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GLANLLYNFI GARTH WIND FARM

Draft Environmental Statement

Chapter 4 - Development Description

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4 Development Description

4.1 Introduction

4.1.1. This Chapter provides an overview of the Proposed Development, including:

- a description of the Site, as defined by the red line boundary in **Figure 1.1**;
- a summary of the proposed infrastructure and the approach to the construction, operational and decommissioning phases; and
- the embedded measures incorporated into the Proposed Development to avoid, reduce or offset potential adverse environmental effects.

4.1.2. The extent of the Site and its wider geographical context is set out in **Figure 1.1** and **Figure 1.2**. Please refer to **Chapter 2: Approach to Environmental Impact Assessment** for further information relating to the Site boundary and EIA methodology.

4.1.3. The description of the Proposed Development presented in this chapter provides the basis for the assessments presented in **Chapters 6 to 17** of this Draft Environmental Statement (ES), in accordance with the requirements of Regulation 17 and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (as amended) ('the EIA Regulations')[1].

4.2 Development Description

Overview of the Proposed Development

4.2.1. The Proposed Development is a wind farm consisting of a maximum of eight wind turbines, each with a three-bladed rotor with a diameter of up to 150m, a hub height of up to 105m and maximum height to blade tip of 180m.

4.2.2. The application also comprises associated infrastructure including:

- Two substations including transformer housing;
- Two temporary construction compounds;
- Two temporary site offices;
- Crane pads and cabling;
- Access track construction; and
- Overhead line connection (via wooden pole) to agreed Point of Connection (POC) with National Grid Electricity Distribution (NGED).

4.2.3. There are references in this Draft ES to specific components of the Proposed Development to support the baseline and technical assessments presented in **Chapters 6 to 17**. The Site is defined in **paragraph 4.2.4** below and shown on **Figures 1.1 to 1.4.** There is specific reference to:

[1] UK Government (2017). Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/wsi/2017/567/contents [Accessed June 2026].

- ‘Northern Array’ - This encompasses the land parcels at Pwll-yr-Lwrch and includes four wind turbines and associated infrastructure (see **Figure 1.3: Northern Array Site Layout**);
- ‘Southern Array’ – This encompasses the land parcels at Cynhordy and includes four wind turbines and associated infrastructure (see **Figure 1.4: Southern Array Site Layout**);
- ‘NGED Connection’ – This describes the proposed grid connection between each parcel and the electrical transmission network, with the Northern Array connecting to a nearby 66kV overhead line at the western boundary and the Southern Array connecting to a 66kV overhead line running through the Site, via short overhead line connections (further detail provided in **paragraph 4.2.37**).
- ‘Forestry access track’ – This describes the access track that extends from the public highway to the Northern and Southern Array areas (see **Figure 1.2: Site Layout**). The track is required to transport the turbine components into the Site from the public highway. An assessment of the Forestry access track has not been undertaken as part of the Draft ES as the design is yet to be determined (further details are provided in **paragraphs 4.2.25**). This will be confirmed, assessed and reported in the final application submission documents.

Site Location and Surroundings

4.2.4. The Proposed Development would be located across two land parcels comprised of semi-improved grassland, marshy grassland and heathland, which are situated in the local authority area of Bridgend County Borough Council (BCBC). The location of the two land parcels is identified below:

- Pwll-yr-lwrch (hereafter ‘Northern Array’) – Central Grid Reference SS 87102 92887; and
- Cynhordy (hereafter ‘Southern Array’) – Central Grid Reference SS 88988 89854.

4.2.5. The nearest settlement is Maesteg, the outskirts of which are approximately 1km to the west of the Northern Array and 1.5km west of the Southern Array. There are a number of isolated residential properties located with 1km of each parcel.

4.2.6. Dunraven Forest and Cwmogwr Forest are located immediately adjacent to the eastern boundary of the Northern Array and Southern Array, respectively. The forest areas contain a network of tracks and trails. The Proposed Development will utilise these tracks (hereafter ‘Forestry access track’) to connect the land parcels (Northern and Southern Array) and provide access to the wider public highway at the A4061 Rhigos Road. The Forestry access track traverses the Rhondda Cynon Taf County Borough Council (RCTCBC) and Neath Port Talbot Council (NPTC) authority areas as shown in **Figure 1.1: Site Location.**

Public Rights of Way

4.2.7. An overview of the local Public Rights of Way (PRoW) network is presented in **Figure 4.1: PRoW Network**. The PRoW footpath MAE/4/2 adjoins the eastern boundary of the Northern Array and footpath MAE/59/1 crosses the northwestern corner of the Northern Array. Within the Southern Array, bridleway GWV/30/1 traverses the western part of the land parcel and Footpath GWV/29/1 crosses the southeastern part of the Southern Array and continues along the boundary. Footpath GWV/36/2 also runs along the northwestern part of the Southern Array.

4.2.8. An extensive number of PRoW across the BCBC, NPTC and RCTCBC areas interact with the Forestry access track.

4.2.9. Construction activities may require a temporary closure and diversion of some footpaths to ensure safety for any users. If required, appropriate measures would be developed to ensure safe access is maintained. Public access through the existing PRoW would be maintained during the operational life of the Proposed Development.

4.2.10. Further consideration of the PRoW network is provided in **Chapter 6: Landscape and Visual**, **Chapter 12: Traffic and Transport** and **Chapter 15: Socio-economics**.

Key Components of the Proposed Development

Wind Turbines

4.2.11. The Proposed Development comprises the construction, operation and decommissioning of a maximum of eight wind turbines, each with a three-bladed rotor with a diameter of up to 150m, a hub height of up to 105m and maximum height to blade tip of 180m.

