CONTENTS

TABLES

FIGURES

TECHNICAL APPENDICES (VOLUME 3 OF EIA REPORT)

Acronyms and Abbreviations

ACP	An Coimisiún Pleanála
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AP	Access Point
BESS	Battery Energy Storage System
CBM	Cement Bound Material
CBM4	Cement Bound Material (Clause 1093 specification)
CBR	California Bearing Ratio
CEMP	Construction Environmental Management Plan
COSHH	Control of Substances Hazardous to Health
CTMP	Construction Traffic Management Plan
DAFM	Department of Agriculture, Food and the Marine
DCP	Dynamic Cone Penetrometer
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EirGrid	Ireland's Electricity Transmission System Operator
ESBN	ESB Networks
ETSU	Energy Technology Support Unit
EU	European Union
GCL	Geosynthetic Clay Liner
Grid Connection Route (GCR)	Refers to the proposed Grid Connection Route as defined in Chapter 1 of this EIAR.
HDD	Horizontal Directional Drilling
HDPE	High Density Polyethylene
HV / LV	High Voltage / Low Voltage
IPP	Independent Power Producer
ITM	Irish Transverse Mercator
km	Kilometre
kV	Kilovolt
Main Wind Farm Development Site	The site where the Proposed Development is located. As defined in Chapter 1 of this EIAR.
MRFS	Mid Range Future Scenario
MW	Megawatt
MWh	Megawatt hour
NIS	Natura Impact Statement
OPW	Office of Public Works
PMP	Peat Management Plan

PPG	Planning Policy Guidance
Proposed Project	Refers to the Proposed Development including the GCR.
SEAI	Sustainable Energy Authority of Ireland
SID	Strategic Infrastructure Development
SLR	SLR Consulting
SuDS	Sustainable Drainage Systems
TCC	Temporary Construction Compound
TDR	Turbine Delivery Route
TSO	Transmission System Operator
Turbine Delivery Route (TDR)	Refers to the proposed turbine delivery route as defined in Chapter 1 of this EIAR.
WFD	Water Framework Directive
WTG	Wind Turbine Generator

2.0 INTRODUCTION

INTRODUCTION

Background

2.1 This chapter of the EIAR describes the Proposed Project (Proposed Development for which consent is being sought and the GCR) and provides details on the construction, operation and decommissioning of the Proposed Project in compliance with the EIA Directive.

2.2 The Proposed Development consists of a 13-no. turbine wind farm development and associated works on land within the townlands of Muingmore (An Mhoing Mhór) and Doolough (Dumha Locha), County Mayo. The Proposed Development Site is c. 454.0 ha in size. **Figure 2-1** shows the red line boundary which includes the Proposed Development for which planning permission is being sought, and **Figure 2-1** shows its location in a wider strategic context.

Definition of Terms

2.3 The general development and all project terms are defined in **Chapter 1** of this EIAR.

Statement of Authority

2.4 This chapter of the EIAR was prepared by SLR Consulting. The competent practitioners responsible for the preparation of this chapter include: Gareth Hughes BSc, MSc; Ruairidh Aitken MEng; Aislinn O'Brien, MSc, MCD, MIPI, MRTPI; and Lynn Hassett BSc, MSc, all of SLR Consulting.

2.5 Gareth is an experienced Project Manager with over 18 years' experience who specialises in managing multi-disciplinary Environmental Impact Assessment (EIA) projects. He holds a Bachelor of Science (Hons) degree in Biological Sciences from the University of Edinburgh and an MSc in Environmental Science from the University of Aberdeen. Gareth has many years in experience authoring EIA Report chapters in the jurisdictions of Scotland and England.

2.6 Ruairidh Aitken (Meng Civil and Structural Engineering) is an Associate Engineer at SLR Consulting, with six years of experience. He has worked on a range of engineering projects, including wind farm design, track design, renewable energy developments, and earthworks. Ruairidh has taken on the role of lead designer for over 25 wind farm projects at planning stage. His responsibilities include project management, infrastructure and access design, feasibility assessments, site investigations, optioneering tasks, decommissioning bonds for renewables projects, construction environmental management plans (CEMPs), risk registers, route analysis, route condition surveys. Working closely with an expert CAD team, Ruairidh develops comprehensive wind farm models incorporating all associated infrastructure. He utilises Civil 3D, InfraWorks, and Geographic Information Systems (GIS) to support his design.

2.7 Darren Keogh is a Civil Engineer with over 22 years' experience working mainly with Clients in the Renewable Energy, Electrical Transmission, Recycling/Waste and Development sectors. He has a wide variety of experience as a designer in these and other sectors and is now principally a Framework/Project Manager on a number of large and varied engineering projects. Darren's design and project management skills are largely through experience on projects such as sub-stations, transmission route assessment, road schemes, surface water schemes, windfarms, demolition contracts, road designs, bridge

assessments, design of waste/recycling facilities, and site investigations for a variety of different types of infrastructure.

2.8 Aislinn O'Brien is a chartered town planner with over 20 years professional planning and EIA experience. During this time Aislinn has project managed and coordinated numerous planning applications and EIARs.

2.9 Lynn is an EIA Co-ordinator with over 16 years' experience in the preparation, contribution to and review of various EIAR chapter, as well as in the EIA co-ordination process as a whole. She has worked in the UK and Ireland on a range of urban and rural projects including in the mixed-use development, mining and quarrying sectors.

2.10 Further information in relation to SLR Consulting can be found at www.slrconsulting.com.

Existing Environment

Main Wind Farm Development Site

2.11 The Main Wind Farm Development Site and its surrounding area are described in **Chapter 1** and topic specific chapters of the EIAR but a summary is provided here for ease of reference.

2.12 The Main Wind Farm Development Site is situated within a coastal region of County Mayo and occupies a relatively condensed area of around 3km in a north-east to south-west orientation, encompassing 2 cluster areas. The surrounding area is predominantly rural in character but there are several small settlements within a 5km radius of the Main Wind Farm Development Site. The Main Wind Farm Development Site is also located c. 8km west of Bangor Eris and c.0.5km north of the village of Gweesalia (see **Figure 2-1**).

2.13 Geographically, the Main Wind Farm Development Site lies north of the intersection of roads L1205 and L1206. The L1206 borders the southern edge of the Main Wind Farm Development Site, while the L1205 runs westward and leads to the R313, located c. 4km north of the Main Wind Farm Development Site. The R313 provides connections to more extensive road networks, as indicated below.

2.14 A local road (L5252) bisects the Main Wind Farm Development Site east to west. This local road branches off from the L1206 (see **Figure 2-3**). This road runs longitudinally through the Main Wind Farm Development Site, spanning from north-west to south-east, connecting the L1205 and L1206. Notably straight and offering good lines of sight, this road will provide access to the Main Wind Farm Development Site, both north and south of the road.

2.15 The Main Wind Farm Development Site predominately consists of cutover lowland blanket bog, conifer plantation and peatland. There is no built development within the Main Wind Farm Development Site, however a vacant industrial facility is located adjacent to the Northern Cluster but outside the planning application boundary.

2.16 The Main Wind Farm Development Site is less than 1 km from the Atlantic coastline and is located on low-lying terrain, ranging from approximately 3 m AOD at the southern end to approximately 33 m AOD at the northeastern portion.

2.17 A number of small streams are present within the Main Wind Farm Development Site and along the boundaries, such as along the northern boundary, flowing west, the lower portion of the east boundary, flowing south.

2.18 There are 109 residential properties indicated in **Figure 4-4** of the EIAR as being located within 1km of the Main Wind Farm Development Site. The nearest residential property is located c. 740m from the nearest wind turbine (T10). There are 282 residential properties within 500m of the GCR.

Onsite Wind Resource

2.19 The layout of the Main Wind Farm Development Site has been designed to minimise the potential for likely significant effects, whilst maximising the energy yields of the wind resource. Available wind speed is a key factor in determining the economic viability of potential wind energy locations.

The Sustainable Energy Authority of Ireland (SEAI) Wind Mapping System[1] identifies the Main Wind Farm Development Site as having an average wind speed of between 8.8 and 8.9 metres per second.

Over a two-year period, a site monitoring campaign utilising lidar equipment was completed by the Applicant. The results of this campaign verified the data from SEAI and confirmed the availability of significant wind resource at this Main Wind Farm Development Site with an average wind speed of 9.1 metres per second.

Proposed Development

Summary of the Statutory Development Description for Consent

2.20 Planning permission is sought for a period of 10 years, for a renewable energy development comprising of the construction of a 13 no. turbine wind farm development, with associated 110 kV substation, battery storage, and all associated works on land within the townlands of Muingmore (An Mhoing Mhór), Doolough (Dumha Locha), Tristia (Troiste), Moneynierin (Moing an Iarainn) and Bangor (Baingear) County Mayo.

2.21 The planning application area is approximately 454 ha in size. Certain details of the proposed development are unconfirmed in this planning application and an opinion on unconfirmed details from An Coimisiún Pleanála (Case Reference: ABP -321948-25) pursuant to section 37CD of the Planning and Development Act 2000 (as amended) accompanies this planning application. The details unconfirmed in this application are the turbine tip height, rotor diameter and hub height. The range of parameters under which the turbine dimensions will fall are specified on this site notice and in the design flexibility opinion that accompanies this application.

2.22 The Proposed Development will consist of:

- Construction of 13 no. wind turbines, each with an overall blade tip height between 179-180m inclusive, rotor diameter between 149-163m inclusive, hub height between 98.5-105m inclusive, in two clusters.
- Battery energy storage system (BESS) compound to include control building with welfare facilities, all associated plant and equipment, security fencing and gates, underground cabling, and all ancillary structures, drainage works, as well as storage and parking.
- Construction of crane hardstands, laydown areas and turbine foundations.
- Construction of permanent internal site access roads including passing bays and all associated drainage infrastructure.

[1] Sustainable Energy Authority of Ireland (SEAI) Wind Mapping System https://gis.seai.ie/wind/

- Construction of a permanent 110 kV onsite electricity substation and onsite IPP (Independent Power Producer) substation to include control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tanks, and all ancillary structures and works.
- Construction of 33kV underground electricity cabling and communications cabling, including joint bays and ancillary works, to connect the windfarm and battery energy storage system to the proposed onsite substation.
- Construction of two temporary construction compounds with associated temporary site offices, parking areas, welfare facilities and security fencing.
- Development of an internal site drainage network and sediment control systems.
- Temporary works as part of road improvements to facilitate the delivery of abnormal loads and turbine component deliveries from Killybegs Port to site, to include 3 no. over-run areas along the turbine delivery route, (No. 1 in the townland of Tristia onto the L1206, No. 2 in the townland of Moneynierin at the junction of the N59 and the R312, and, No. 3 in the townland of Bangor off the R313).
- Construction of 1 no. new site entrance and the construction/ upgrade of 2 no. additional site entrances (all off local road L5252, west of the L1206),
- Ancillary forestry felling to facilitate construction of the development.
- All associated site development works including landscaping, lighting, soil management and the ongoing maintenance and management of the biodiversity measures in accordance with the Habitat Management Plan and the Peat Restoration Plan.
- The replacement of felled trees with the planting of new trees, and;
- The erection of a permanent meteorological mast 100m in height

2.23 The general layout of the Main Wind Farn Development Site is shown in **Figure 2-3**.

2.24 A 35-year operational life from the date of full commissioning of the Proposed Development and BESS is being sought for all works (other than temporary and permanent works specified above), and the subsequent decommissioning. The proposed substation will continue to exist on a permanent basis. Permanent planning permission is being sought for this element.

