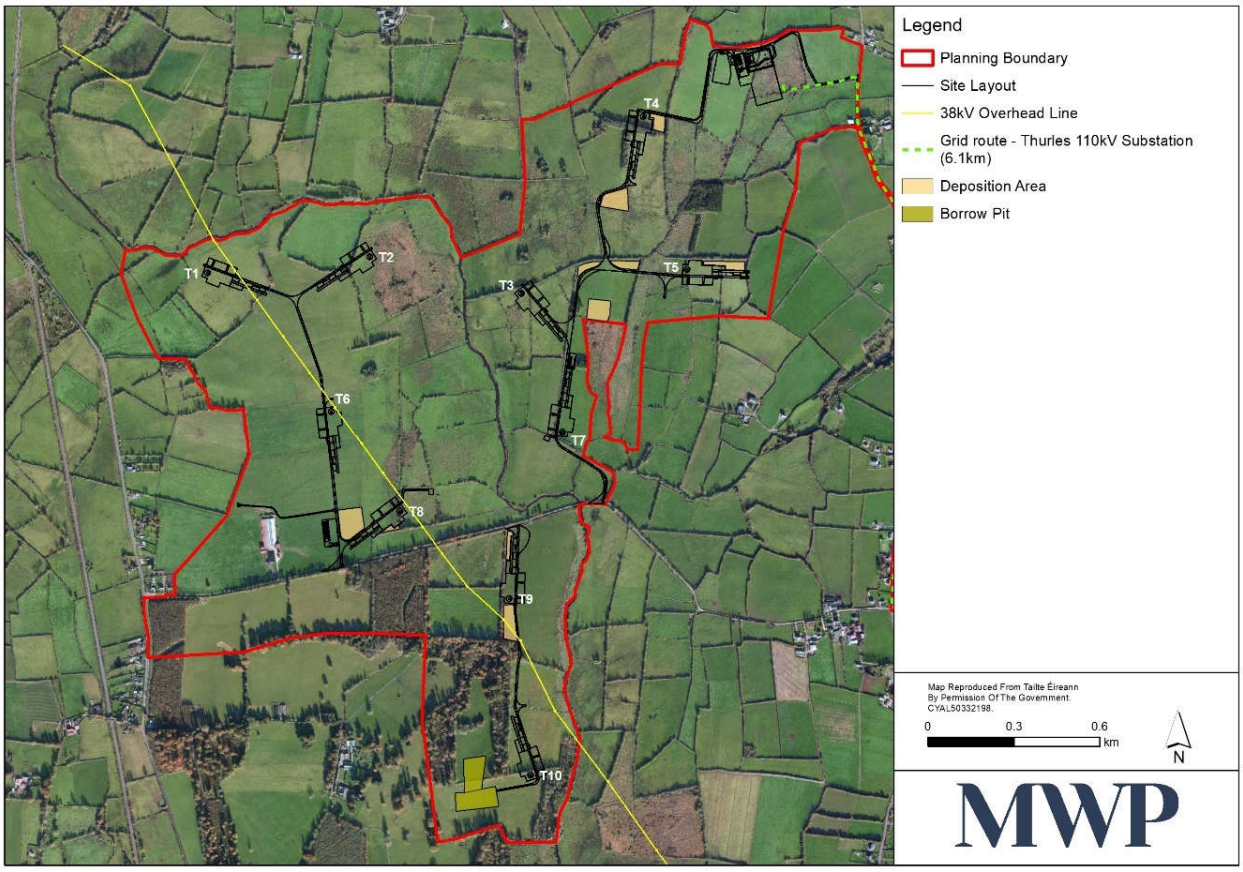


Figure 2-24: Aerial map of the ESB 38kV overhead powerline permitted in mid 2023.

2.5 Description of Construction

2.5.1 The construction phase land use requirement

Land use requirements during the construction phase will be greater than that of the permanent land take area. The temporary land take required during the construction phase is set out in Table 2-3 below.

Table 2-3: Land Use Requirements

Item	Area
Construction compound	6,125m² Two site compounds (main and supplementary)

Item	Area
Wind Turbine Construction	57 930m² (5793m² per hardstand) Construction requires temporary workspaces during the erection of the different turbine components. These workspaces include storage areas for the turbine blades and temporary areas for the assembly of the auxiliary cranes and parking.