4.2.12. The indicative layout of the Proposed Development, including wind turbines, access tracks, temporary construction compounds, and substations, is detailed in **Figure 1.2 to Figure 1.4**. The layout of the Proposed Development, incorporating maximum tip heights of up to 180m, has been chosen because it balances high productivity with the environmental sensitivities present at the Site (details of iterative design process are detailed in **Chapter 3: Need, Alternatives and Iterative Design**. The grid references for each turbine are provided within **Table 4.1**.

Table 4.1 Proposed turbine locations

Turbine ID	Easting	Northing
1	286850	193130
2	287420	192958
3	286684	192694
4	287410	192540
5	289446	189945
6	288914	190378
7	288694	189428
8	288422	189842

4.2.13. At this stage, the preferred choice of wind turbine to be installed is the Vestas V150 (4.2MW). Should an alternative model be selected, it would not exceed the physical parameters specified in the consent. Furthermore, any alternative wind turbine would comply with the assessed noise limits and would not give rise to materially worse environmental effects.

4.2.14. The wind turbines would be three-bladed, variable speed and pitch-regulated, with the rotor and nacelle mounted on a cylindrical tower. This is a typical modern, horizontal axis design comprising four main components: a rotor (consisting of a hub and three blades); a nacelle (housing the generator and often a gearbox) to which the rotor is mounted; a tower; and a foundation. A typical wind turbine is detailed in **Figure 4.2**.

4.2.15. Wind turbines convert the kinetic energy of the wind into electrical energy, the air passing over the blades causing them to rotate. This low-speed rotational motion of the blades is converted into electrical energy by a generator located inside the nacelle at a nominal voltage of 690V.

4.2.16. The voltage is stepped up by a transformer, typically housed in a kiosk adjacent to the wind turbine (typically 5.0m x 2.5m x 2.5m (L x W x H)) and fed to the control building via underground electrical cabling linking all of the turbine unit transformers. While the transformers may be integrated into the nacelle or base of the tower, the external kiosk has been assessed as a worst-case. The electricity generated by the Proposed Development would be metered and fed into the electricity transmission network to which it is connected.

4.2.17. The wind turbines would be painted in a neutral colour (colour specification, light grey RAL 7035) with a semi-matt finish to minimise visual intrusion. Note however that the photomontages supporting **Chapter 6: Landscape and Visual Impact** are shown in white to ensure adequate contrast in the imagery.

4.2.18. Wind turbine towers, nacelles and blades will be transported to the Site via low bed trailers, some incorporating rear steering. The towers will be delivered in three or four sections, which will be stored at each turbine lay-down area until lifted into position. Some storage of components may also be required at the Site compound dependent on weather conditions and access track construction progress at the time of delivery. The overall assembly process for each turbine takes approximately two to four days, depending on weather conditions.

4.2.19. Two teams will carry out erection, each using either two road-going cranes (of approximately 100 tonne capacity and 500 or 800 tonne capacity) or crawler cranes. The construction contractors would determine the actual cranes used, together with the exact programme and number of teams on Site.

Wind Turbine Foundations

4.2.20. Wind turbine foundations will be required to ensure the stability of the wind turbine structures. Where rockhead, or suitable bearing, is relatively shallow (<2m), the wind turbine foundations will bear directly onto rock. Where rockhead or suitable bearing is between 2-5m depth, the existing overburden will be excavated and replaced with suitable load-bearing material, most likely to be imported stone.

4.2.21. The foundation design will depend on the results from detailed ground investigation; it is currently expected that turbines will not require piled foundations. Should piling be necessary, the methodology will be discussed and agreed with the appropriate determining authority prior to construction. Details will be included within the CEMP to ensure effective implementation. It is expected that the conditions would vary depending on the relative location of the turbine to potential receptors for any adverse environmental impacts.

4.2.22. Foundations will usually comprise a reinforced concrete base slab with dimensions of approximately 20m diameter x 4m depth. This will include a circular steel support plinth to

suit the base profile of the wind turbine steel tower and will then be overlaid by stone and previously excavated overburden and dressed back with topsoil to allow re-vegetation. The design of these foundations in terms of size and depth minimises excavation requirements, minimises visible projection above the ground and allows the re-establishment of surface vegetation following construction. The final choice of foundation design will be based on the most efficient use of materials and local ground conditions. A typical wind turbine foundation is shown on **Figure 4.3.**

Wind Turbine Crane Hardstanding and Storage

4.2.23. Each wind turbine requires an area of hardstanding to be built adjacent to the turbine foundation. This provides a stable base on which to lay down turbine components ready for assembly and erection, and to site the two cranes necessary to lift the three-tower section, nacelle, and rotor into place. Areas for crane pads were identified to avoid sensitive ecology habitats, archaeological constraints, and areas of steeper gradients where possible. The crane hardstanding will be left in place following construction in order to allow for the use of similar plant should major components need replacing during the operation and maintenance of the wind farm. These could also be utilised during decommissioning of the Proposed Development.

4.2.24. The total area of hardstanding for the crane pad area at each turbine location including the turbine foundations and the crane pad will be sized to suit the turbine manufacturer's requirements but will be approximately 2,200m^2. It is anticipated that approximately a third of the crane pad area will be dressed back with topsoil and landscaped into the surrounding area upon completion of turbine erection. In addition, an area of approximately 1,500m² will be provided at each turbine location for the temporary storage of turbine components, including blade and tower sections, during the construction phase. A typical crane hardstanding is illustrated in **Figure 4.4**.