Turbine Delivery Route

2.25 The Turbine Delivery Route forms part of the Proposed Development for which planning permission is sought. The turbine delivery route assessed as part of this project is found in **Figure 2-4**, with temporary accommodation works (nodes) to facilitate turbine delivery proposed in certain areas. These are outlined in **Technical Appendix 14-1**. Three over-run areas on the TDR (Over-run areas 1, 2 and 3) are shown on **Figure 2-4b-d**.

Grid Connection Route

2.26 A single 110kV Grid Connection Route (GCR) is assessed as part of this EIAR but is not the subject of this planning application. This will be the subject of a later application which will require works along public roadways to facilitate a 110kV underground Grid Connection to Bellacorick Substation (c. 25.5km east).

2.27 The GCR assessed in this EIAR is shown in **Figure 2-5**.

Detailed Description of Proposed Project

2.28 The Proposed Project will primarily consist of a wind farm of 13 No. wind turbine generators (WTGs), meteorological mast, 110kV substation compound along with ancillary civil and electrical infrastructure, BESS, and 3 no. temporary Overrun Areas along the TDR. Construction of two temporary construction compounds will be required, with associated temporary site offices, parking areas, welfare facilities and security fencing.

2.29 The total installed capacity of the Proposed Development is estimated to be between 74.1 to 91 MW[2].

2.30 The exact turbine will be subject to a competitive procurement process that will only commence if the Proposed Development receives consent. The proposed turbines will be detailed by the turbine manufacturer at award of the contract.

2.31 As such the proposed turbines will be within the following specifications:

- The turbines will be three bladed, horizontal axis type.
- The turbines will have a height range of 179-180m from top of foundation (at ground level) to blade tip height.
- The rotor diameter of the proposed turbines will be within the range of 149-163m.
- The hub height will be within the range of 98.5 to 105m.
- Foundation diameters will either be gravity or piled foundations.

2.32 A 33kv collector cable will run between the Northern and Southern Clusters of the Proposed Development.

2.33 The associated GCR will consist entirely of an underground cable route. This GCR has been assessed in the EIAR but does not form part of the Proposed Development. This chapter does include details of the Proposed Development and the Proposed Project.

2.34 Construction methodologies provided in this Chapter of the EIAR are based on initial site investigations and intended to enable a robust assessment of the potential impacts of the Proposed Project. Further details are provided in the Construction Environmental Management Plan (CEMP) in **Technical Appendix 2-1**.

2.35 The CEMP will be updated prior to commencement of construction activities to address the requirements of any relevant planning conditions, including any additional measures which are conditioned and will be submitted to the planning authority for written approval.

Temporary Construction Compounds

2.36 Two temporary construction compounds will be provided, one each within the Northern and Southern clusters, as shown on **Figure 2-3**. **Planning Drawing Number 501.065301.00001.D10** provides further details of the proposed layouts of the compounds, which will be constructed according to the following methodology.

2.37 The compound boundaries will be set out and marked prior to any works commencing. Any significant surface undulations or irregularities will be trimmed and the removed peat placed

[2] Note: the MW output is stated here based on turbines of between 5.7 MW and 7 MW output only for the purposes of assessment of benefits towards climate as set out in **Chapter 8**.

in designated peat storage areas for reuse or reinstatement, subject to ECoW approval. Otherwise, surface vegetation is to remain intact to increase founding strength.

2.38 Where the fibrous top layer is weak or saturated, a geotextile or geocomposite material will be placed directly upon the ground surface to improve load distribution, separation, filtration and drainage.

2.39 A base geosynthetic layer, to be specified pending the specific site conditions identified at the pre-construction stage, will be installed across the full compound footprint. Overlaps, anchorage, and tensile orientation will conform to manufacturer requirements.

2.40 Imported well-graded granular fill will be tipped incrementally across the compound footprint, progressing outward from the floating access track, and spread by a wide tracked dozer. The initial stone layer will be compacted through a contractor specified method that minimises vibration and excessive loading such as tracking or dead rolling.

2.41 Where required, an intermediate geogrid layer will be installed. This will be placed upon the first stone layer and will be overlapped and tensioned in accordance with the manufacturer's specification.

2.42 A second layer of granular fill will be placed upon the intermediate geogrid to the designed thickness. Where very low CBR values are encountered, a third geogrid layer may be required.

2.43 A final compacted wearing layer of appropriately graded stone will be installed to accommodate construction traffic and pedestrian use.

2.44 Where necessary, pressure berms (stabilising berms) will be constructed around the perimeter of the compounds to enhance stability and reduce lateral displacement.

2.45 Ongoing consolidation and localised settlement of the compound surface should be expected throughout the construction period. The Contractor will be responsible for maintaining the compound to required standards, including remediation of rutting, settlement, or lateral spread using additional granular fill and localised geogrid repairs where appropriate.

2.46 Shallow drainage ditches will be excavated at a safe offset from the compound to prevent undercutting of peat. Existing field drains will be connected where appropriate and protected using silt-management measures such as silt fences or settlement features.

2.47 Once all construction works are complete, the work areas will be reinstated with excavated soil and either seeded out with native species, allowed to vegetate naturally, or reinstated with excavated grass turves and will be restored to their original condition. This work will be carried out in in consultation with the landowner and in line with any relevant measures outlined in the planning application, CEMP and planning conditions.

Turbines

Candidate Turbines

2.48 Whilst the exact make and model of the turbine will be dictated by a competitive tender process it is envisaged at this time that it will meet with the parameters as set out in **Table 2-1.**

Table 2-1: Turbine Details

Turbine Type	Tip Height (m)	Hub Height (m)	Rotor Diameter (m)
Vestas V150	180	105	150
Nordex N163	180	98.5	163
Nordex N149	179	104.5	149

Turbine Layout

2.49 The Northern Cluster consists of seven turbines (nos. 1-7) with 4 no. turbines (or associated buffer areas) located in forested areas (nos. 1–3 and 7). The remaining 3 no. (nos. 4–6) turbines are located in open areas of peatland.

2.50 The Southern Cluster comprises 6 no. turbines (nos. 8-13), with a further 4 turbines (or associated buffer areas) within forested areas (nos. 10, 11, 12 and 13) with the remainder located in open areas of peatland.

2.51 The Main Wind Farm Development Site layout is shown in **Figure 2-3**. This layout reflects the outcome of an iterative design process. Further detail on the design, philosophy, constraints and alternative layouts is documented in **Chapter 3**.

2.52 The turbines referenced from T1-T13 and coordinates in Irish Transverse Mercator [ITM] are detailed in **Table 2-2 .**

Table 2-2: Proposed Turbine Coordinates

Turbine ID	X (ITM)	Y (ITM)
1	475806	823891
2	476156	824041
3	476506	823991
4	477006	823091
5	476998	823635
6	477564	823173
7	477624	823705
8	476357	822557
9	476464	822151
10	476198	821592
11	476576	821830
12	477164	821788
13	477072	822318

Turbine Foundations

2.53 An access track will be constructed to the turbine location where the turbine location, foundation footprint and associated working area shall be set out and marked prior to commencement of works.

2.54 A temporary working area shall be established at the end of the track using geogrid(s) and granular stone to provide a stable platform for excavators, piling rigs and ancillary construction plant. Excavation and storage of peat will follow the specification set out in **Technical Appendix 6-3**.

2.55 The bases of the turbine foundations will be excavated to a competent-bearing stratum or founded on piles. Ground investigations to date have provided an outline indication of the possible ground conditions expected to be encountered at the proposed turbine locations. Deep peat (greater than 1m) was encountered at the majority (12 of 13) of turbine locations. Hence, based on the available ground investigation data it is assumed that turbine foundations will utilise a piled solution, with the potential for a small number to be gravity foundations based on depths to competent strata. For typical turbine foundation detail please refer to **Planning Drawing Number 501.065301.0001.D06-1** and **Planning Drawing Number 501.065301.0001.D06-2**. For proposed turbine elevations please refer to **Planning Drawing Number 501.065301.0001.D07**.

2.56 Shallow surface water drains will be excavated around the working area to prevent surface water runoff into it.

2.57 Where peat is present, subject to its depth, water ingress and stability conditions, excavation support shall be provided through one of the following methods:

- Sheet Pile, Rock or Modular Cofferdam - Used where peat is saturated or unstable. A method will be chosen based on ground conditions with sheet piled and modular cofferdams being temporary and rock cofferdams being left in situ.
- Benched Excavation - Used where peat has sufficient shear strength to maintain stable slopes, subject to geotechnical approval and slope toe support where required.

2.58 A designed piling pad will be constructed at formation layer consisting of geogrid and stone build up to the specified requirement based on the piling rig used.

2.59 The final pile type and installation method shall be determined by detailed ground investigation results, accounting for peat characteristics, underlying strata and environmental constraints. Piling methods may include:

- Bored Piles with Temporary Casing - Suitable in saturated or unstable peat to prevent ingress or instability.
- Continuous Flight Auger - Typically used where bore stability can be maintained and groundwater inflow is manageable.

2.60 Piles shall be installed to a competent bearing layer. After installation, a blinding layer shall be placed across the foundation footprint to provide a level, clean surface for the foundation reinforcement installation.

2.61 A large reinforcement cage, with a central anchor cage, will be prepared for all foundations and complete with cable routing.

2.62 Once temporary formwork has been placed, a high strength, specified concrete is poured in a continuous operation and completed through a site-specific methodology. After concrete has been cured, backfilling of the excavation, with engineered fill, and surface

grading is completed, leading to the final stages of preparation to install the turbine tower upon the foundation plinth.

2.63 Based upon the proposed tip height and ground conditions, it is estimated a typical gravity foundation design will require 1,000m^3 of concrete in the turbine foundation. Where piled foundations are required, reduced quantities of concrete will be needed. This assessment is based on 1,000m^3 of concrete for each turbine foundation and as such reflects a worst case scenario. Foundations range from circular to hexagonal and square, depending on the requirements of the final turbine supplier.

2.64 Following the completion and quality assurance of the turbine foundation, the crane pad and full hardstand footprint will be marked out for construction. The footprint will consist of, but not be limited to, the crane pad, access track, blade laydown, assembly area, storage area and auxiliary crane pads.

Crane Pad Hardstands

2.65 Each turbine will have a hardstanding area constructed at its base to provide a stable surface for the main installation crane, which will be used to erect the turbine. The dimensions of the main crane hardstandings can be utilised to a maximum of 82m by 35m. The dimensions of the designated blade laydown areas are 90m x 25m. Interchangeable dimensions and extra storage room has been incorporated into the design to provide sufficient area of hardstanding to cover any of the possible three candidate specifications.

2.66 Turbine crane hardstands will consist of up to 1,000mm of hardcore placed on top of a base geotextile layer with additional geotextiles installed subject to ground conditions. There are two construction methodologies, one for hardstands to be founded on competent bearing strata and one for deep peat.

2.67 The construction methodology for the crane pad and hardstand on competent bearing strata will be as follows:

- Topsoil and unsuitable material within the hardstand footprint will be stripped to the required depth and stockpiled or disposed of in accordance with **Technical Appendix 6-3**. Subgrade preparation will include proof-rolling, localised excavation of soft spots, and replacement with engineered fill where necessary.
- Where ground conditions require improvement, a base geogrid layer will be installed.
- Stone placement upon the excavated formation level will be carried out in layers with each layer being suitable compacted until specified thickness is achieved.
- The crane pad will be constructed to the design platform level and bearing capacity specified by final crane model.
- Peripheral drainage, such as shallow ditches, will be formed around the hardstand to intercept surface water runoff and to prevent water ingress.
- Surplus topsoil will be placed along the side of the hard standing and dressed to blend in with surrounding landscaping.

2.68 Crane pads will be constructed to facilitate the installation of turbine components. Their location and orientation have been optimised to utilise the existing topography, minimise land take and avoid environmental constraints where applicable.