2.5.2 Proposed Works

Construction works will be carried out in a phased manner in order to minimise disruption to the local community, minimise environmental impact and create the safest working conditions possible. The construction of the proposed project will comprise of the following works:

- Felling of 1.4 ha of forestry plantation and 4086m of hedgerows necessary to facilitate construction works;
- Construction of four site entrances and any sections of internal access tracks necessary to facilitate access to the temporary construction compound and proposed on-site borrow pit location;
- Construction of temporary construction compounds including fencing (for security and ecology, water and archaeological exclusion zones), site offices, parking, material laydown and storage areas, etc;
- Establishment of the on-site borrow pit and temporary storage of stockpiled overburden and surplus excavated materials within the material storage areas.
- Earthworks and drainage infrastructure associated with construction of new and upgraded internal access tracks, crane hardstand, turbine foundations and substation compound;
- Construction of upgraded and new watercourse crossings for construction of internal access tracks and underground cables;
- Excavation of turbine bases and permanent met lidar foundations, and associated turbine hardstand areas;
- Installation of sections of underground cabling between turbines;
- Installation of sections of underground cabling to connect to the national grid;
- Construction of the substation compound;
- Turbine delivery, installation, and commissioning; and
- Meteorological lidar delivery, installation, and commissioning.

2.5.3 Construction Methods

Details on the construction methods are fully set out in EIAR Chapter 3 Civil Engineering and in Volume 3 Appendix 2B CEMP. Table 2-4 provides a summary of the types of proposed construction techniques for the various elements of the project.

Table 2-4 Proposed Construction Techniques

Element	Construction Technique
Wind turbine foundations and hardstands	Wind turbine locations will be cleared, graded, and foundations will be either excavated or piled by rotary core technique. Blasting and piling may be required at wind turbine locations where bedrock is present near the ground surface, which is not expected at this site. An engineered concrete foundation will be installed in the excavated/piled structure location. Backfill will be provided, and grading will be performed in a manner to allow for immediate drainage away from each tower. Construction activities include tree removal, vegetation clearing, topsoil and/or peat stripping, excavation and or piling, grading, foundation construction, final grading and landscaping of temporary works areas.
Permanent Meteorological Lidar	Construction includes grass removal, topsoil stripping, excavation, grading, foundation construction, final grading, and landscaping of temporary works area.
Site Access	Four site accesses will be needed, including one for the substation during the operational phase. Sightline improvements where required. . Construction activities include vegetation clearing (including some hedgerows), topsoil and/subsoil stripping, aggregate placement and grading, and landscaping of temporary works areas.
Internal access tracks	Upgrading, widening and new excavated access tracks: Construction activities will include vegetation clearing (including some hedgerows), topsoil stripping, excavation, placement of geogrid/ geotextile layer and aggregate, compaction, grading, berm placement and landscaping.
	Floating Roads: If required, construction activities will include removal of major protrusions, placement of geogrid/ geotextile layer and aggregate, compaction, grading, berm placement and landscaping. However, it is not expected that floating roads will be required at this site.
Internal underground site electrical cables	To the extent possible, underground electrical collector cables will be co-located on the verge of the proposed access tracks and roads in order to minimise the area of construction disturbance. Underground cable installation construction activities include some hedgerow removal, topsoil stripping, trenching, installing electrical cables, and revegetation of disturbed areas unless the cables are under the roads.
Substation Compound	Construction includes some hedgerow removal, topsoil stripping, excavation, grading, foundation construction, building construction.

Element	Construction Technique
Battery Energy Storage System	Construction includes some hedgerow removal, topsoil stripping, excavation, grading, foundation construction, building construction.
Construction compounds	Construction includes topsoil stripping, excavation, grading, aggregate placement, compaction, and landscaping
Borrow pit	Works include topsoil stripping, excavation and/or blasting. Once the borrow pit is excavated, the area will be backfilled with spoil material and rehabilitated to pasture land.
Water crossings	Seven water crossing will be required, including five crossings at the Wind Farm site for the internal underground cables and access tracks. The cable river crossings will involve Horizontal Directional Drilling (HDD) under the River Suir. Two additional stream crossings will be needed for the grid connection route. This will involve Horizontal Directional Drilling (HDD) under the river/stream courses.
Grid Connection Route to Thurles Sub-station (7km)	Construction activities include excavation, trenching, backfilling, resurfacing and associated traffic management. Horizontal Directional Drilling (HDD) will be used at watercourse crossings to route the cable ducts beneath each stream.

2.5.4 Duration and Timing

2.5.4.1 Wind Farm

It is envisaged that the proposed project will commence in Quarter 4 of 2028 with an 18-month construction period. The start date is dependent on planning being granted, receipt of a grid connection offer from EirGrid, funding and all permits being in place.

A proposed programme of work is outlined in Table 2-5 below. It is expected that a number of these phases will however run concurrently as follows.

- As the internal site access tracks are constructed up to each turbine, hardstanding areas for construction purposes, crane stands, turbine foundations and building foundations will be prepared.
- Once the tracks are completed, the trenching and laying of underground cables will begin.
- Construction of the site sub-station and control houses will commence so that they will be ready to export power as turbines are commissioned.