Internal Access Tracks

4.2.25. The internal access track network will commence at the public highway junction at the A4061 Rhigos Road, providing access to, between and within the Northern Array and Southern Array. It would include the Forestry Access Track (from highway to the array areas) and internal access tracks (within the array areas):

- Approximately 9.4km of access tracks would be required for the Proposed Development between and within the Northern and Southern Array areas. This would include approximately 2.1km of new access tracks in the Northern Array, 2.7km of new access tracks in the Southern Array, and 4.6km of upgraded access tracks between the array areas.

- Further upgrades to the Forestry access track between the highway and Northern Array would be required to facilitate traffic movements during the construction, operation and maintenance of the Proposed Development. At this stage, detailed surveys are currently being undertaken to inform the design of any required improvements. As such, an assessment of the forestry access track has not been included within this Draft ES. Following the completion of surveys, assessment and design, the identification of the required upgrades along the route, together with an assessment of environmental effects will be presented in the final ES.

4.2.26. The internal access tracks would comprise of newly formed stoned tracks. The track construction will be approximately (~) 5m wide, ~0.6m deep (dependent of ground conditions), with a ~2m grass verge either side. Typical track cross sections are shown in **Figure 4.5.**

4.2.27. Further details relating to the movement of traffic on and off the Site are reported in **Chapter 12: Traffic and Transport** and the Outline Construction Traffic Management Plan (**Appendix 12B**).

Track Layout Design

4.2.28. There are various constraints which have influenced the track layout design, some generic and some site-specific:

- Track length is kept to a minimum and utilises existing access tracks where possible to reduce environmental impact, construction time and material quantities (imported stone);
- New track gradients are to be kept to less than 8 percent (1 in 12.5) and radius curves to 50m where practicable to accommodate the requirements of delivery vehicles and also to allow construction plant to move safely around the Site;
- Track layout is designed to reflect contours and avoid cross slopes and deep cut and fill into existing terrain where possible; and
- Tracks are routed to avoid sensitive ecological, archaeological, and hydrological features, where possible.

4.2.29. The track design resulted from optimisation of these criteria.

Electrical connection

Electrical Infrastructure

4.2.30. Following turbine foundation construction, some of the required electrical infrastructure would be installed such as the small transformers to be located either internally within the turbine towers or adjacent to each turbine in a small kiosk (5.0m x 2.5m x 2.5m (L x W x H)).

Underground Cables

4.2.31. Underground cables will link the turbines within the Northern and Southern Array to the on-site substation situated within each parcel. Detailed construction and trenching specifications will depend on the ground conditions encountered at the time, but typically cables will be laid in a trench 750mm deep and 450mm wide. To minimise ground disturbance, cables will be routed alongside the roads connecting each parcel of land. **Figure 4.6** shows a typical cable trench detail. The grid coordinates for the on-site substations are detailed below and the locations presented in **Figure 1.3** and **Figure 1.4**.

- Northern Array – X: 287202 Y:193095; and
- Southern Array – X: 288664 Y:189718.

Substations

4.2.32. The arrangement of the substation within each parcel would depend on NGED's requirements and shall be determined by the rating of the grid connection and requirement for a step-up transformer. If required, a transformer would be provided within the substation

compound which would comprise a stoned area of approximately 37.5m x 35m containing the transformer and associated equipment (isolators, circuit breakers). If a transformer is not required, then all electrical equipment would be housed within the substation building.

4.2.33. The substation buildings (approximately 14m x 10m) would be single storey buildings which will house metering, protection and control equipment, storage, and welfare facilities. The substation buildings would be traditional blockwork construction and faced in stone with a slate roof. Associated fencing would be either moorland green/brown or dark grey in order to blend with either the existing landscape colours or traditional building colours for the area. **Figure 4.7** provides an illustration of the substation building. The substation building elevations are detailed in **Figure 4.8**.

Overhead Lines

4.2.34. The Proposed Development would include short sections of 66kV overhead lines (via wooden pole) within each array area to connection the on-site substations to the Grid Connection (see **section 4.2.37**). Indicative overhead line corridors are shown in **Figure 1.3** and **Figure 1.4**.

Site Access

4.2.35. Traffic related to the Proposed Development would travel on the A465 and A4061 before using the Forestry access tracks to access the Site. Access to the Site will be achieved via existing access tracks which serve the operational Pen y Cymoedd Wind Farm and Llynfi Afan Wind Farm. Starting to north of the Site from an existing junction with the A4061, the access tracks travel south through Pen y Cymoedd Wind Farm, then cross the A4107 and travel through the Llynfi Afan Wind Farm. The Proposed Development would require the access tracks to be upgraded to facilitate the movements of Abnormal Indivisible Loads (AILs). As discussed in **paragraph 4.2.25**, at this stage, surveys, assessment and design in relation to the forestry access track are ongoing. The identification of the required upgrades along the route, together with an assessment of environmental effects will be presented in the final ES.

4.2.36. A number of access tracks would also be constructed between the turbines within the Site. **Figure 1.2** provides details of the proposed access route to the Site.

Grid Connection

4.2.37. All wind farms need to be connected into the grid distribution system, though such connections are often subject to a different consenting process to the wind farms themselves.

4.2.38. The Applicant has undertaken discussions with NGED and has agreed that the Northern Array will connect to the 66kv Overhead line that runs adjacent to the western extents of the parcel. The Southern Array will connect to the 66kv Overhead line that traverses the centre of the parcel. It is envisaged that the Development Site will connect to both Points of Connection via a short overhead line. The proposed connections are shown on **Figure 1.3** and **Figure 1.4.**

4.3 Delivery Route

4.3.1. It is anticipated that the AILs (transporting turbine equipment) would travel by road from Swansea which is the closest port in the region capable of handling wind turbine equipment and as such is in line with the Government's "Water Preferred" policy[2] towards AIL movements. The Port of Swansea has been used by renewables deliveries in the past for a number of wind farms including, Mynydd y Betws, Pen y Cymoedd and Brechfa Forest. The port has sufficient quay, and storage space is well located for the strategic trunk road agent.