2.69 The construction methodology for the crane pads located in deep peat will be as follows:

- Temporary geosynthetic-reinforced working platforms, or piling pads, for piling rigs shall be constructed on top of the ground surface to a specified requirement based on the piling rig proposed. The platforms will consist of geogrid(s) and granular stone.
- The specified piling method shall be carried out across the crane pad area in accordance with the specified number, spacing, and arrangement of piles as indicated in the design documentation.
- The piling type and installation method will follow the same principles as described in **Section 2.60 onwards** with piles installed to a competent bearing layer.
- The piles will receive a reinforcement cage and specified concrete.
- Once cured, each pile will be cut down to specified elevation to create a uniform cap level and cleaned prior to pile caps being constructed.
- High-strength specified geogrids will be installed over the set pile caps to the manufacturer's specification and quantity. A well-graded granular material will be placed and compacted in controlled layers over the geogrids to completion.
- Blade laydowns, assembly areas, and temporary storage areas will generally be constructed as floating hardstands. These will consist of a designed stone depth with interchangeable geosynthetic quality and quantity based on ground conditions.
- The Contractor will be responsible for maintaining the hardstands to required standards, including remediation of rutting, settlement, or lateral spread using additional granular fill and localised geogrid repairs where appropriate.
- Peripheral, shallow drainage ditches will be formed around the hardstand to intercept surface runoff and protect peat stability.

2.70 Crane pads will remain in place for the operational life of the Proposed Development, with stored topsoil and peat being used to restore the edges, blade laydowns and jib assembly areas.

Turbine Erection

2.71 The turbine components will be delivered to the Main Wind Farm Development Site where they will be placed on prepared hardstanding storage and laydown areas prior to assembly. The components include the turbine towers (which will be delivered in sections), nacelle, hub and individual turbine blades (which will be delivered one by one). Once all components are available, and there is suitable weather, each turbine will be assembled.

2.72 The tower of a turbine is a conical steel tube, with a corrosion resistant paint finish. Tower sections are generally transported to the Main Wind Farm Development Site in 4 to 5 sections. The base section is lifted by crane and bolted to the foundation anchor cage with upper sections bolted to their lower section in ascending order. The base of the tower is 4m to 5m in diameter, tapering to between 3m and 4m, where it is attached to the nacelle. The base is accessed by a galvanised steel staircase and a steel hatch door which will be kept locked except during maintenance.

2.73 The size and configuration of the turbine foundations will vary depending on the selected turbine model, site-specific ground conditions and the detailed geotechnical and structural design. Where piled foundations are required, they will comprise of reinforced concrete caps of diameter of 22m. Where gravity foundations are suitable, they will consist of a foundation diameter of 27m.

2.74 Each turbine will take approximately a week to erect, weather dependent, and will require two cranes in the assembly process. The turbines will then be commissioned and tested.

Turbine Blades

2.75 The blades of a modern turbine comprise glass fibre reinforced polyester. The turbine blades rotate between five and 15 revolutions per minute, dependent on wind speed and turbine manufacturer make and model. A turbine begins generating electricity at a wind speed of approximately 3 to 4 m/s depending on the turbine type, with rated power generation at wind speeds of approximately 12 to 14 m/s.

2.76 Turbines are usually shut down at wind speeds greater than 25m/s, although some machines are designed to operate up to 30m/s. The yaw mechanism, controlled by a wind vane, turns the nacelle and blades into and out of the wind. Blades are pitched to match the wind conditions.

2.77 Operational safeguards against the effects of extreme temperatures will be incorporated into the design in the form of anti-vibration sensors to detect any imbalance resulting from ice formation on the blades and delay the turbine's operation until the blades have been de-iced.

Turbine Transformer

2.78 The turbine will have a transformer located within the tower. The turbine transformer steps up the voltage of the electricity generated by the turbine to approximately 33kV to reduce the electrical loss on the internal collector cabling that connects to the onsite substation.

Power Output

2.79 The Proposed Development will have an estimated installation capacity of between 74.1 MW to 91 MW depending on the final turbine technology installed. Turbines of the exact same make, model and dimensions can have different power outputs depending on the capacity of the electrical generator installed in the turbine nacelle. Rated capacity of 74.1-91 MW has been used below to calculate the power output of the Proposed Development. Assuming installed capacity of 74.1 MW to 91MW, the Proposed Development has the potential to produce approximately 226,884 to 279,006 MWh (megawatt hours) of electricity per year, based on the following calculation:

- A x B x C = megawatt hours of electricity produced per year

Where:

- A = the number of hours in a year: 8,760 hours.
- B = the capacity factor, which takes into account the intermittent nature of wind, the availability of wind turbines and array losses. The capacity factor of 0.35 is applied here based on the turbines operating 35% of the time.
- C = rated capacity of the proposed turbines: 74.1 MW-91 MW.

2.80 The 226,884 to 279,006 MWh of electricity produced by the Proposed Development will be sufficient to supply approximately 54,020 to 66,430 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity[3].

2.81 According to the 2022 Census of Ireland, there are a total of 52,114 private households within County Mayo. Based on a capacity factor of 35%, the Proposed Development will

[3] March 2017 Commission for Energy Regulation Review of Typical Domestic Consumption CER/17042 (still in use in renamed Commission for Regulation of Utilities most recent Estimated Annual Bills https://www.cru.ie/publications/28025/)

produce enough electricity for the equivalent of 104% to 127% of all households in County Mayo as per the Housing stock of the 2022 Census.

Turbine Colour

2.82 Turbines have multiple painted coatings which protect against corrosion. They are coloured light grey to blend into the sky background. The colour of the turbines minimises visual impact, as recommended by the following guidelines on wind energy developments:

- Draft Wind Energy Development – Planning Guidelines (2019)[4].
- Wind Energy Development – Planning Guidelines (2006)[5].
- The Influence of Colour on The Statics of Wind Turbine Generators – ETSU W/14/00533/00/00[6].
- PPG 22, Department of The Environment – Welsh Office[7].
- Technical Advice Note 8, Welsh Assembly, 2005[8].

Turbine Delivery Route

2.83 A turbine delivery route selection and assessment was carried out to identify the optimum delivery route to the Main Wind Farm Development Site. The proposed TDR is presented in **Figure 2-4a**. The nodes relate to minor works within the public carriageway as described in **Technical Appendix 14-1**. In addition, there are three over-run areas where temporary tracks will be constructed to avoid pinch points. These are shown on **Figure 2-4b, Figure 2-4c and Figure 2-4d**.

2.84 Turbine delivery will be from Killybegs Port to the Main Wind Farm Development Site (**Figure 2-4a**). Leaving Killybegs, the TDR continues via the R263 to merge with the N56 north of Killybegs and then along the N56 south through Dunkineely, Mountcharles Bypass, and onto the Donegal Bypass. At this point it merges onto the N15, following it for approximately 65 km through Ballyshannon, Bundoran, before merging onto the N4 at Sligo. The route continues on the N4 southbound to junction S1, then onto the N59 through Ballysadare. From here it follows the N59 through Dromore west, turning south to Ballina. Continuing on the N59 through Crossmolina to Bangor Erris. At Bangor Erris, the TDR follows the R313 before branching onto the L1206. Following the L1206 to the local access road the L5252 to the Main Wind Farm Development Site.

2.85 Further discussion on this route selection assessment is found in **Chapter 14** and **Technical Appendix 14-1** found in **Volume 3** of this EIAR.

Meteorological Mast

2.86 Meteorological conditions will be monitored by a permanent, free standing anemometry mast, located as shown on **Figure 2-3**, and with a height of up to 100m. The design will be of a steel lattice type and the mast will be left in situ for the operational period.

[4] Department of Housing, Planning and Local Government (2019) Draft Revised Wind Energy Development Guidelines https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/draft-revised-wind-energy-development-guidelines-december-2019/
[5] Department of the Environment, Heritage and Local Government (2006) Wind Energy Development Guidelines https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/wind-energy-development-guidelines-2006/
[6] Department of Trade and Industry and Energy Technology Support Unit (2021) The Influence of Colour on the Aesthetics of Wind Turbine Generators W/14/00533/00/00
[7] Department of the Environment - Welsh Office (1993) Planning Policy Guidance Note 22: Renewable Energy
[8] Welsh Assembly Government (2005) Planning Policy Wales Technical Advice Note 8: Planning for Renewable Energy

Onsite Electricity Substation

2.87 It is proposed to construct one onsite electricity substation within the Proposed Development Site as shown in **Figure 2-3**. This substation will provide a connection point between the Main Wind Farm Development Site and the national grid, via the proposed GCR which will connect to the Bellacorick 110kV ESB Station.

2.88 The dimensions of the proposed 110kV substation compound will be 84.5m wide on the southwest width and 82m wide on the northeast width by 149m long on the northwest length and 147.5m on the southeast length. The substation compound will incorporate a connected Independent Power Producer (IPP) compound area measuring 84.5m wide on the southwest width and 82m wide on the northeast width by 38.5m on the northwest length and 36.5m on the southeast length. The compounds will be surrounded by a 2.6m high steel palisade fence and will include two buildings along with electrical components necessary to export electricity generated from the Main Wind Farm Development Site to the National Grid. Internal fences will be provided to segregate different areas within the compounds.

2.89 The proposed Transmission System Operator (TSO) control building (the 'Eirgrid Building) will be operated and maintained by EirGrid. It will measure 27m x 20m and will have an overall height of 7.85m. It will contain a control room, associated electrical equipment and apparatus and will also include storage and welfare facilities.

2.90 The IPP Building will measure 22.1m x 12.m and will have an overall height of 6.17m. It will house switchgear, associated electrical equipment and apparatus, storage and welfare facilities.

2.91 Staff welfare facilities will introduce a small water requirement for occasional toilet flushing and hand washing. It is proposed to install a rainwater harvesting system as the source of water for toilet facilities and this rainwater harvesting tank will be installed adjacent to the control buildings. It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off-site by a permitted waste collector to a wastewater treatment plant. The proposed storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying.

2.92 The compound will also include associated outdoor electrical equipment, including a 110 kV transformer and an internal access track. A 110 kV cable sealing end and associated cable equipment will be required to connect the 110 kV incoming underground cables into the substation.

2.93 Prior to construction of the substation compound, an area incorporating a drainage system surrounding it will be marked out by a qualified engineer prior to excavation and installation of the drainage system. Peat is present at a depth from 1.8m to up to 3m across the proposed BESS and substation compound area and will be excavated in accordance with the proposed design, including details on slope excavation of peat. This will remove the need for piled foundations.

2.94 The compound extents will be excavated to the required formation level. The excavation will remove peat and other unsuitable materials. Excavated peat will be placed in designated peat storage areas for reuse or reinstatement in accordance with the Peat Management Plan (PMP). A layer of geotextile material will be laid over the footprint of the compound. Using an excavator and dozer, a base layer of suitable backfill material will be laid and compacted, followed by a capping layer which will provide the finished surface for machinery and pedestrian use. Each layer will be compacted using a vibrating roller.

2.95 A range of different concrete foundations will be constructed across the substation compound. All concrete works will be carried out in accordance with the relevant Irish and European standards.

2.96 Raft foundations will be constructed for the IPP and Eirgrid buildings.

2.97 Earthing cable will be laid underground around the substation for connection to the various electrical components during the electrical fit out phase. Marker tape and cable tiles, where required, will be placed above the buried services.

2.98 Lighting will only be required during the operational phase of the Main Wind Farm Development Site when staff personnel are onsite. This will be provided by lighting columns to be installed around the substation compound.

2.99 A lightning protection mast of approximately 18m height will be installed to protect the station from direct lightning strikes.

2.100 This element of the Proposed Development Site is to be a permanent fixture, and the Eirgrid Building will be taken in charge by EirGrid at the end of the construction phase.