Table 2-5 Construction Programme

Phase	Activity	Duration
Phase 1	Clearfelling (to be complete ahead of construction site mobilisation)	2 months (prior to construction)
Phase 2	Prepare site, pre-construction activities, site entrance, temporary compounds	1 month
Phase 3	Access road construction + Drainage plan implementation	3 months
Phase 4	Hard standing construction for turbines	2 months
Phase 5	Turbine Foundation construction	4 months
Phase 6	On site trenching and ducting (underground electrical collection system)	2 months
Phase 7	Substation and BESS construction	4 months
Phase 8	Permanent meteorological lidar compound preparation and unit installation	1 month
Phase 9	Underground grid connection route within the public road	5 months
Phase 10	Turbine delivery	3 months
Phase 11	Turbine erection	4 months
Phase 12	Wind Farm Commissioning	4 months (approx.)

2.5.4.2 Grid Connection Construction

The proposed grid connection from the proposed on-site substation to the existing Thurles 110kV substation will be constructed in on-site tracks and within the public road. The active construction area is proposed to be only along a 100-200m stretch of any roadway at any one time. The works for the grid connection route are estimated to take approximately 4-5 months and will overlap with the wind farm works. During the first 2 months the cable trenches will be constructed. The second 2-3 months will involve sequentially opening up all joint bays (these are pre-cast concrete chambers that will be required along the grid connection route over its entire length) and pulling electrical cables, pulled through ducts and then joining each cable together. There is anticipated to be 12 joint bays with 2-3 days' work involved at each. Construction activities along the proposed grid connection route will operate between the hours 7:00 a.m. and 7:00 p.m., Monday to Saturday (if required).

Any deviations to these times will be agreed in advance with Tipperary County Council. It is expected that the civil works for the grid connection route will require at least 10 personnel to complete the works. The electrical works will require less heavy machinery but more labour personnel.

2.5.4.3 Turbine Delivery Route Accommodation Works

Prior to turbine delivery movements, accommodation works will be required along the turbine delivery route to allow for transport of oversized loads. The accommodation works are described in Appendix 2A. The accommodation works will require temporary hard standing areas at 2 no. locations. Other temporary works will be completed under road opening licence. Temporary accommodation works required to allow the movement of oversized loads include the temporary removal of traffic signs and lights, the temporary removal of electricity poles, bollards and lamp posts, hedges and tree removal or trimming, temporary land take, lowering of some roadside banks, temporary fence removal and road widening. The temporary accommodation works will be completed one month prior to delivery in agreement with the Local Authority.

2.5.5 Major temporary features

Temporary features on site include the construction compound facilities, plant, and equipment along with safety fencing and building materials. Large excavators and turbine erection cranes are also a temporary feature on site during the construction phase. There will be some temporary stockpiling of soils on site. Any surplus material will be placed within the proposed borrow pit and material deposition areas.

2.5.6 List of Plant

Various plant used for construction projects will be required to facilitate the proposed project. The following non-exhaustive list of mechanical machinery and electrical equipment is proposed to be used for the wind farm and heavy civil engineering work:

- 30-50T excavators;
- 15-30T Excavator;
- Rubber Tired 15-20T Excavator;
- 3-10T Mini Diggers;
- Mobile Crane for construction;
- Rebar/shuttering/precast units/conc. pipes/box culverts etc 60t to 120t;
- Cranes (1 main, 1 assist) Erection 120t to 1000t;
- Telescopic Handler;
- Tractors and trailers;
- Road grader;
- Double contained fuel bowsers;
- 12T Rollers;
- Diesel powered generators; and
- Water bowsers.

2.5.7 Construction Working Hours

2.5.7.1 Wind Farm Site

It is proposed, construction will occur within the hours 07.00am – 7.00pm, Monday to Saturday

Due to the requirement for the concrete pours to be continuous, the working day may extend outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the days of turbine foundation concrete pours, which are normally complete in a single day per turbine. Turbine and crane erections may also occasionally occur outside of these times in order to take advantage of low wind periods. Working hours will be confirmed at the outset of the project and any changes in hours will be agreed with Tipperary County Council.

Works along public roads will be from 7.00 a.m. to 7.00 p.m. Monday to Friday and 9.00 a.m. to 2.00 p.m. on Saturdays. A permit for moving abnormal loads will be sought from An Garda Síochána for the night time movement and delivery of oversized wind turbine components (i.e. blades, nacelles and towers).

There will be no work on Sunday or bank holidays unless pre-approved with the Local Authority.

2.5.7.2 Grid Connection Cable

The works for the grid connection route are estimated to take approximately 4-5 months within the overall project works schedule. During the first 2 months the cable trenches will be constructed. Construction activities along the proposed grid connection route will operate between the hours 7:00 a.m. and 7:00 p.m., Monday to Saturday or as otherwise conditioned as part of the consent.

2.5.8 Construction Personnel

During the construction phase, the number of on-site construction personnel will vary for each phase of the development. Overall, it is envisaged that the proposed project would generate employment for up to 60 persons during the construction phase to include site contractors, on-site vehicle and plant operators, engineers, materials delivery personnel, environmental personnel, health and safety personnel.