4.3.2. An AIL access study has been undertaken and is provided as **Appendix 12C.**

4.4 Pre-Construction

4.4.1. This section describes those aspects that have become standard practice for developing a consented wind farm proposal into a buildable project. In the technical chapters of this Draft ES, environmental management and mitigation proposals are set out.

Environmental Management Plans

4.4.2. A draft Outline Construction Environmental Management Plan (CEMP) has been produced as part of the Draft ES (**Appendix 4A**). Further detail on the CEMP is set out below in **Section 4.8**. The detailed CEMP would be secured as a condition of the consent.

4.4.3. The construction works would require a Construction Method Statement (CMS) to set out overriding construction principles, programme and health and safety requirements etc. The CMS would also be secured as a condition of the consent and would be agreed with the relevant local planning authority(s) in advance of commencement of development. Further detail on the CMS is set out below in **Section 4.8**. Additional CMSs corresponding to individual construction activities may also be provided. They would identify reference documentation for that activity; principally the CEMP and also any relevant individual management plans (e.g., waste, habitat, water management plans), legislation and construction drawings and documents. For each construction activity, the CMS would detail all environmental sensitivities pertaining to the activity alongside the controls/mitigation measures to be put in place. Approvals or consents required to complete the activity would also be described.

4.4.4. Detailed management plans are frequently requested as pre-commencement documents for agreement with the relevant local planning authority and relevant environmental regulators. Once these are agreed, the provisions and requirements set out therein would be incorporated into the CEMP. The Draft ES is accompanied by the below documents which will be finalised for formal submission along with the Final ES:

- An Outline Construction Traffic Management Plan (CTMP) (**Appendix 12B**); and
- A Flood Consequence Assessment and Outline Drainage Statement (ODS) (**Appendix 10A).**

[2] Department for Transport (2019). Water preferred policy – guidelines for the movement of abnormal indivisible loads [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799833/WPP_guidelines_2019_DfT_consultation_revision.pdf [Accessed: June 2026].

Geotechnical Investigations

4.4.5. Geotechnical Investigation (GI) work would be carried out at the pre-construction stage to determine detailed ground conditions to allow for the design of foundations and micro-siting of turbines, tracks, and at construction compound and substation locations. This would provide support to the project team to develop further phases of detailed design work. The geotechnical fieldwork undertaken may include (but not be limited to): visual inspections; machine and hand excavated trial pits; windowless sample boreholes; rotary core boreholes; and sampling and laboratory based geotechnical and geochemical testing. This information would inform the detailed track design, the turbine foundation design and identify any micro-siting requirements.

4.5 Construction Activities

Enabling works

4.5.1. Prior to the main construction phase commencing, a number of enabling works may be necessary, including:

- Geotechnical investigations: excavation of trial pits or boreholes (see above);
- Upgrading of existing access point and tracks and construction of new access tracks and passing places inter-linking the turbine locations and substation; this will require import of suitable roadstone;
- Any required upgrades to public roads, including road widening to allow the abnormal loads to negotiate corners, protection of any below ground services and the temporary removal or re-siting of infrastructure (i.e. signage); and
- Establishment of temporary construction compounds.

Local Sources of Stone

4.5.2. Stone materials for track building are expected to be imported from local quarries; no borrow pits are proposed on the Site. Concrete for construction of the turbine foundations and substation structures will be imported to Site. Fine aggregates (i.e. sand) would also be sourced from regional suppliers and imported to the Site.

4.5.3. It is anticipated that stone and sand could be sourced from one or more of the local established sources identified below:

- Cornelly Quarry, Porthcawl; and
- Breedon Gilfach Quarry, Neath.

4.5.4. It is anticipated that concrete would be transported to the Site from local batching plants.

Construction Programme

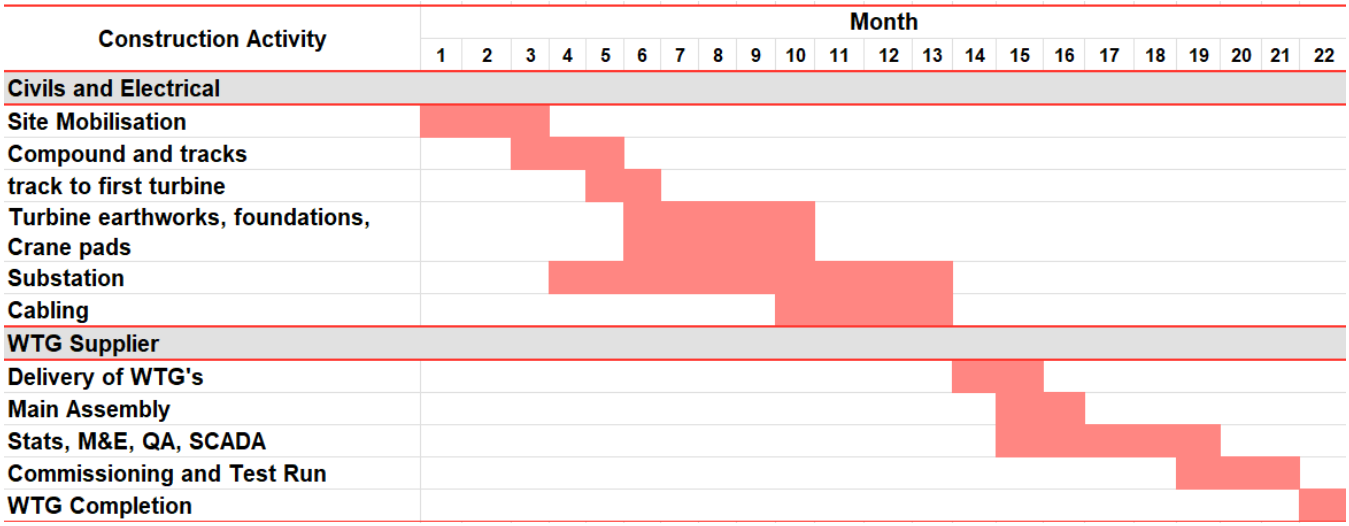
Development Timescales and Programme

4.5.5. It is anticipated that the construction period for the Proposed Development would be approximately 22 months in duration. An indicative programme for construction activities is