Battery Energy Storage System (BESS)

2.101 It is proposed to construct one onsite BESS compound with a capacity to reflect the generation capacity of the Proposed Development as shown in **Figure 2-3**. The BESS will have the future ability to store excess power being generated locally on the grid and will release it back into the grid when there is a demand for it. The BESS will comprise 120 Battery Containers and 15 Inverter Containers in total, within a compound measuring 156m long on the northwest length, 153m long on the southeast length and 99m wide either side, secured by a 2.6m high palisade fence.

2.102 Each of the 120 battery container units will measuring 2.9m in overall height, 2.54m in width and 6m in overall length. Each of the 15 inverter units will measure 2.9m in overall height, 2.7m in width and 6m in overall length.

2.103 Prior to construction of the BESS, an area incorporating a drainage system surrounding it will be marked out by a qualified engineer prior to excavation and installation of the drainage system. Peat is present at a depth from 1.8m to up to 3m across the proposed BESS and substation compound area and will be excavated in accordance with the proposed design, including details on slope excavation of peat. This will remove the need for piled foundations.

2.104 The construction of the BESS compound will follow the same principals as **Section 2.101** with the battery container units and associated equipment will sit on reinforced concrete foundations.

2.105 Raft foundations will be constructed for the BESS switchgear building.

2.106 The associated battery cable equipment will be required to connect the substation via underground cables into the substation. Marker tape and cable tiles, where required, will be placed above the buried services.

2.107 Adequate lighting will be installed on the lighting masts around the compound.

Internal Access Tracks

2.108 The Main Wind Farm Development Site will require 8.75 km of internal access tracks. Of this, 1.95 km of existing internal access tracks will be utilised and upgraded where required. It is anticipated that 6.80 km of new track will be constructed to a floating track standard, as

will the existing tracks to be upgraded. Please refer to **Planning Drawing Number 501.065301.0001.D21**.

2.109 The construction specification for the access tracks will be confirmed by further site investigations. This will include in-situ testing, such as Dynamic Cone Penetrometer (DCP) testing, to determine the California Bearing Ratio (CBR) of the underlying peat. The CBR values will inform the track design, including the required thickness of the stone sub-base and the need for, and specification of, any geogrid or other geosynthetic reinforcement necessary to achieve the required load-bearing capacity for construction and operational traffic.

2.110 **Figure 2-3** illustrates the internal access tracks within the Main Wind Farm Development Site and indicates which tracks are new and which are to be upgraded. The proposed internal site track layout will permit access for vehicles during the construction phase, for maintenance during the operational phase, and for vehicles to decommission the turbines at the end of their operational life.

2.111 All tracks will be constructed to a 6-metre surface, inclusive of a minimum 5 metre running track and space for stone shoulders where required. Existing drainage infrastructure will be retained and utilised, where possible, and improved, as necessary. New drainage infrastructure will be required on all new access tracks. Drainage infrastructure and cable runs will be constructed in parallel with new access track construction.

2.112 Cables connecting turbines to the substation will be alongside the access tracks during their construction. Electrical cables will need to cross the access tracks in a number of locations. Indicative cable route alignment and track crossing points are presented within **Planning Drawing Number 501.065301.0001.D22**.

2.113 At construction stage the specific requirements such as number of cable crossing points and duct size will be confirmed to allow suitable ducts to be installed through / below the access track during track construction works. This will then allow cable to be pulled through in the future without need for future disturbance to the track.

2.114 A cable crossing of the public road which routes through the Main Wind Farm Development Site is required to connect Turbines T8 to T13 to the substation. Indicative cable route alignment and the public road crossing point is presented within **Planning Drawing Number 501.065301.0001.D22**.

2.115 Due to the low volume of traffic recorded using the road, it is proposed that this cable crossing is achieved by open cut trenching with either partial closure with traffic management or full closure of the road required. The cable ducts will be installed at a minimum 0.75m below the road surface and may be surrounded by either natural soil arising, stabilised backfill material or concrete, depending on the cable duct selected. Following cable installation, the road will be reinstated to existing make-up and condition.

New Access Tracks

2.116 It is anticipated that the stone required for the construction of all new internal access roads will be sourced from quarries in the vicinity of the Main Wind Farm Development Site.

2.117 As mentioned above, the depth and makeup of the floating tracks will vary dependent on the peat's CBR value which will be obtained during detailed site investigations. The range of the depth can be between 400mm and 1500mm with a varied depth and quantity of geocomposite layer placement. A standard floating track incorporates two geogrid layers, or similar.

2.118 A general construction methodology of floating tracks will be followed and will consists of the following procedures where applicable:

- The designed alignment of the track will be marked out and clearly indicated prior to any construction works.
- The ground surface will receive a base geogrid, placed directly along the track alignment, in line with the geogrid manufacturer's specification. Where the ground surface lacks a fibrous surface layer, a geotextile or geocomposite (typically bonded geogrid and geotextile) will be placed to improve strength, separation, filtration and drainage.
- The makeup of the track will follow the designed requirement which may differ across the Main Wind Farm Development Site subject to the grounds CBR values. General methodology consists of an initial layer of specified, well-graded, granular fill being tipped in sections, typically 10m, on the base geogrid and spread using a suitable dozer, followed by a second geogrid, topped with the same specified fill and completed with a surface layer to accommodate construction traffic requirements.
- The stone buildup can range with interchangeable geogrid depths and quantities subject to the ground condition requirements. Very low CBR values may require up to three geogrid installations throughout its depth.
- In sections of floating tracks where lateral support is deemed necessary, pressure berms or stabilising berms will be constructed either side of the track. This is an unlikely requirement due to the flat topography on site but may be beneficial for the reuse of excavated material. The berms act as a counterweight which widen the base of an embankment load to increase the factor of safety against slip failure.
- Shallow drainage ditches will be excavated and will tie into the existing field drains where applicable.
- Both drainage ditches and cable trenches will follow the alignment of the access tracks and will be suitably distanced to ensure track stability is maintained.

2.119 **Planning Drawing Number 501.065301.00001.D21** contains a visual representation of a typical floating track.

Upgraded Access Tracks

2.120 The existing tracks onsite are utilised within the Main Wind Farm Development Site's design to form a foundation on which the floating roads will be constructed on or the potential for cut roads. In both cases, the existing tracks will have their depth increased as well as their width to ensure track specifications are met. The historic peat compaction and drainage caused by the continued use of the tracks will benefit the founding of the upgraded floating tracks.

2.121 The improvement and extension of the existing floating tracks will follow the same methodology of the floating track construction where existing tracks are located on deep peat. The upgraded track will have interlocking geogrids installed over and around the existing track to form a base in which the upgraded track will utilise.

2.122 Where existing tracks are located on shallow peat or soils, the methodology of cut access tracks will be used. The width of the existing track and the required distance on either side of the track, will be extended to suit the requirement. The different track types are shown in **Planning Drawing Number 501.065301.00001.D21**.

2.123 In-situ strength testing and confirmation testing on the existing track make-up, such as trial pits through the track, will be required to assess the existing tracks suitability to form part of the upgraded route.

Cut Access Tracks

2.124 Where applicable, cut access tracks will be formed on suitable underlying material (superficial soil or rock with sufficient bearing capacity) in the following manner:

- stripping of surface vegetation (turves) and careful stockpiling of this material.
- excavating the remaining superficial soil materials and stockpiling this material.
- where different superficial materials are present these will be stored according to type. This material will be retained for reinstatement purposes.
- the exposed suitable track formation will receive a geogrid prior to rock fill material being tipped from dumper trucks directly onto the proposed access track alignment.
- this material will then be either spread by a dozer or placed by a hydraulic excavator and compacted in layers, typically using vibratory rollers.

2.125 Access tracks will be formed from a sub-base of general fill and finished off with a cap-stone / wearing course of graded crushed rock to provide a nominal Type-B (Series 800) finish. Wearing course stone will be of a suitable material that is not susceptible to breaking down / weathering to a high fines content material.

2.126 Maintenance of the running surface on all access tracks will be carried out on a regular basis, as required, to prevent undue deterioration. Loose track material generated during the use of access tracks will be prevented from reaching watercourses by maintaining an adequate cross fall on the tracks. Periodic maintenance of tracks by way of brushing or scraping will be carried out to minimise the generation of wheel ruts, which could lead to some track material being washed away. In dry weather, dust suppression methods may be required for track and hardstanding areas.

Watercourse Crossings

2.127 Construction of water crossings has the potential to cause sediment loading to water receptors. Measures to prevent the release of any pollution/sediment are outlined in **Section 7** of the CEMP and are as follows:

- Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall, so areas will be reinstated as soon as possible to reduce the potential for silt, chemicals and/or other contaminants being washed into existing watercourses.
- Best practice guidance in relation to drainage (and control of pollution to the water environment) will be followed in watercourse crossing areas.
- Ditches will remain in place to convey surface water flows during the operational life of the Proposed Project. With the notable exception of extensive ditch blocking as described in **Technical Appendix 5-5** of the EIAR.

Internal Access Track Watercourse Crossings

2.128 The proposed wind turbine layout will utilise, in total, four watercourse crossings as shown on **Figure 2-6** . These comprise two existing and two proposed crossings as listed in **Table 2-3**.

2.129 Watercourse crossings can be classified as follows:

- Existing structures (bridges or culverts) that need to be crossed by infrastructure (access tracks or cables) associated with the Proposed Project, without a need to modify the structure.
- Installation of new structures to facilitate the crossing of watercourses by infrastructure associated with the Proposed Project.
- Existing structures that need to be either replaced or upgraded to facilitate the crossing of watercourses by infrastructure associated with the Proposed Project.

2.130 There are two new and two upgraded watercourse crossings for new and upgraded access tracks within the Main Wind Farm Site. The type and location of these is shown in **Table 2-3** and **Figure 2-6**.

2.131 New watercourse crossings will be provided as culverts according to typical specifications identified in **Planning Drawing Number 501.065301.00001.D17**.

2.132 New crossings are designed to convey 1% Annual Exceedance Probability Mid-range Future Scenario (AEP MRFS) storm event, with a minimum 300mm freeboard level. This is in line with the Office of Public Works (OPW) requirements. A Section 50 application will be required to obtain the consent of the OPW for the construction of the crossings. Existing crossings will be upgraded.

Table 2-3: Watercourse Crossings

Crossing Point	Existing / Proposed	X coordinate (ITM)	Y coordinate (ITM)
WCX1	Proposed	476064	823774
WCX2	Proposed	476880	822463
WCX3	Existing	477113	822549
WCX4	Existing	477286	822437

Watercourse Crossings Along the Turbine Delivery Route

2.133 Construction of water crossings has the potential to cause sediment loading to water receptors. Measures to prevent the release of any pollution/sediment are outlined in **Section 7** of the CEMP and are as follows:

- Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall, so areas will be reinstated as soon as possible to reduce the potential for silt, chemicals and/or other contaminants being washed into existing watercourses.
- Best practice guidance in relation to drainage (and control of pollution to the water environment) will be followed in watercourse crossing areas.
- Ditches will remain in place to convey surface water flows during the operational life of the Proposed Project.

2.134 Over-run area 1 is located c. 94m west of the Tristia river, Over-run Area 2 intersects with the Moneynierin River and is the only watercourse crossing associated with the TDR Over-run Areas (see **Figure 7-10c)**. The works for Over-run Area 2 are temporary and will not involve any in stream works, modification of the river channel or obstruction of flow. Upon completion of works, the site will be restored to its existing land use without delay.

2.135 Over-run Area 3 is located within an area of moorland with drainage ditches located within 50m of the temporary track. This Over-run Area is located within the 50m buffer due to constraints associated with land access see **Figure 7-10d**.