It is expected that the civil works for the grid connection route will require at least 10 personnel to complete the works. The electrical works will require less heavy machinery but more labour personnel, with an expected 25 personnel to complete the works.

2.5.9 Construction Environmental Management Plan (CEMP)

A Construction and Environmental Management Plan (CEMP) has been prepared and will be updated in accordance with the parameters in the CEMP and to incorporate any planning conditions during the preconstruction and construction phases and implemented on site. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation and decommissioning of the proposed project, are implemented. The CEMP will collate and manage the proposed and agreed mitigation measures, monitoring and follow-up arrangements and management of environmental impacts. 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 development stages. The CEMP will mainly address the construction phase however, where mitigation and monitoring is to continue into the operational and decommissioning, phases these commitments will be communicated and transcribed into operational process documentation. The CEMP is included in Appendix 2B of Volume III.

2.6 Description of Commissioning

Wind farm commissioning is expected to take two to four months to complete from the erection of the final turbine to exporting of power. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical testing and control measures to ensure the wind farm will perform and export power to the national electricity grid as designed.

2.7 Description of Operation

2.7.1 Land Use Requirement

The permanent land take will be limited to the wind turbine hardstands and crane pads, access tracks, lidar area, control building and substation hard-standings and BESS hardstanding which account collectively for about 20.4 ha or 6% of the total planning area within the proposed project planning boundary. All land within the planning boundary but not used for the above-mentioned permanent elements of the proposed wind farm can continue in agricultural use throughout the operational phase of the proposed project.

2.7.2 Operating Hours and Operational Conditions

The proposed project is expected to have a lifespan of 35 years. The proposed project is designed to operate when wind speeds at the hub height are within the operating range of the wind turbines. Most turbine models have a cut in wind speed of 3m/s with optimum generation at approximately 12.5m/s. The turbines are expected to have a cut out wind speed of 25m/s.

Each wind turbine will be computerised to control critical functions, monitor wind conditions and report data back to a SCADA system. An anemometer mounted on the top of the wind turbine nacelle provides wind speed information used to automatically set blade pitch and control the wind turbine. A wind vane mounted on top of the nacelle provides information needed to yaw the wind turbine into the wind. The SCADA system monitors problems and diagnoses potential issues. If a problem causes a wind turbine to shut down, the wind turbine will either be restarted by the SCADA system operator, or service personnel will perform the necessary repairs and then manually restart the wind turbine.

In addition, the wind turbine can also be controlled manually at the nacelle, from a panel inside the base of the tower, or from a remote computer via the SCADA system. Using the tower top control panel, the wind turbine can be stopped, started, and turned out of the wind.

Turbines can be programmed to shut down during periods when shadow flicker is predicted to occur. Shadow flicker control modules will be installed on the appropriate turbines which can be programmed to shut down to

eliminate the occurrence of shadow flicker at any particular dwelling. Turbines will be fitted with shadow flicker control modules to ensure that the proposed wind farm will comply with existing guideline thresholds and also eliminate flicker at receptors. This is detailed in EIAR Chapter 13, Shadow Flicker.

2.7.2.1 Turbine Maintenance

During the operation of the wind farm, the turbine manufacturer, the Developer or a service company will carry out regular maintenance of the turbines. The likely schedule of visits to the site during the operational phase is as follows. The regional supervisor will visit the site 2 times per month, civils maintenance will occur as needed and will likely take place twice per year, substation maintenance will occur once per year and the Original Equipment Manufacturer (OEM) will inspect the wind turbines twice per year or as needed if specific issues are identified.

During the life of the project, it is envisaged that at least two permanent jobs will be created locally in the form of an operator or maintenance personnel. In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link. However, routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the wind farm and require a minimal presence.

2.7.2.2 Grid Maintenance

During the operational phase the grid connection cable will remain in situ. It is unlikely that the underground cable will require much maintenance during its operation but in the event a fault does occur, inspection of the fault will be carried out to determine what works to the ducting/cabling may be required.

2.8 Decommissioning and Restoration Phase of the Proposed Project

2.8.1 Wind Farm

At the end of the 35-year lifespan of the proposed project, the Developer will make the decision whether to repower or decommission the turbines. Any further proposals for development at the site during or after this time will be subject to a new planning permission application. If planning permission is not sought after the end of life of the turbines, the site will be decommissioned and reinstated with all 10 No. wind turbines and towers removed. Removal of infrastructure will be undertaken in line with landowner and regulatory requirements and best practice applicable at the time. The information below outlines the proposed decommissioning tasks based on current requirements and best practice.

Prior to the decommissioning work, the following will be provided to Tipperary County Council for approval:

- A plan outlining measures to ensure the safety of the public and workforce and the use of best available decommissioning techniques at the time.
- A comprehensive reinstatement proposal, including the implementation of a programme that details the removal of all structures and landscaping.

Cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed.

Wastes generated during the decommissioning phase will be taken off site and disposed of at an authorised waste facility. Any materials suitable for recycling will be disposed of in an appropriate manner.

At present it is anticipated that internal underground cables connecting the proposed turbines to the proposed on-site substation will be cut back and left underground. The cables will not be removed if an environmental assessment of the decommissioning operation demonstrates that this would do more harm than leaving them *in situ*. The assessment will be carried out closer to the time to take into account environmental changes over the project life.

Hardstand and turbine foundation areas will be left in situ and covered with soil to match the existing landscape. Access roads will be left in situ for agricultural use.

2.8.2 Grid Connection

The grid cable will be taken in charge by EirGrid on commissioning of the project and remain a permanent part of the national electricity grid and therefore decommissioning is not foreseen. In the event of decommissioning, it will involve removing the cable from the ducting but leaving the ducting and associated supporting structure in place. Similarly, the proposed on-site substation will be taken in charge of by EirGrid on commissioning and will likely remain in place and will form part of the national electricity grid.

2.9 The Use of Natural Resources

2.9.1 Aggregate

Aggregates, concrete, and steel will be used during construction. Twenty percent of aggregate materials (circa 22,319m^3 (15%)) required for the construction of the access tracks, hardstands and the substation compound will come from aggregate (rock, stone, gravel, sand) extracted from the proposed on-site borrow pit. An additional 121 625 m^3 (85%) of material will be sourced from local quarries (see **Table 2-6** below). Material to be delivered to site will mainly consist of higher-grade materials not available to be won on site, limestone capping material for tracks and hardstands, and concrete for the construction of the 10 No. turbine bases, permanent met lidar foundation, underground cabling (on site and for grid connection), storage areas, substation and BESS infrastructure.

Table 2-6 Summary of Approximate Aggregate and Steel Quantities

Item	Unit	Quantity
Total volume of aggregate required (including site won and imported)	m3	135365
Site won aggregate from onsite borrow pit	m3	22319
Total volume of site won aggregate required	**m3**	**22319**

Item	Unit	Quantity
Imported aggregate for turbine bases	m3	53842
Imported aggregate for turbine hardstand	m3	25778
Imported aggregate for access tracks	m3	12101
Imported aggregate for substation area	m3	12036
Imported aggregate for independent power provider area	m3	2931
Imported aggregate for battery energy storage system area	m3	5637
Imported aggregate for internal cable route	m3	721
Imported aggregate for external cable route	m3	8580
Total volume of imported aggregate required	**m3**	**121625**
Concrete for Turbine Bases	m3	12058
Concrete for substation area	m3	40
Concrete for independent power provider area	m3	29
Concrete for battery energy storage system area	m3	162
Concrete for internal cable route	m3	4530
Concrete for external cable route	m3	3230
Total volume concrete required	**m3**	**20049**
Reinforced steel for turbine bases	tonnes	1356
Reinforced steel for substation area	tonnes	4
Reinforced steel for independent power provider area	tonnes	2
Reinforced steel for battery energy storage system area	tonnes	16
Total volume of imported steel reinforcement required	**tonnes**	**1379**

There are six quarry facilities within 20km of the proposed project site which are capable of supplying these construction materials (see **Table 2-7** below). The Traffic Management Plan (**Appendix 16A**, Volume III) has considered transport of quarry material from the closest quarry, but the aggregate source will be finalised at a later date prior to construction. Further details are provided in **Chapter 16 of the EIAR**.

Table 2-7: Quarries within 20km of the site

Quarry Name	Address	Rock or Deposit Type	Product Type	Distance from site (km)	Co-ordinates (Lat/Long)
Castletown Quarry, Maher Quarries Ltd.	Castletown, Moyne, Thurles, Co. Tipperary	Blue Limestone	Aggregates for concrete, hardcore, farm drainage, earthworks/fill	8.88km east	52.71858, -7.68274
Lisduff Quarry, Dowling Quarry Ltd.	Lisduff, Erril, Co. Laois	Limestone	Aggregates for concrete, hardcore, farm drainage, earthworks/fill	16.75km northeast	52.84969, -7.71326
Killough Quarry, Roadstone Ltd.	Aughnagomaun, Thurles, Co. Tipperary	Limestone	Aggregate for concrete, hardcore, farm drainage, earthworks/fill	12.15km southwest	52.60389, -7.84411
Gleeson Quarries, Laffansbridge Quarry	Laffansbridge, Thurles, Co. Tipperary	Limestone	Aggregate for concrete, hardcore, farm drainage, earthworks/fill	17km southeast	52.58538, -7.73162
Ballybeg Pit, Seamus Ryan Sand and Gravel	Ballybeg, Toomevara, Nenagh, Co. Tipperary	Unsorted	Fine/coarse sand, pebble, natural gravel, crushed gravel, graded aggregate	17.25km northwest	52.83642, -7.96667
Cloncannon Pit, Harney Masonry Ltd.	Cloncannon, Moneygall, Roscrea, Co. Tipperary	Unknown	Coarse sand, natural gravel, crushed gravel,5mm chip, 10mm chip	18.40km northwest	52.85958, -7.94888

2.9.2 Water

Water needs for construction activities will be limited to potable water, concrete truck chute washing, wheel wash, dust suppression and sanitary facilities. This water requirement will be imported to the site in bulk and stored at temporary compounds.