shown in **Plate 4-1** below. The start date for construction activities is largely dependent upon the date that consent might be granted and grid transmission availability; subsequently the programme would be influenced by constraints on the timing and duration of any mitigation measures confirmed in the individual technical chapters or by the application decision.

4.5.6. At the time of writing this Draft ES, it is anticipated that construction would commence in 2029 and finish in 2031.

Plate 4-1 Indicative construction programme



4.5.7. Where possible, operations would be carried out concurrently (thus minimising the overall length of the construction programme). In addition, development would be phased such that, at different parts of the Site, the civil engineering works would be continuing whilst wind turbines are being erected. Site restoration would be programmed and carried out to allow restoration of disturbed areas as early as possible and in a progressive manner.

4.5.8. The final length of the programme would be dependent on seasonal working and weather conditions. Summer months are favoured for construction due to longer periods of daylight allowing longer (and safer) working days. Summer months are generally also drier which aids construction progress and reduces the impact of Site debris (mud etc) reaching the public highway, although wheel wash facilities would be installed at the main Site entrance / exit points.

Construction Working Hours

4.5.9. For the purposes of this Draft ES, subject to the caveats noted below, construction activities have been assumed to take place between 07:00 to 19:00 hours on weekdays and 07:00 to 13:00 on Saturdays. Quiet on-site working activities such as electrical commissioning have been assumed to extend outside the core working times, noted above, where required. No working will be undertaken on Sundays. Working hours may be reduced at times due to seasonal or weather restrictions or in certain locations where required as mitigation (for example during the breeding bird season should a stand-off from an active nest be required).

4.5.10. Weather, in particular wind, has a strong influence on the timing of construction activities. Crane activities are generally limited during strong winds (>9 m/s) and erection during these weather conditions may be avoided for safety reasons, with the actual limiting conditions

being reviewed as part of the crane lifting plan. As a result of this, it may be necessary to carry out turbine erection activities out with the standard working times and during periods of calm weather. During periods of cold weather, concrete pouring of the turbine bases may be prohibited (temperatures <4°C) or subject to specific cold weather working practices.

Development Phasing

4.5.11. Construction of the Proposed Development would consist of two main elements. Firstly, civil, and electrical construction of the infrastructure and secondly, erection and commissioning of turbines. Construction of the control building, and the grid connection are lengthy processes which would commence early in the construction programme to allow a live grid connection to coincide with the commissioning of the turbines. As noted, many individual construction processes would run partly or fully concurrently whilst others would progress in a sequence with or without some overlap in time.

4.5.12. There are constraints which will require cessation of construction of specific parts of the Site during certain times of the year. These are discussed in later technical chapters as appropriate. Construction phasing to avoid those constraints will be agreed with the determining authorities and relevant consultees should development consent be agreed.

Micrositing

4.5.13. In carrying out the various surveys that are necessary in advance of construction activities, environmental, geotechnical and health and safety sensitivities, as well as wind-related sensitivities such as turbulence, might be identified that could be avoided if the locations of turbines or tracks are re-sited to a relatively small degree (i.e., ‘microsited’). It is therefore proposed that some flexibility for infrastructure micrositing be retained and that appropriate limits of deviation would be up to 50m for turbines and 100m for internal wind farm tracks and other infrastructure such as the substations and Site compounds. This may be restricted further in terms of specific locational hard constraints, for example not micro-siting closer to a watercourse if within 50m.

Site Accommodation and Construction Compounds

4.5.14. A temporary Site office comprising a portacabin, a single parking space and a vehicle layby would be located at the Site compound within each parcel. This office would be manned during construction hours and provide a sign-in / out function for the Site. This would prevent unauthorised vehicular access to the Site and allow supervision of anyone remaining on-Site beyond agreed working hours.

4.5.15. The location of the temporary construction compounds is illustrated on **Figure 1.2**. A maximum area of 50m x 50m in area for each compound has been assumed as a worst case for the assessment but this may be reduced depending on Site requirements at the start of the construction phase.

4.5.16. Once the erection and commissioning of the wind turbines is complete, the construction compounds would be removed and the land reinstated.

Site Security and Lighting

4.5.17. The construction compounds would be lit with security lighting, which would face inwards to minimise light pollution. The construction compounds may be enclosed within a security fence around the perimeter of the substation and the access to electrical compounds would be via a locked access gate.

Existing Utilities

4.5.18. Existing overhead lines within and in close proximity to the Site are illustrated on **Figure 1.3** and **1.4**. Two overhead lines are located to the west of the Northern Array and run in a generally southerly direction. These overhead lines are anticipated to form the point of connection for the Proposed Development, as outlined in **paragraph 4.2.38** above.

4.5.19. In addition, an existing overhead line traverses the western section of the Southern Array. This alignment overlaps with site infrastructure and therefore has been considered as part of the design and assessment process. The position of this overhead line will be subject engagement with National Grid Electricity Distribution (NGED) and if necessary, mitigation measures such as diversion or undergrounding may be required.