2.136 As there will be proposed construction or infrastructure located within 50m of the stream, further mitigation measures will be proposed to facilitate the turbine delivery with minimal impact to nearby water receptors (see **Chapter 7** for more information).

2.137 There will be no construction works required on the crossing structures to facilitate the turbine delivery.

Watercourse Crossings Along the GCR

2.138 The GCR is approximately 25.5 km in length all located on public roads. The GCR will utilise 32 existing crossings with minimal direct impact with water environment receptors.

2.139 Water crossings associated with the GCR are shown in **Figure 7-1b-e**. Crossing methodology will be either by a standard trenched crossing technique or by utilising incline Horizontal Direction Drilling (HDD) methodology.

Electrical Cabling

2.140 The electricity generated from wind turbines within both the Northern and Southern Clusters will be collected by a medium voltage 33kV circuit of underground collector cables which will follow the onsite access tracks. The collector cables will be embedded beneath the public roadway to connect the Southern Cluster to the proposed onsite substation in the Northern Cluster and forms part of the Proposed Development.

2.141 Ultimately, the electricity from the Northern and Southern Clusters will be exported from the onsite substation to the national grid via a 110kV underground cable via the GCR, which will be the subject of a separate application. Once consented and built, the GCR will be a permanent fixture and will be taken in charge by EirGrid / ESBN.

Traffic Management

Wind Farm

2.142 Access to the Main Wind Farm Development Site will be facilitated via the central spine road (L5252) taken off the L1206. There are three Access Points (AP1, AP2 and AP3) located roughly equidistant along the spine road (see **Figure 14-3**). A Construction Traffic Management Plan (CTMP) will be implemented, covering vehicle routing, signage, road condition monitoring, and engagement with Mayo County Council. A CTMP is provided at **Technical Appendix 14-4**.

Cable routes

2.143 An internal 33kV underground collector cables will connect the Northern and Southern Clusters to the proposed onsite substation.

2.144 The GCR, a 110 kV underground cable connecting the Main Wind Farm Development Site to the Bellacorick Substation, will be the subject of a separate planning application but has been assessed in this EIAR as part of the Proposed Project, as defined in **Chapter 1** of the EIAR.

Peat Management

2.145 Peat depths vary across the Main Wind Farm Development Site, with an average thickness of 2.5m across the surveyed area up to a maximum depth of 6.4m (further detail is provided in **Technical Appendix 6-2**). **Technical Appendix 6-3** presents a Peat Management Plan (PMP) specifically for the construction phase, but which also provides details for the management of the peat during the first 2 years of its operation. Further information on land, soils and peat management can be found in **Chapter 6**.

Balances of Materials Required for Site Works

2.146 **Table 2-4** below sets out the estimated cut and fill balance for soil, aggregate and concrete materials required on site.

Table 2-4: Cut and Fill Balances of Materials Required for Site Works

Material	Cut (m^3)*	Fill (m^3)*	Import Requirement (m^3)*	Balance (m^3)*
Topsoil	32,572	N/A	N/A	-32,572
Subsoil / Substrate	117,573	N/A	N/A	-117,573
Aggregate	N/A	254,398	254,398	254,398
Concrete	N/A	20,223	20,223	20,223
*Numbers rounded to nearest hundred.				

2.147 **Topsoil:** Topsoil has been classified as acrotelm peat or nutrient rich soil due to its lack of saturation. The depth has been taken as 0.4 m, which is at the higher end of recommended topsoil cover following best practice such as British Standard BS3882:2015 Specification for Topsoil.

2.148 **Subsoil / Substrate:** The subsoil quantities refers to peat, which is saturated and has been assumed as 0.4 m and deeper due to the nature of the Main Wind Farm Development Site. The substate accounts for the underlying silt and granular material found under the peat layers. Finally, the substrate also includes pile arisings from the competent bearing strata.

2.149 Due to the varied depths of peat across the Main Wind Farm Development Site, all excavated subsoil and substrate material have been accumulated in the absence of detailed site investigations. The PMP accounts for the estimated peat removal volumes whereas the cut and fill balances account for all excavation works including the Civil 3D model cut volumes.

2.150 As this is an overview assessment of likely volumes, a bulking factor has not been considered in **Table 2-4**.

2.151 Concrete volumes are included for the substation platform, BESS platform, main crane working pad, turbine foundations and met mast foundation.

2.152 The Proposed Project will utilise local quarries for the importation of materials to the Main Wind Farm Development Site and Over-run Areas. These quarries will be sourced once planning consent for the Proposed Development is secured. Further information on the quarries most likely to be utilised is found in **Chapter 6**. An assessment of trips required for the transportation of material is provided in **Chapter 14** within this EIAR.

Tree Felling

2.153 To facilitate the construction of the various infrastructural elements of the Proposed Development, the permanent removal of existing commercial forestry is planned, totalling between 27.17 – 31.37 hectares, contingent on the chosen candidate turbine model.

2.154 The felling of trees for wind farm construction is subject to and can only occur following the granting of a felling licence by the Minister for the Department of Agriculture, Food and the Marine (DAFM).

2.155 The Forest Service policy[9] requires that a copy of the planning permission for a wind farm is submitted with a felling licence application, therefore, the felling licence cannot be applied for until planning permission is received for the Proposed Development. The licence will include the provision of relevant replant lands to be planted in view of the proposed tree felling on the Main Wind Farm Development Site.

2.156 The construction methodology for tree clearance will follow the specifications set out in the Standards for Felling & Reforestation (DAFM, 2019) and Felling and Reforestation Policy (DAFM, 2017).

2.157 Before harvesting works commence onsite, all personnel, particularly machine operators, will be made aware of the following and will have copies of the relevant documentation including:

- The CEMP, felling plan, surface water management, construction management, emergency plans and any contingency plans.
- Environmental issues relating to the Main Wind Farm Development Site.
- The outer perimeter of all buffer and exclusion zones.
- All health and safety issues relating to the Main Wind Farm Development Site.

2.158 The proposed method of tree felling near infrastructure will be limited to:

- 10m-wide exclusion zone to be established from the edges of any aquatic zones or water hotspots as per *Standards for Felling & Reforestation* (Department of Agriculture, Food and the Marine (DAFM), 2019).
- 5m-wide exclusion zone to be established from the edges of any relevant watercourses (DAFM, 2019).
- Appropriate exclusion zone to be established from the outer edges of any archaeological features: see Environmental Requirements for Afforestation (DAFM, 2024). The archaeological assessment set out in **Chapter 12** of the EIAR assumes a worst-case scenario that the entire footprint of the proposals will require ground intrusive works. Turbine 11, the closest turbine, is located c.0.23 km away from the zone of protection of the national monument located within the Main Wind Farm Development Site boundary (crannog registered as Site and Monument Record MA025-004). As such is not predicted to cause direct effects to the asset. Any unknown remains related to the crannog would also not be anticipated to extend outside the Zone of Protection and within the footprint of the development.
- Should any palaeoenvironmental materials within the Main Wind Farm Development Site be preserved within the peat, it is unlikely to comprise substantial materials due to the likely low level of activity across the Site, and the disturbances caused by the extensive

[9] Forest Service, Department of Agriculture, Food and the Marine (2017) Felling and Reforestation Policy https://teagasc.ie/wp-content/uploads/2025/05/Felling-and-Reforestation-Policy-4.pdf

modern drainage ditches, peat cutting and commercial forestry. In the event that an unrecorded archaeological feature is found during harvesting, the discovery must be immediately reported to the National Museum of Ireland or the Garda Síochána. A minimum exclusion zone of 20m must be established around the feature until the site of the find has been investigated (Forest Service, 2000[10]).

- Appropriate exclusion zones and work programme for harvesting areas to be established for any areas of ecological sensitivity, such as buffers around habitats deemed valuable for breeding birds in the appropriate season and timing of works will to avoid bat roosting periods. The location of such exclusion zones will be included in the CEMP and will be well known by all operators on site.

2.159 For further information see the Forestry Report included as **Technical Appendix 2-2** found in **Volume 3** of this EIAR.

Project Construction Management

CEMP

2.160 Overview details of the key stages of construction of the Proposed Project are provided under the respective headings set out within this section. A CEMP provided in **Technical Appendix 2-1** found in **Volume 3** of this EIAR provides more specific information.

2.161 The CEMP sets out the key environmental management measures associated with the construction of the Proposed Project, to ensure that during this phase of the Proposed Project, the environment is protected, and any potential impacts are avoided and minimised.

2.162 No oils, greases, hydraulic fluids or other hazardous substances (or associated wastes) will be stored outside designated areas within the Main Wind Farm Development Site. All such materials will be stored only within designated Control of Substances Hazardous to Health (COSHH) storage areas located in the construction compounds, substation and BESS compounds. These storage areas will comprise impermeable surfaces, be covered where appropriate, and include fuel spill trays and/or bunded containers. A separate decommissioning environmental management plan will be prepared prior to decommissioning the Proposed Project in line with the requirements of legislation, guidance and best practice at the time of this phase commencing 35 years from operation starting.

2.163 In the event that An Coimisiún Pleanála (ACP) grants permission for the Proposed Development, the CEMP will be updated as required to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by ACP. The CEMP will be a key construction contract document which will ensure that the contractor will implement the prescribed measures to protect the environment. It will provide a framework for ensuring that any remaining sensitivities following construction will be appropriately managed and monitored during the operational phase of the Proposed Project. The CEMP will also be used as a framework for a future Decommissioning Plan to manage any potential environmental impacts arising at that stage. The Decommissioning Plan will be expanded in line with experience of the Proposed Project over time, as well as best practice measures as they will have evolved in the intervening period.

[10] Forest Service (2000) Forestry and Archaeology Guidelines

Phasing of Construction Activities

2.164 The construction phase of the Proposed Project, which includes civil, electrical, grid works, and turbine assembly is anticipated to take 18-24 months once the proposed turbines are acquired via a competitive tender process.

Wind Farm, Substation and Battery Energy Storage System

2.165 For these elements of the Proposed Development, the construction sequence will be as follows:

- off-site TDR works.
- mobilisation and site set up.
- site clearance and tree felling.
- site access and internal access tracks turbine hardstands turbine foundation construction.
- onsite substation, BESS and collector cable .onsite cable delivery and installation.
- turbine delivery & installation.
- wind farm commissioning and testing; and
- landscaping, reinstatement and demobilisation.

2.166 The electrical installation of the substation compound is expected to take 17 months (including 2 months of commissioning activities) and includes the following:

- Delivery and installation of 110 kV transformer.
- Wiring and cabling of HV/LV equipment, protection and control cabinets.
- Commissioning of all newly installed equipment.

2.167 The BESS compound installation is expected to take 14 months (including 2 months of commissioning activities) and includes the following:

- Delivery and installation of the battery units.
- Wiring and cabling of MV/LV equipment.
- Commissioning of all newly installed equipment.

Electrical Works and Collector Cable

2.168 Construction of the Proposed onsite Substation, BESS and internal cable network between turbines will be carried out in tandem with the wind farm element of the Proposed Development in sequenced activities. A description of construction techniques is contained within the CEMP in **Technical Appendix 2-1** found in **Volume 3** of this EIAR.

Grid Connection Route

2.169 The GCR will follow a 25.5 km route from the Main Wind Farm Development Site to the Bellacorick 110 kV Substation. The GCR will follows a large section of the National Road (N59) and the local road (L1206) from the Proposed Substation. For most of the route, and subject to consultation with the TII and Mayo County Council as part of a future Planning Application, the GCR will use the National Road which will accommodate a single circuit 110 kV cable. Typical trenched method can be utilised for watercourse crossings with a likely requirement for horizontal directional drilling (HDD) at bridge crossings.