It is estimated that up to approximately 3,000 litres per day of potable water will be required during peak construction for construction employees. It is proposed that this water requirement will be imported in bulk water tanks.

Potable water for the operational and maintenance phase is estimated to be approximately 20 litres per day. This water will be supplied as bottled water. Waste water facilities at the substation compound will be serviced by a rainwater harvesting system.

2.10 The Production of Waste

2.10.1 Excavated soils, subsoil, and rock

It has been calculated that there will be approximately 163 752m³ of material excavated during the construction of the proposed project. Approximately seventy eighty percent of all soils and subsoils generated from excavation works (128 350 m^3) will be retained on site and reused in bunding, landscaping and localised earthworks. Excess spoil material will be stored on site in designated deposition areas and used to infill the borrow pit. Twenty one percent (35 402m^3) of excavated material will need to be classified and removed from site. The removed wastes will all be reused, recycled, or disposed of in an authorised facility in accordance with best practice. The CEMP (Appendix 2B) includes a waste management plan.

2.10.2 Domestic Waste-Water Effluent

Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licenced waste facility for treatment and disposal. There are licensed, operational wastewater treatment plants at Limerick, Mullinahone, and Herbertstown.

During the construction time period, wastewater production is estimated to be 3,000 litres per day.

Although primarily controlled remotely, during the operational phase, maintenance personnel will visit the substation building on a regular basis. The daily average wastewater production during the operational phase is estimated from the average number of workers on site, which is expected to be 2 workers, resulting in a typical wastewater production rate of 60 litres per day on days where substation maintenance and monitoring is undertaken. This is likely to take place once per year over a short period. The regional manager will likely visit the customer control building two times per month. The wastewater generated during the operational phase will be managed by a holding tank which is of twin-hull design and fitted with an alarm to indicate levels and when it is due for empty. The holding tank will be emptied by a permitted contractor and treated at a licenced facility.

2.10.3 General Wastes

Construction phase waste is anticipated to consist of hardcore, concrete, spare steel reinforcement, shuttering timber and unused oil, diesel and building materials. This waste will be segregated stored in the construction compound and collected regularly during the construction phases and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility. Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility. Domestic type waste generated by contractors will be collected on site, stored in an enclosed skip at the construction compounds

and disposed of at an appropriately authorised facility. A list of licenced waste facilities and service providers is provided in Appendix 2C.

The power generation aspect of the proposed project will not produce any waste emissions or pollutants. The general operation and maintenance of the proposed project is expected to produce a minimal amount of waste. Wastes arising during the operation phase of the project include but are not limited to lubricating oils, cooling oils, and packaging from spare parts.

The containment and disposal of such oils will be carried out by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998. The remaining wastes will all be removed from site and reused, recycled, or disposed of in an authorised facility in accordance with best practice.

2.11 Emissions and Nuisances

The anticipated residues and emissions likely to be generated during the project lifetime are summarised in Table 2-8 below. These environmental effects have been identified, assessed and proposals for management of the anticipated nuisances and/or emissions are presented throughout relevant chapters of this EIAR.

Table 2-8: Emissions and Nuisances

Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
Construction / Decommissioning	Air	The main emissions to atmosphere during the construction stage of the project is from fugitive dust associated with the following activities: • Groundworks associated with the construction of the project infrastructure; • Transportation and unloading of crushed stone around the site; • Vehicular movement over potentially hard dusty surfaces such as freshly excavated and constructed access tracks and crane hardstanding areas; • Vehicular movement over material potentially carried off site and deposited on public roads. The movement of machinery, construction vehicles and the use of generators during the construction phase will also generate exhaust fumes containing predominantly carbon dioxide (CO_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}).	EIAR Vol 2 Chapter 14 Air and Climate
	Noise	Traffic flows, excavation/blasting mechanical machinery and electrical equipment proposed to be used for construction projects will generate noise emissions.	EIAR Vol 2 Chapter 10 Noise
	Water	Surface water runoff and discharges from construction working areas are likely during construction, although overall the quantity of surface runoff will not change overall as a result of the	EIAR Vol 2 Chapter 9 Water

Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
		construction works. Occasional and low quantity discharges could arise from pumping in order to dewater foundation excavations. This would be discharged to the water management drainage system. Pollution sources could arise as a result of soil erosion or from oil/ fuel or chemical storage and use. Proposals for management of water quality and quantity from the proposed project are presented in **EIAR Volume 3: Appendix 2B**: CEMP.	
Operational	Traffic	The additional traffic, especially heavy goods vehicles associated with the construction phase, has the potential to cause nuisance to those using the local road networks	EIAR Vol 2 Chapter 5 Population and Human Health, Chapter 16 Traffic
	Air	Due to the nature of the project no significant point source or diffuse air emissions will be produced during its operation.	EIAR Vol 2 Chapter 14 Air and Climate
	Noise	Potential noise nuisance from operational turbines and a proposed new 110kV on-site substation. Any perceived noise nuisance will be in compliance with limits.	EIAR Vol 2 Chapter 12 Noise
	Water	No water emissions or pollution sources have been identified for the operational phase.	EIAR Vol 2 Chapter 9 Water
	Shadow Flicker	In certain conditions, the movement of wind turbine blades could give rise to shadow flicker nuisance at nearby residential receptors. Any perceived shadow flicker nuisance at receptors will be eliminated through the installation of control modules in line with national guidance.	EIAR Vol 2 Chapter 13 Shadow Flicker

2.12 Environmental Protection Measures

The design of the proposed wind farm was primarily influenced by *mitigation by avoidance*. Buffers and set back distances are the principal tool used by the Malachy Walsh and Partners designers when incorporating mitigation by design and avoidance. This methodology has been applied successfully nationally and internationally by the design team. This can only be done when all the environmental sensitivities have been established across the project area. Buffers and set back distances derived from guidance documents, stakeholder input, studies and project experience. The buffers and set back distances applied in this instance are outlined in **Chapter 4 Alternatives**.

The Proposed Development will avoid environmental impacts during its lifetime through design mitigation, good site management practices, tight controls, regular inspections and ongoing vigilance with staff and employees on site. The **Construction and Environmental Management Plan (CEMP)**, (refer to **Appendix 2B** of the EIAR) details the environmental protection measures that will be implemented during the construction phase.

2.12.1 Surface Water Management System

A site drainage system will be constructed on the site to attenuate run-off, guard against soil erosion and safeguard downstream water quality. The measures are outlined in **Chapter 3 Civil Engineering** and Chapter 9 Water. Detailed drawings are provided in **Drawings 23318-MWP-00-00-DR-C-5025 to 23318-MWP-00-00-DR-C-5033**.

2.12.2 Site Management Controls

Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillages occur. There will be no domestic wastewater discharges to the environment. Temporary toilet facilities will include an integrated wastewater holding tank and be emptied routinely by a licence waste contractor. A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.

The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete.

2.13 Transboundary Effects

The location of the project is entirely in County Tipperary within the Republic of Ireland. Transboundary impacts relate to potential impacts on other Member States, i.e. outside of the Republic of Ireland.

Considering the nature of the project, the largely localised nature of potential impacts and the distance from any neighbouring member states, it is considered that any potential for impacts on transboundary receptors would not arise. Following on from the assessments carried out as part of the EIAR studies, it is concluded that the project is unlikely to result in significant adverse transboundary impacts. Reductions in greenhouse gas emissions due to the project's generation of electricity from wind will have beneficial effects in terms of contributing to the achievement of emissions reductions targets for Ireland and Europe.

2.14 Risk of Major Accidents and Disasters

The risk of major accidents or disasters is assessed in each of the EIAR chapters and particularly in Chapter 14 Air and Climate Change. Major accidents include the potential for fire, explosion, traffic collisions, contamination and pollution. Natural disasters include earthquakes, flooding, tsunamis, lightning strikes, hurricanes or any other extreme natural event. The EIAR also considered the potential increased risk of such events occurring as a result of climate change, such as sea-level rise and increased frequency in the occurrence of extreme weather events

It is considered that there is no risk for the project to cause major accidents and/or disasters. The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters and man-made disasters is also considered low for the following reasons:

2.14.1 Construction Issues

As in all construction activities, there is a wide range of potential risks of accidents and hazards associated with wind farm construction. While many risks are similar in nature to those for other industries, wind farm construction works take place in exposed windy locations and involve transport of heavy equipment, heavy cranage and specialised electrical installation.

2.14.1.1 Health and Safety

All work on site will be carried out in compliance with all relevant legislation and work practices including, to ensure that the construction areas, site environs and public roads remain safe for all users. This legislation includes:

- Safety, Health and Welfare at Work (Construction) Regulations S.I. No. 291/2013 as amended;
- Safety, Health and Welfare at Work Act 2005 as amended;
- Safety, Health and Welfare at Work (General Applications) Regulations 2007 to 2023; and
- Irish Wind Energy Association Best Practice Guidelines.