Site Material Quantities

4.5.20. A number of materials would be required to construct the different elements of the Proposed Development. **Chapter 12: Traffic & Transport** provides a detailed breakdown of the estimated material requirements for each element (e.g. Site track, crane pads, hardstanding areas, turbine foundations etc), and a summary of total tonnages for each material to be used is provided in **Table 4.2**.

Table 4.2 Estimated tonnages of materials required for construction of the Proposed Development

Material	Estimated total tonnage
Stone	120,000
Sand	2,500
Concrete	15,000
Tarmac	0

4.5.21. All materials required for construction of the Proposed Development would be delivered from quarries and batching plants in the local area (see **paragraph 4.5.3**).

Waste Management

4.5.22. At this stage it is not possible to estimate quantities of waste and surplus materials which would be produced on Site. Any such waste materials produced, which are expected to be minimal, and surplus material excavated from constructing turbine bases, access roads and other infrastructure would be removed from Site in Heavy Goods Vehicles (HGVs) and taken to an appropriate waste recycling or disposal facility. No other discharges are anticipated

from the development. Site waste management procedures are discussed further in the Draft Outline CEMP provided alongside this Draft ES in **Appendix 4A**.

Employment proposals

4.5.23. Potential job creation levels are discussed in detail in **Chapter 15: Socio-economics.**

4.6 Operation

4.6.1. Operation of the Proposed Development is anticipated to commence in 2031 and will be designed with an operational life of 30 years.

Wind Turbine Characteristics

4.6.2. The power output from a wind farm largely depends on the strength of the wind blowing across the Site. Wind turbines start to generate electricity at a wind speed of about 4m/s, their output increasing up to their maximum rated power at a wind speed of about 12m/s. As the wind speed increases further, the output is limited to the maximum until the wind speed reaches 25m/s when the wind turbine shuts down automatically.

4.6.3. The proportion of time which the turbines would be generating electricity is therefore dependent on the time that the wind speed is between 4 and 25m/s. Generation output from a wind farm is also seasonally dependent, such that approximately two thirds of the total annual energy yield from the wind farm is expected to be delivered in the six months between October and March, with the remaining six months delivering the other third.

Meteorological Effects

4.6.4. Although wind farms require wind for electricity generation, at high wind speeds (>25m/s or 56mph) they shut themselves down to avoid excessive wear on the components; the rotor is both aerodynamically and mechanically braked. However, modern wind turbines are designed to withstand much higher wind speeds and are normally certified against structural failure for wind speeds up to 150mph. Lightning generally has no effect on turbines, though as with all structures there is risk of damage if hit directly by lightning. Turbines are fitted with a lightning protection system as part of their design.

4.6.5. Snow does not generally pose problems other than with access to the Site. Occasionally very heavy snow and ice may affect the anemometer or aerodynamics of the turbine blades resulting in temporary automatic shutdown. The wind turbine would restart automatically after accumulations have naturally thawed.

Servicing and Emergency Repairs

4.6.6. Turbines would be maintained by a local team of technicians. Turbines would be typically maintained at 6 monthly internals, with each service requiring on average two technicians over two days per turbine. Technicians operate in transit vans or 4x4 vehicles.

4.6.7. Technicians would also visit turbines to repair faults, again typically working in pairs in a transit van or 4x4. Most components would be replaced by hoisting to the nacelle using onboard cranes / hoists within the turbine. In instances of a major fault requiring major

component replacement (e.g., blade failure), cranes would be required to remove components.

4.6.8. High Voltage equipment (substation) would be inspected and maintained at 6 monthly intervals, typically by two technicians over two days.

4.6.9. Servicing and emergency works would be covered by the Construction (Design and Management) Regulations 2015.

Extended services

4.6.10. At regular periods through the lifetime of the Proposed Development, oils and components will require changing which will increase the service time on-site per machine.

4.6.11. Gearbox oil changes are required approximately every 18 months. Changing the oil and worn components will extend each turbine service by one day.

4.6.12. Blades would be inspected annually, either by drone or rope access. Repairs may be carried out every few years using a cherry picker or rope access.

4.6.13. Blade inspection and repair work is especially weather-dependent. Light winds and warm, dry conditions are required for blade repairs. Hence mid-summer (June, July, and August) is the most appropriate period for this work.

Emergency operations

4.6.14. The following factors could have significant effects on the duration of emergency operations:

- Working with cranes is highly weather dependant; wind speed and cloud cover being the key factors (due to crane and manhandling safety limits);
- The availability of spares will determine delivery times to Site for a replacement; and
- The duration of repair on a component where there is no spare available is event specific.

4.6.15. It has been found that operation in the first three or four years will highlight any manufacturing and/or installation issues which may require multiple replacements. In general, unscheduled maintenance is more likely to be required at the project start up and towards the end of the 30-year period at the end of the design life.

Track maintenance

4.6.16. Site tracks are likely to be maintained annually with a JCB, dumper and a roller taking around 5 to 10 days and will generally be undertaken in the summer months when the tracks have dried out.

4.7 Decommissioning

Wind Farm Decommissioning Requirements

4.7.1. The Proposed Development will be designed with an operational life of 30 years. At the end of this period the Applicant has three options, including:

- to decommission the wind farm and dismantle and remove the turbines;
- to apply for an extension to the operating period using existing equipment; or
- apply to install new equipment on the Site.