Drainage Design and Hydrological Management

Existing Site Drainage

2.170 The Main Wind Farm Development Site is located in an area with an extensive network of peat drainage channels. The channels are present throughout all of the open land and link with V-ditches parallel to the existing farm tracks.

2.171 There are two watercourses in proximity to the site. The northern watercourse follows the alignment of the northern red line boundary, with a small tributary stream which splits Turbine 1 and Turbine 2. The second watercourse follows the centre-eastern red line boundary and cuts through the Main Wind Farm Development Site, west of Turbine 13 and east of Turbine 11. It realigns with the south-eastern red line boundary.

Drainage Design

2.172 The drainage design for the Main Wind Farm Development Site as shown in Planning Drawings **501.065301.00001.D12-1 to 12-5** utilises the existing peat drains and drainage ditches. Surface water runoff from the hardstanding areas within the Main Wind Farm Development Site will be controlled and diverted into the surrounding drainage channels and attenuation basins following the topography of the site to permit a gravity flow. All drainage is designed to incorporate Sustainable Drainage Systems (SuDS) through the use of permeable surfaces, attenuation basins, shallow ditches, stone check dams, silt fences and swales, where applicable.

2.173 Prior to main earthwork activities, interceptor drains, or diversion ditches will be created to minimise the pooling water in areas of development. The employed diversion method will flow into the existing peat drainage channels. The diversion method will follow the topography of the site and installation shall commence up gradient of all construction to commence. The clean surface water will be collected and diverted to the existing ditches via the peat channels.

2.174 Preservation of the existing local hydrology and its incorporation into the design is important to maintain equilibrium between the new tracks and the underlying peat. To ensure a lesser effect on the local hydrology, flat ditches will be employed parallel to tracks opposed to standard V-ditches. The shallower excavation will not lower the water table, preventing lateral effects to the infrastructure.

2.175 The construction of the Main Wind Farm Development Site's drainage comprises:

- The excavation of in channel rock drainage channels 2m in width and 275mm in depth from the edge of the Main Wind Farm Site's access tracks.
- Silt fence textile will be laid within the channel. The silt fence textile will be Hy-tex Terrastop premium or similar and will be fixed to the upslope side of the supporting slope within the main drainage channel.
- Support posts for silt fence support and for channel supports will be inserted at the edge of the drainage channel at 1,500mm intervals.
- Silt fence textile will be anchored using clean drainage stone.

2.176 The area behind silt fences will be maintained regularly and silt will be removed and buried. Further detail is shown in **planning drawings 501.065301.00001.D15 and 501.065301.00001.D16** which accompany this planning application.

2.177 The proposed drainage system will be based on the following methods:

- The first method will involve protecting existing water quality by avoiding disturbance to natural drainage features, minimising any works in or around drainage features, and diverting clean surface runoff around excavations and construction areas.
- The second will involve collecting any drainage water from works areas that might carry silts or sediments, and to route them towards settlement ponds prior to controlled diffuse release over vegetated natural surfaces. To achieve this, shallow surface water drains will be excavated around areas of earthworks to prevent surface water runoff into the working area and thereby protect the wider water network from siltation. The CEMP identifies appropriate options for protecting watercourses and choosing stable design methods depending on the specific nature of ground conditions encountered during construction.

2.178 Perimeter drainage channels will be installed around the compounds and surface water drainage pipework will be installed within trenches in the stone platform, with downpipes from the buildings discharging to the surface water network.

2.179 Surface water runoff from impermeable surfaces will be managed via attenuation basins. These basins will provide the required storage for runoff within their respective compounds while also providing treatment of the water prior to discharge. To mitigate the risk of attracting protected bird species into the turbine sweep path, the basins are designed to be dry-bottomed features with no permanent standing water.

2.180 The basins will only temporarily store surface water runoff up to a maximum peak depth of 500mm following substantial and prolonged rainfall. The basins will also comprise a minimum 300mm freeboard above the peak water depth. Following such an event, the basins will gradually discharge at a controlled rate over a 24 to 48-hour period until fully emptied. To facilitate this full drainage cycle, the basin outlet will be positioned at the base level to ensure no permanent volume of water is retained. To prevent groundwater interaction, the basins will be lined with a combination of the geosynthetic clay liner (GCL) and natural clay liner and topped with a 300mm soil protection layer. This layer will be seeded to maintain a vegetated dry bank that blends with the surrounding landscape while remaining unattractive as a foraging or nesting habitat for aerial fauna.

2.181 Separate surface water and foul drainage networks will be provided. The network will include manholes located at junctions and directional changes in the drainage pipework as appropriate.

2.182 Oil separators will be installed where required, particularly in transformer or plant areas, to prevent hydrocarbons entering the surface water system. Discharge from the built compounds and turbine hardstandings will be directed to a network of associated attenuation ponds, which will be connected by a series of underground pipes, as shown on **Planning Drawing Number 501.065301.00001.D14**.

2.183 The compounds will utilise rainwater harvesting to collect roof runoff for reuse where feasible.

2.184 A separate system consisting of foul water drainage pipework, manholes and a foul water holding tank will be installed. The foul water holding tank will be tankered off-site by a permitted waste collector to a wastewater treatment plant.

2.185 The CEMP (**Technical Appendix 2-1**) which has been developed for the Proposed Project outlines measures to ensure adequate protection of the water environment.

2.186 Specific forms of SuDS that are more suitable for wind farm developments are recommended for implementation in **Chapter 7** of the EIAR.

2.187 A comprehensive water quality monitoring regime is proposed to ensure that the measures are effective in protecting the water environment.

2.188 Further details on the hydrology and drainage are contained in **Chapter 7** and in the accompanying planning drawings.

Cable Trenches

Collector Cable within the Main Wind Farm Development Site

2.189 Cable-ducts parallel to the Main Wind Farm Development Site's access tracks will be laid in cable trenches when the track is being constructed and will follow the alignment of the access tracks.

2.190 Marker tape and cable tiles, where required, will be placed above the buried services.

2.191 HV circuits, transformer connections, auxiliary power supplies, control cabling and BESS interconnections will be installed within designated trenches.

2.192 All cable routes will be surveyed and recorded.

2.193 Trenches will be backfilled with specified, suitable material and reinstate to finished platform levels.

Internal Track Crossings

2.194 Collector cables connecting turbines to the substation will be laid alongside the access tracks as identified within the Access Track Construction methodology above. On the route from the turbines to the substation the cable will need to cross the access tracks in a number of locations. Indicative cable route alignment and track crossing points are presented within **Planning Drawing Number 501.065301.00001.D22.**

2.195 Prior to construction the number of cable crossing points, duct size and requirements will be confirmed to allow suitable ducts installed through / below the access track during track construction works. This will then allow cable to be pulled through in the future without need for future disturbance to the track.

Internal Collector Cable - Public Road Crossings

2.196 A cable crossing of the public road which routes through the Main Wind Farm Development Site is required to connect Turbines T8 to T13 to the substation. Cable route alignment and the public road crossing point is presented within **Planning Drawing Number 501.065301.0001.D22.**

2.197 Due to the low volume of traffic recorded using the road it is proposed that this cable crossing is achieved by open cut trenching with either partial closure with traffic management or full closure of the road required. The cable ducts will be installed minimum 0.75m below the road surface and may be surrounded by either, natural soil arising, stabilised backfill material or concrete depending on the cable duct selected. Following cable installation, the road will be reinstated to existing make-up and condition.

Proposed GCR

2.198 The proposed GCR route is shown in **Figure 2-5**.

2.199 Cable ducts will be laid and joint bays will be located within the public roadway. A separation distance of 600mm from existing services will be preserved where possible. The trenches within these locations will be backfilled using the excavated material. The contractor will

excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material (CBM). A rope will be inserted into the ducts to facilitate cable-pulling later. The as-constructed detail of the cable duct locations will be carefully recorded. Cable marker strips will be placed above the ducts and the two communication ducts will also be laid. An additional layer of cable marker strips will be laid above the communication ducts and the trench backfilled. Back-filling and reinstatement in public roads will be to a specification to be agreed with the road authority and at least as good as the existing.

2.200 During the construction stage of the Proposed Project, records of services such as water mains, sewers, gas mains and other power cables will be obtained from the relevant service providers ahead of construction works to ensure that all new developments between the period of assessment and pre-– construction is captured.

2.201 Where required, cable detection tools, ground penetrating radar, and slit trenches will be used as appropriate to find the exact locations of existing services. The final locations of the cable routes within the public roadway will be selected following these investigatory works to minimise conflicts with other services.

General Construction Sequence for All Cable Trenches

2.202 A general overview of the construction sequence is detailed below:

- All relevant bodies i.e. ESBN, Gas Networks Ireland, Eir, Mayo County Council, Irish Water etc. will be contacted and all drawings for all existing services will be sought to confirm the conditions predicted in this EIAR.
- Immediately prior to construction taking place the area where excavations are planned will be surveyed and all existing services will be identified, and temporary warning signs erected where necessary.
- For cable works in the public road, the Construction Traffic Management Plan (CTMP) included as **Technical Appendix 14-4** will be agreed with Mayo County Council Road's Department and implemented. Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.
- An excavator will be used to excavate the trench to the dimensions of 600mm wide by 1.2m deep.
- A silt filtration system will be installed on all existing drainage channels for the duration of the cable construction to prevent contamination of any watercourse.
- Any ingress of ground water will be removed from the trench using submersible pumps and pumped to the nearest available existing drainage channel.
- Once the trench has been excavated, a bedding layer of sand or 15 Newton concrete will be installed and compacted. All concrete will be offloaded directly from the concrete truck into the trench.
- PVC ducts will be installed on top of the compacted base layer material in the trench.
- Once the ducts have been installed, couplers will be fitted and capped to prevent any dirt etc. entering the unjointed open end of the duct.
- In poor ground conditions, the open end of the duct will be shimmed up off the bed of the trench to prevent any possible ingress of water and dirt into the duct. The shims will be removed once the next length of duct has been joined to the duct system.

- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to ensure recording of exact location of the ducts, and hence the operational electricity cable. These co-ordinates will be plotted on as-built record drawings for the cable route cable operational phase.
- When ducts have been installed in the correct position on the trench base layer, sand (in road trench) or Lean-mix CBM4 (CL1093) (off road trench) will be carefully installed in the trench around the ducts so as not to displace the duct and compacted.
- Spacer templates will be used during installation to ensure that the correct cover of duct surround material is achieved above, below and at the sides of the duct in the trench.
- A red cable protection strip will be installed above duct surround layer of material and for the full length of the cable route.
- A layer of Lean-mix CBM4 (CL1093) (in road) or excavated material (off road) will be installed on top of the duct surround material to a level 300mm below the finished surface level.
- Yellow marker warning tape will be installed for the full width of the trench, and for the full length of the cable route, 300mm from the finished surface level.
- The finished surface of the road, road verge, or agricultural land will be reinstated as per its original condition or to the requirements of the Mayo Area Engineer.
- Precast concrete cable joint bays will be installed within excavations in line with the trench. The cable joint bays are backfilled and the finished surface above the joint bay reinstated as per its original condition. The cable joint bays are re-excavated a second time during cable pulling and jointing, after which the finished surface above the joint bays is reinstated again to its original condition.
- When trenching and ducting is complete, the installation of the cable route cable will commence between the onsite sub-stations to the Bellacorick 110kV substation.
- Construction work areas and traffic management measures will be setup at 2 no. consecutive cable joint bays simultaneously. The underground cable will be pulled through the installed ducts from a cable drum set up at one joint bay and using a winch system which is set up at the next joint bay, the cable is pulled through.
- The cables are jointed within the precast concrete cable joint bays.
- The finished surface above each cable joint bay is reinstated to its original condition, and the construction work area removed.