The Construction and Environmental Management Plan (CEMP), (refer to Appendix 2B of the EIAR) outlines the safety procedures that will be implemented during the construction phase. The effective implementation of the CEMP will help to reduce the risks associated with the construction phase of the Proposed Project.

2.14.1.2 Landslide

A scoping exercise was carried out to determine whether a detailed Peat Landslide Hazard and Risk Assessment is required for this site. This scoping exercise reviewed whether peat was present onsite. No peat is mapped on the GSI maps for the site. During a site walkover a small area of peaty type soil was noted in the north-eastern corner of the site. Site investigations found small patched of peat less than 0.5m deep. As no infrastructure is proposed within this area of the site, it was not deemed necessary to carry out a Peat Stability Risk Assessment for this site.

Overall, there is no risk of instability of the site, access roads, turbine bases, or grid connection from peat.

2.14.2 Operational Issues

2.14.2.1 Fire/ Fuels

The presence of electrical generating equipment and electrical cables along with the storage and use of various oils (diesel fuels, lubricating oils, hydraulic fluids) can create the potential for fire and/or ground contamination. This potential exists within the turbine tower, nacelle, substation, electrical transmission structures and operations maintenance buildings. Modern wind farm design will minimise the use of combustible materials. Lightning and surge protection will cover the nacelle and rotor blades, as well as electrical equipment, including cables. Each element of equipment has strict and exact operational protocols that provide for the elimination of risk. The protocols set out the flammability or chemical properties of each of the oils, lubricants and fuels that

may be used within equipment on site. The proposed project will be operated to the specifications of the chosen turbines and in accordance with all electrical standard operating procedures.

In relation to the BESS, each unit is fitted with an individual fire suppression system this will be subject to adequate measures and standards in relation to fire detection, with measures in place for detecting issues, to controlling of temperatures within the storage units, the identification of potential fire risk and the incorporation of fire suppression systems. In particular the BESS units shall comply with Irish building regulations Part B (Fire Safety) of the Second Schedule to the Regulations, 2006 as amended and Irish Standard I.S. EN 54: Fire Detection and Fire Alarm Systems. The above guidance and standards provide details on the following requirements that shall be complied with in the design, construction and operation of the BESS.

- Means of escape in case of fire;
- Internal fire spread (linings and structure);
- External fire spread;
- Access and facilities for the fire service;
- Fire detection and fire alarm systems.

The Battery Management System (BMS) shall be capable of detecting problems (e.g. high temperatures, electrical faults) using cell and module voltage measurements and select temperature measurements within the batteries. This is monitored from off-site. Automatic disconnect of the batteries will occur if any unusual parameters are measured (i.e. parameters such as system temperature outside normal operational conditions). In the event of an electrical fault, the system will automatically shut down.

In the extremely rare instance of a fire occurring within an individual container, the internal fire suppression technology will ensure the isolation of the fire within the fireproof container. Furthermore, in the unlikely event of a fire that needs to be extinguished, any water run-off or contaminants associated with fire retardant chemicals will be wholly contained within the specific container and will be tankered off site by an authorised waste collector to a wastewater treatment plant. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 as amended, will be employed to transport wastewater away from the site as described further in this chapter. The internal fire suppression technology is considered robust in nature and will act as the first response in the unlikely event of a fire incident.

2.14.2.2 Lightning Strikes

A lightning strike could cause a fire or could cause severe damage to blades which may lead to blade failure. To protect wind turbines from damage caused by a lightning strike and to provide grounding, each turbine will be equipped with an electrical grounding system.

2.14.2.3 Turbine Structural Failure

Turbine structural failure includes tower collapse, blade failure or separation. Risk may arise due to stress, wear and tear.

Rigorous safety checks are conducted on the turbines during operation to ensure the risks posed to staff, landowners and general public are negligible. The turbines are also centrally monitored and controlled to

identify and avoid risks. These checks are specified particular to the turbine model procured for the project. The separation distances of turbines from public roads and residences are beyond fall over distances that will not present a risk of significant accidents.

2.15 Impact of Climate Change

2.15.1 Severe Weather

There is potential for the Proposed project to be impacted by severe weather including increased wind and storms due to climate change. However, wind turbines are designed to withstand extreme weather conditions with brake mechanisms installed within the turbines so that they only operate under specific wind speeds and will shut-down during high wind speed events. Therefore, there is very low risk to the proposed project from high wind speeds.

2.15.2 Flooding

Flood risk is considered in EIAR Chapter 9 to determine whether the site is at risk from extreme fluvial flooding events. The turbines have been located to avoid areas prone to flooding. This assessment concluded that the site is not at risk from extreme flooding. The assessment also considered the increased risk of downstream flooding as a result of the forest felling, new site access tracks, turbine hard-standing areas and other new hard surfaces and determined that the risk of an increase in downstream flooding is low due to the small percentage increase in run-off contributing to the catchments as a result of the wind farm development.

2.16 References

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