4.7.2. For the purposes of this assessment, it is assumed that the wind farm would be decommissioned.

4.7.3. Wind turbines can easily be removed and the hardstanding areas re-instated. Prior to wind turbine removal, due consideration would be given to any potential impacts arising from these operations. Some of the potential issues could include:

- Potential disturbance by the presence of a crane, HGVs, and engineers on-site;
- On-site temporary compound would need to be located appropriately;
- Time of year and timescale (to be outside sensitive periods); and
- Access tracks may remain in use for the benefit of the landowner and other stakeholders.

Wind Turbine Decommissioning

4.7.4. Wind turbines (towers, nacelle, hub, blades, and electrical kiosk) can be dismantled using a crane and removed from Site. When dismantling and removing the turbines the bases would be broken out to below ground levels and all cables cut at depth below ground level and left in the ground. Roads would either be left for use by the landowner or covered with topsoil. No stone would be removed from the Site. The decommissioning works are estimated to take six months. This approach is considered to be less environmentally damaging than seeking to remove foundations and cables entirely.

4.7.5. The turbine components themselves will be taken to an appropriate recycling facility where applicable. Due to the timescales, it is not possible to identify a specific facility at this time.

4.7.6. It should be noted that the developer will set up a decommissioning fund during the lifetime of the Proposed Development.

Substation and Distribution System Decommissioning

4.7.7. The control building, substation and associated equipment would be removed, and the components reused or recycled. It is likely that the plant would be re-used as it has a life well in excess of the Proposed Development itself. The buried distribution cables within the Site would be de-energised and would be cut off below ground level at the ends. Any disturbed areas would be reinstated and re-vegetated.

Access Track Decommissioning

4.7.8. Following decommissioning of the Proposed Development, some wind farm tracks may remain in perpetuity for future use by landowners, other stakeholders and for recreational purposes. It is also considered that the disturbance associated with their removal and disposal of the material would have a much greater environmental effect than leaving them in situ.

Transmission System Decommissioning

4.7.9. There may well be other users of the wider transmission system at the end of the Proposed Development. In this case, the relevant circuits would not be removed when the Proposed Development is decommissioned.

4.8 Vulnerability to major accidents and disasters

Construction / Decommissioning

4.8.1. The Draft Outline CEMP details measures to manage the environmental impacts of the Proposed Development during the post consent phase. Such measures will minimise the likelihood of major accidents or disasters arising from construction of the Proposed Development, for example through pollution prevention, management of waste, and water management measures (see **Section 4.9** for further details).

4.8.2. The construction works for the Proposed Development would also be undertaken in accordance with primary health and safety legislation, including:

- The Health and Safety at Work Act 1974[3];
- The Management of Health and Safety and Work Regulations 1999 (as amended)[4]; and
- The Construction (Design and Management) (CDM) Regulations 2015[5].

4.8.3. As required by the CDM Regulations a Construction Phase (Health & Safety) Plan will be prepared for the works by the Site contractors, setting out emergency procedures to be followed in the event of such an incident.

4.8.4. During decommissioning, management measures would be implemented in a similar manner to those applied during the construction phase and in accordance with the latest guidance and legislation at the time of decommissioning activities.

Operation

4.8.5. Given the nature of the Proposed Development, it is considered that the key areas of concern in relation to major accidents and disasters would include mechanical failure, aviation, fire risk, and flooding. These matters are considered in further detail below:

- **Mechanical Failure**: To reduce the likelihood of issues associated with mechanical failure, the wind turbines would be designed and constructed to withstand extreme wind conditions. Additionally, the wind turbines would automatically shut down during periods of excessive wind (>25m/s). The wind farm and associated infrastructure (i.e. substation equipment) would be subject to inspection and maintenance to ensure all components are working correctly.
- Aviation: Aviation is considered within Chapter 16: Aviation and Telecommunications.

[3] UK Government (1974). The Health and Safety at Work Act etc 1974. [Online] Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents [Accessed June 2026].
[4] UK Government (1999). The Management of Health and Safety and Work Regulations 1999 (as amended). [Online] Available at: https://www.legislation.gov.uk/uksi/1999/3242/contents [Accessed June 2026].
[5] UK Government (2015). Construction (Design and Management) Regulations 2015. [online] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents [Accessed June 2026].

- **Fire Risk**: Electrical infrastructure, such as transformers and substation equipment, present a potential fire risk. The Proposed Development would include the following measures to mitigation potential fire risk:
  - Wind turbines would be fitted with a lightning protection system as part of their design;
  - Use of fire-resistant cables and insulation, where reasonably practicable;
  - Appropriate fire detection and suppression systems would be installed within substation buildings;
  - Inspection and maintenance of wind turbine and associated infrastructure (i.e. substation equipment) to ensure all equipment is functioning correctly; and
  - Maintenance staff would undertake relevant fire safety training and emergency plans would be in place to set out fire response procedures.
- **Flooding**: The flood risk associated with the Site and the Proposed Development is detailed within the Flood Consequence Assessment (see **Appendix 10A**).

4.8.6. It is considered that the implementation of the above measures would ensure safety and minimise the likelihood of major accidents and disasters during the operation of the Proposed Development.

4.9 Embedded environmental measures

Introduction

4.9.1. In accordance with Regulation 17(3) of the EIA Regulations, the environmental topic chapters (Chapters 6-16) within the ES include a description of the "*measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment*".

4.9.2. For each environmental topic, the EIA process has systematically identified impacts and effects, taking into consideration environmental measures that the Proposed Development will adopt. These environmental measures include avoidance, best practice and design commitments, which are classified into primary or tertiary measures in accordance with the Institute of Sustainability and Environmental Professionals (ISEP) Implementing the Mitigation Hierarchy from Concept to Construction[6] definitions as follows.