Waste Generation

2.203 Any waste that is generated during the Proposed Project's construction phase will be collected, separated and stored in dedicated receptacles at the temporary construction compounds in accordance with the details outlined in the CEMP.

2.204 The contractor for the main construction works will nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as the Waste Manager who will have overall responsibility for the management of waste. The Waste Manager will have overall responsibility to instruct all site personnel including subcontractors to comply with onsite requirements.

2.205 The following categories of waste will most likely be generated during the construction phase of the Proposed Project:

- construction waste and pile arisings.
- waste oil and hydrocarbons.
- paper and cardboard.
- timber and steel; and
- municipal solid waste generated from the office and canteen.

2.206 Sanitary waste will be removed from site by a licensed waste disposal contractor. All portaloo units located on the Proposed Project during the construction phase will be operated and maintained in accordance with the manufacturer's instructions and will be serviced under contract with the supplier. All such units will be removed offsite following the completion of the construction phase.

2.207 A fully authorised and licenced waste management contractor will be appointed prior to the commencement of construction works. This contractor will provide the appropriate receptacles for the collection of the various waste streams and ensure regular emptying and/or collection of these receptacles.

Waste Reduction Practices

2.208 Waste generation throughout the operational phase of the Proposed Project is expected to be minimal. Measures to further reduce operational waste include the following:

- Material ordering will be optimised to ensure only the necessary quantities of materials are delivered to the Proposed Project.
- All plant will be serviced before arriving to the Proposed Project which will reduce the risk of breakdown and the possible generation of waste oil or hydrocarbons onsite.
- Where material such as concrete are to be ordered, great care will be taken in the calculation of quantities to reduce wastage.
- All operators and foreman will be instructed in measures to cut back on the amount of wastage and will only order the materials necessary to complete each construction task as required.
- Prefabrication of design elements will be used where appropriate to eliminate waste generation on sites.

Waste Reuse

2.209 When possible, materials will be reused onsite for other suitable purposes as follows:

- Re-use of shuttering etc. Where it is safe to do so.
- Re-use of rebar cut-offs where suitable.
- Re-use of excavated materials for screening, berms etc.
- Re-use of excavated material – it will be used as suitable fill elsewhere onsite for access tracks, the hardstanding areas and embankments where possible.

2.210 Any excess excavated material that will be used for fill, re-instatement, or similar activities, within the Proposed Project is not categorised as a waste material under relevant waste legislation, rather this material is exempt from waste classification.

2.211 Article 2 (1) (c) of Directive 2008/98/EC on waste, transposed through Article 26 (1) (c) of the European Communities (Waste Directive) Regulations (S.I. 126 of 2011) identifies the following as being an exemption from waste regulation:

"uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated".

2.212 Surplus material will be re-instated in its natural condition on the site from which it was excavated, this material is not considered as waste as it is being reused on site. The PMP set out within **Technical Appendix 6-3** confirms that peat excavation volumes will be reused for peatland restoration during the construction, operational, and decommissioning phases of the project.

Waste Management

2.213 Wastewater holding tanks will be provided within the substation and IPP compounds.. The wastewater holding tank will be a sealed storage tank with all wastewater tankered offsite as required 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, will be employed to transport wastewater away from the Main Wind Farm Development Site. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed Development's turbines, wind measurement devices and electricity substation that will be monitored 24 hours a day seven days per week. This approach for managing wastewater onsite has become a standard practice in wind farm sites.

2.214 Receptacles will be clearly labelled, signposted and stored in dedicated areas.

2.215 The provision of receptacles for the separation and collection of dry recyclables such as paper, cardboard, plastics will be provided and removed to a licenced facility by a suitable contractor.

2.216 The Applicant and the appointed contractor will seek to prevent, reduce, reuse and recover as much of the waste generated at the Proposed Project as possible and to ensure the appropriate transport and disposal of residual waste is undertaken offsite in accordance with the Waste Management Act 1996 (as amended) and in alignment with the National Waste Management Guidelines and the European Waste Management hierarchy.

Waste Recycling, Recovery and Disposal

2.217 National waste policy requires the separation of recyclable material at source. During the construction phase of the Proposed Project, receptacles will be provided for the separation and collection of dry recyclables (paper, cardboard, plastics), biological waste (canteen waste).

2.218 All receptacles will be clearly labelled, signposted and stored in dedicated areas.

2.219 Receptacles for the following sources aggregated materials will be made available onsite at a suitable location:

- food waste.
- packaging waste.
- dry mixed recyclables.
- aluminium.
- ferrous materials; and

- timber.

2.220 These materials will be transported offsite by an authorised contractor to a permitted recovery centre. These materials will then be processed through the various recovery operations.

2.221 Residual waste generated onsite may require disposal. This waste will be deposited within dedicated receptacles and collected by the permitted waste management contractor who will then transport this waste to an appropriate facility. All waste movements will be recorded, and the waste manager onsite will hold these records.

Site Security

2.222 In addition to the palisade fencing which will be erected around the perimeters of both the substation and BESS compounds, the following security measures will also be incorporated to the Main Wind Farm Development Site.

- Access gates will be installed at designated entry points.
- CCTV cameras will be mounted on poles to provide full site coverage.
- Security lighting will be installed and directed downward to minimise light spill.
- Signage and safety notices will be erected.

Project Operation and Lifespan

2.223 During the operational phase of the Proposed Development, turbines will function automatically on a day-to-day basis. The turbines will respond to changes in wind speed and direction by means of anemometry-equipment and control systems.

2.224 As mentioned above, there will be minimal operational waste associated with the wind farm once construction is finalised. As such, operational residues and emissions are expected to be negligible.

2.225 Twice a year each turbine will undergo a scheduled service. The operation of the wind turbines will be monitored remotely, and a caretaker will oversee the day-to-day running of the Proposed Development.

2.226 The expected physical lifetime of a turbine is 35 years, and permission is sought for a 35-year operation period commencing from full operational commissioning of the wind farm. At the end of the operational period, the developer will either decommission the Proposed Development or, subject to a new planning application, seek permission to extend its operation or re-power. The proposed substation, and the GCR (subject to a separate planning application) will continue to exist on a permanent basis.

2.227 The applicant respectfully requests that a 10-year planning permission is granted in addition to a 35-year operational period.

Decommissioning

2.228 During the decommissioning phase of the Proposed Project, cranes will disassemble the above ground turbine components and meteorological mast which will be removed offsite for recycling.

2.229 The foundations will be covered over and allowed to re-vegetate naturally. Leaving turbine foundations in situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine will result in environmental effects such as noise, vibration and dust. It is likely that the onsite access tracks will be left in situ, subject to agreement with Mayo County Council and the relevant landowners at that time.

2.230 The BESS and associated electrical equipment will be removed offsite for recycling.

2.231 Underground cabling will be cut back and left in situ.

2.232 The onsite substation and GCR will be taken in charge by ESBN / EirGrid upon completion and will be left in place forming part of the national electricity network.

2.233 A detailed decommissioning plan will be agreed with Mayo County Council in advance of decommissioning.

Cumulative Projects to be Assessed

2.234 An online planning search spanning 10 years within a radius of 20 km was undertaken to identify and reasonably foreseeable projects that may not be known but are in the planning pipeline. It was considered that a 20 km radius was robust given that it is in tandem with the general 15-20 km radius that is generally considered within Appropriate Assessments. Sources consulted included the EIA portal, An Coimisiún Pleanála, Mayo County Council planning lists. The list included single dwellings within 2 km of the Main Wind Farm Development Site to ensure that any future new residential receptors were identified for consideration within the technical assessments of the EIA. Outside of the 2 km radius, the cumulative project search focused on planning applications of over 50 houses and planning applications which contained an EIAR or an NIS as it was considered based on professional judgement and experience that these types of projects will be the most likely sources of potential cumulative impacts. The resultant long list of cumulative developments was updated monthly when updated searches of all the above sources was conducted by the SLR planning team.

2.235 This long list was then further refined by considering the following criteria:

- All wind farms and cable route planning applications within 20 km where the planning status is to be determined, or where the construction period will likely coincide with the construction period of the Proposed Development.
- All infrastructure projects which are operational and utilising the same road networks as the Proposed Development.
- All quarries within 2 km of the Main Wind Farm Development Site boundary.
- All Strategic Infrastructure and Strategic Housing Developments within 20 km where the same road network will be utilised.
- All Strategic Housing Development and Large-Scale Residential Developments within 5 km.

2.236 The result formulated the cumulative development short list which is set out in **Table 2-5** List of Cumulative Projects within 20 km of the Main Wind Farm Development Site.

Wind Farms in the Surrounding Area

2.237 There is one constructed wind farm in the immediate vicinity (5 km) of the Proposed Development. At the time of this assessment, there are several wind farms (proposed and permitted) within 20 km and are shown in **Figure 2-7**.

2.238 The nearest wind farms to the Main Wind Farm Development include:

- The three turbine Bunnahowen Wind Farm is the closest operational wind farm to the Proposed Development Site, c. 4 km to the north.
- The larger Oweninny Wind Farm (60 turbines) is located c. 25 km to the west.

Projects to be Assessed Cumulatively

2.239 In the first instance, a desktop review of available data sources (satellite imagery) was undertaken to identify developments in the local area including https://www.myplan.ie/national-planning-application-map-viewer and ACP decisions via the ACP website. Other types of consents - arterial drainage consents, forestry felling licences, agricultural activities within the zone of influence of the Proposed Project were also considered. Secondly, the EIA Portal was consulted to assess for the presence of proximate developments which have been subject to EIA. Finally, the respective online ePlan portals of Mayo County Council was examined to assess for extant planning permissions which had not yet been commenced.

2.240 In terms of all proposed and permitted developments within vicinity of the Proposed Project, the details of projects considered in the cumulative assessment are presented in **Technical Appendix 2-3** found in **Volume 3** of this EIAR – this is the cumulative long list of projects. The short list of these projects which are included as part of this assessment (including the wind farms listed above) are set out in **Table 2-5** . These projects (all within the 20 km radius) were selected for three reasons: 1) they are of a similar nature to the Proposed Project; 2) they utilise the same road networks as the Proposed Project; or 3) on review of the specific details of the long list developments, the short-listed projects were of a type (based on professional experience) to potentially give rise to wide ranging environmental effects.

2.241 It is noted that a universal study area was not applied in this EIAR in the identification of developments to be included within the cumulative assessment for different environmental topics. Accordingly, individual chapters within this EIAR apply a study area having regard to the scope of their specific assessment and the inclusion of the identified developments in the cumulative assessment for each environmental topic varies.

Table 2-5: List of Cumulative Projects within 20 km of the Proposed Development Site Boundary

Development	Planning Reg. Ref.	Description	Distance from Main Wind Farm Development Site
Bellacorick Wind Farm	n/a	21 wind turbines. Decommissioning commenced in November 2025 and completed in January 2026.	17km
Sheskin Wind Farm (Phases 1 and 2)	P15/825 / 19457	Amendments to an existing planning permission (Mayo County Council Ref. P15/825) for 8 wind turbines with an overall maximum height of 150m and associated infrastructure. Main amendment relates to increase in tip height of the turbines.	18.5 km east
Grid Connection for Sheskin Wind Farm	311157 Granted by ABP 31/08/2022	10.4 km of 38kV underground cable from the granted Sheskin Wind Farm to connect the wind farm to the national grid at the existing Bellacorick 110kV ESB Station	15.7 km east
Sheskin South Wind Farm	ABP-315933-23 - Granted by ABP 13/03/2024	21 no. turbines (max blade tip height 200m),	15.7 km east
Oweninny Wind Farm	PA0029 / Granted by ABP 02/06/2016 / PM16.307261 ABP-316178-23	Proposed Oweninny Wind Farm of 112 no. turbines (370 MW output)	17 km east
Bunnahowen Wind Farm	18873 Granted by MCC 07/02/2019	Permission to modify the existing permission, P08/1997, to erect three (3) 1 MW turbines,	4.6 km north
Mayo Green Hydrogen Production Plant	22502 Granted by MCC 26/03/2023	Green Hydrogen Production Plant with Hydrogen Storage Area, Gas Injection Compound, Substation, Water Storage and Abstraction,	19.7 km east

Development	Planning Reg. Ref.	Description	Distance from Main Wind Farm Development Site
SEAI Substation	16356 - Granted by MCC 23/11/2016 PL16.247758 Granted by ABP 18/04/2017	Construction of a 20 kV substation building and underground cable	12.7 km north-east
Lennon Quarries Ltd. Tallagh, Belmullet, Co.Mayo	21638 - Granted by MCC 24/11/2021	The development will consist of the recontouring of 12.419 hectares of agricultural land using 348,816 tonnes of imported inert soil and stone material over a 15-year period for the consequential benefit to agriculture. This application was accompanied by an EIAR	13.1 km north-east

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Figures

Appendices

Technical Appendix 2-1: CEMP

Technical Appendix 2-2: Forestry Report

Technical Appendix 2-3: Projects Considered in the Cumulative Assessment

(Refer to EIAR Volume 3 for Technical Appendices)

460000 470000 480000 490000 500000

840000 830000 820000 810000

Broadhaven Bay
Béal an Mhuirthead
Loch na Ceathrún Móire
Blacksod Bay - Cuan an Fhóid Duibh
Achill Island - Acaill
Keel Beach
Wild Nephin National Park
N59

N

0 2.5 5
Kilometres

LEGEND

Proposed Development Site Boundary

Proposed Turbine Location

Mayo

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

SITE LOCATION

FIGURE 2-1

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0063.0 Site Location

470000
475000
480000
825000
820000

Bun na hAbhna
Glencastle Cemetery
Clencastle Hill 220 m
Lennon Quarries
Lennon Quarries
Knocknascollop 240 m
Moire
Claggan Island
L1205
R313
R313
R313
R313
Gortmore Island
Attavally Island
Munhin River
Blacksod Bay - Cuan an Fhóid Duibh
L120
T1
T2
T3
T5
T7
T4
T6
T8
T13
T9
T11
T12
T10
N59
Doohooma Cemetery
0
2.5
5
Kilometres

N

LEGEND

Proposed Development Site Boundary

Proposed Turbine Location

Mayo

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

SITE CONTEXT

FIGURE 2-2

Scale 1:50,000 @ A3

Date MARCH 2026

402.064443.00001.0064.0 Site Context

474000
476000
478000
824000
822000
402.064443.00001.0065.0 Site Layout

N

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
TCC1
TCC2
1
2
3

L1205
L1206
Saint Colmcille's Church

0
1
2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound (TCC)
- Proposed Attenuation Basin

RWE

SLR

MUINGMORE WIND FARM

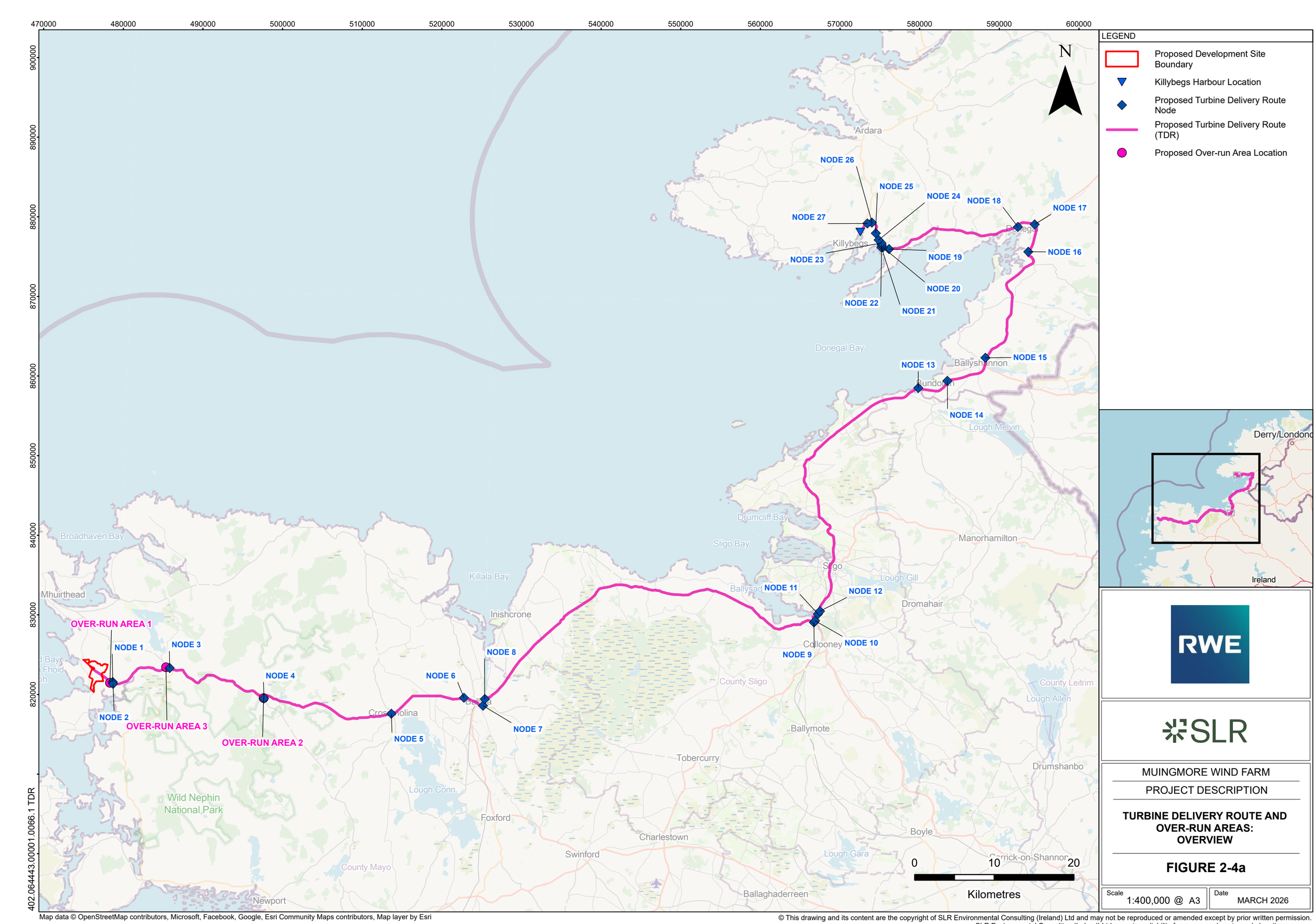
PROJECT DESCRIPTION

SITE LAYOUT

FIGURE 2-3

Scale 1:18,000 @ A3

Date MARCH 2026



RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

TURBINE DELIVERY ROUTE AND OVER-RUN AREAS: OVERVIEW

FIGURE 2-4a

Scale 1:400,000 @ A3

Date MARCH 2026

477750
478000
478250
478500
478750

821750
821500
821250
402.064443.00001.0145.0 Overrun Areas

N

LEGEND

- Proposed Development Site Boundary
- Area Under Applicant's Control
- Proposed Turbine Delivery Route (TDR)
- Proposed Over-run Area Access Track

0 50 100
Metres

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

TURBINE DELIVERY ROUTE AND OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 2-4b

Scale	Date
1:4,000 @ A3	MARCH 2026

497000 497250 497500 497750 498000

820250 820000 819750 819500

N

LEGEND

- Proposed Development Site Boundary
- Area Under Applicant's Control
- Proposed Turbine Delivery Route (TDR)
- Proposed Over-run Area Access Track

0 50 100

Metres

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

TURBINE DELIVERY ROUTE AND OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 2-4c

Scale	Date
1:4,000 @ A3	MARCH 2026

402.064443.00001.0145.0 Overrun Areas

485250

485500

485750

823500

N

LEGEND

- Proposed Development Site Boundary
- Area Under Applicant's Control
- Proposed Turbine Delivery Route (TDR)
- Proposed Over-run Area Access Track

0 50 100

Metres

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

TURBINE DELIVERY ROUTE AND OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 2-4d

Scale 1:2,000 @ A3

Date MARCH 2026

402.064443.00001.0145.0 Overrun Areas

460000
480000
500000
840000
820000
402.064443.00001.0067.0 GCR

N

LEGEND

- Proposed Development Site Boundary
- Bellacorick 110 kv Substation
- Proposed Grid Connection Route (Subject to Separate Planning Application)

Broadhaven Bay
Béal an Mhuirthead
Loch na Ceathrún Móire
Blacksod Bay - Cuan an Fhóid Duibh
Achill Island - Acaill
Keel Beach
Wild Nephin National Park
N59

0 10 20
Kilometres

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

GRID CONNECTION ROUTE

FIGURE 2-5

Scale 1:200,000 @ A3

Date MARCH 2026

474000
476000
478000
824000
822000
402.064443,00001.0068.0 Watercrossings

N

Doolough (Stream)
Doolough (Stream)
AN_MHOING_MHÓR
TRISTIA 33
L1205
L1206
Saint Colmcille's Church
Béal an Mhuirthead
Blacksod Bay-Cuan an Fhóid Duibh

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13
WCX1 WCX2 WCX3 WCX4
1 2 3
TCC1 TCC2

0 1 2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound
- Proposed Attenuation Basin
- Watercourse
- Waterbody

Watercourse Crossing Type

- Proposed
- Existing

RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

ON-SITE WATER CROSSINGS

FIGURE 2-6

Scale 1:18,000 @ A3

Date MARCH 2026

450000 460000 470000 480000 490000 500000

850000 840000 830000 820000 810000

N

Broadhaven Bay
Béal an Mhuirthead
Loch na Ceathrún Móire
Blacksod Bay - Cuan an Fhóid Duibh
Achill Island - Acaill
Keel Beach
Wild Nephin National Park

Bunnahowen Wind Farm
OVER-RUN AREA 1
OVER-RUN AREA 3
OVER-RUN AREA 2
Sheskin Wind Farm Phase 1
Sheskin Wind Farm Phase 2
Sheskin South Wind Farm
Bellacorick Wind Farm
Oweninny Wind Farm

N59

0 5 10
Kilometres

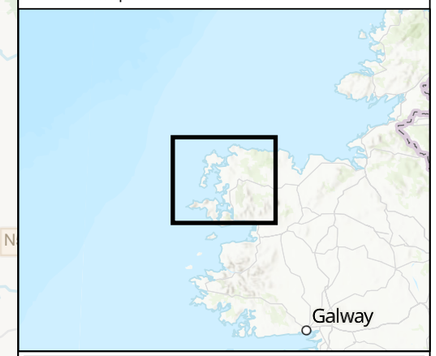
LEGEND

- Proposed Main Wind Farm Development Site Boundary
- Study Area (Main Wind Farm Development Site Boundary 20 km Buffer)
- Proposed Over-run Area Location

Planning Application Status

- Bellacorick Wind Farm
- Bunnahowen Wind Farm
- Oweninny Wind Farm
- Sheskin Wind Farm Phase 1
- Sheskin Wind Farm Phase 2
- Sheskin South Wind Farm
- Other Development

Note
See Table 2-5 for further details of developments
Other Developments are not labelled



RWE

SLR

MUINGMORE WIND FARM

PROJECT DESCRIPTION

CUMULATIVE ASSESSMENT

FIGURE 2-7

Scale 1:200,000 @ A3

Date APRIL 2026

402.064443.00001.0070.2 CAM