4.9.3. A key benefit of the EIA process is the opportunity it gives to integrate environmental considerations into the iterative design of a project. Embedded environmental (mitigation) measures are those measures which are inherent to the Proposed Development and are integral to and should be included in consideration of the application. Embedded measures include those assumed to be in place during construction, operation, and decommissioning. Embedded measures include those considered as industry standard or best practice.
- Primary (inherent): Referred to as 'embedded measures', are modifications to the location, design or operation of the Proposed Development made during the pre-

[6] ISEP. (2024). ISEP Guidance: Implementing the Mitigation Hierarchy from Concept to Construction [online]. Available at: https://www.isepglobal.org/resources/blogs/2024/08/iema-guidance-implementing-the-mitigation-hierarchy-from-concept-to-construction?trk=public_post_comment-text (Accessed: June 2026).

application phase that are an inherent part of the Proposed Development, and do not require additional action to be taken.

- Secondary (foreseeable): Actions that will require further activity in order to achieve the anticipated outcome and are referred to as ‘additional measures’ unless they are ‘committed’ to in EIA documentation, i.e. measures which are defined and will be secured through conditions, requirements, agreements or plans -in which case they are considered as ‘embedded measures’ in this ES.
- Tertiary (inexorable): Actions that would occur with or without input from the EIA feeding into the development process. These include actions that will be undertaken to meet other existing legislative requirements or actions that are considered to be standard practice used to manage commonly occurring environmental effects. These are referred to as ‘good practice measures’ and are also embedded within the design of the Proposed Development. Examples include construction management measures implemented to minimise the risk of nuisance or pollution effects, set out in an Outline Construction Environmental Management Plan (CEMP) and associated plans such as an Outline Drainage Strategy, with the final versions secured via a suitably worded planning condition.

4.9.4. Opportunities for embedded design measures have been identified throughout the evolution of the design of the Proposed Development and the EIA process; whereby potential significant adverse environmental effects have been fed back into the design process to verify whether they can be avoided or otherwise mitigated in accordance with the hierarchy. Alongside this, good practice measures have been identified with reference to legislative requirements and measures of standard practice to manage commonly occurring effects. These design measures and good practice measures have been included within the Proposed Development plans and drawings and thus are integrated into the overall design as embedded measures.

4.9.5. Following the application of embedded measures, where the potential for a significant environmental effect remains, ‘additional mitigation measures’ are considered to avoid, reduce or compensate this effect. Typically, additional measures cannot be implemented as part of the Proposed Development. An example would include off-site planting schemes within privately owned land where agreement would need to be reached with the landowner in order to implement the planting. In such instances these additional measures are identified, and consideration given to residual effects should such measures be implemented. However, such mitigation does not form part of the Proposed Development. The assessment of residual effects is only provided as an indication of whether the additional measures could potentially mitigate significant effects.

4.9.6. All embedded environmental measures are included in the first assessment of impacts within **Chapters 6-16** of this ES. Only where a significant adverse effect is identified following the initial assessment, are ‘additional’ mitigation measures considered. This is set out in the relevant section of **Chapters 6-16** where necessary.

4.9.7. In addition to the plans and management plans described in **Section 4.5**, the following provides an overview of some of the general environmental management considerations for the construction of the Proposed Development. These provisions do not replace or affect the implementation of specific environmental measures detailed in the specialist assessment chapters which follow.

Construction Environmental Management Plan (CEMP)

4.9.8. The CEMP will be the master document for consolidating all environmental requirements and undertakings that relate to the Site. As such, it aims to ensure that construction activities for the Proposed Development are carried out in accordance with legislation and best practice for minimising the effects of construction on the environment and local communities.

4.9.9. The CEMP will be produced prior to the commencement of works and made available to the appointed civil engineers and construction company, and its objectives will be to:

- Provide a mechanism for delivering many of the embedded environmental measures described in the ES;
- Ensure compliance with legislation through setting out the need for consultation with 'consultation bodies' (see Regulation 2 in the EIA Regulations[7]), and by obtaining necessary consents and licences from relevant bodies;
- Provide a framework for monitoring and compliance auditing and inspection to ensure the environmental measures included in the Proposed Development are being implemented;
- Ensure environmental best practices are adopted throughout the construction stage;
- Provide a framework for dealing with adverse effects as they occur; and
- Ensure a prompt response should unacceptable adverse effects be identified during the works.

4.9.10. The CEMP will remain a live document throughout the pre-construction and construction processes and some provisions may extend into the operational phase. The CEMP will consolidate all appropriate embedded measures, and additional mitigation and enhancement strategies where required, and would clearly outline what should be implemented, where, and by whom. A Draft Outline CEMP is provided alongside this Draft ES (**Appendix 4A**).

Construction Method Statement (CMS)

4.9.11. The CMS would be prepared following the grant of consent and be subject to approval with individual elements and the supporting CEMP. The proposed content of the CMS is as follows:

- Ground Investigation (GI) methods including appropriate reference to the CEMP;
- Turbine and infrastructure locations following post GI micro-siting involving a number of technical specialists;
- Good practice guidance relevant to H&S, design details etc;
- Design detail for infrastructure (e.g., foundation specification, foundation and crane hardstanding configuration, confirmation of track sections to be excavated, external finish to buildings, security fencing form and location, etc) - see **Section 4.2**;
- Design detail for pollution control measures (location specific arrangements and design for management of dewatering activities) - see **Section 4.5**;

[7] UK Government (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. (online) Available at: https://www.legislation.gov.uk/uksi/2017/571/introduction [Accessed June 2026].

- Material import requirements and confirmation of stone and concrete source - see **Section 4.5**;
- Programme of works and working hours controls -see **Section 4.5**; and
- Site restoration plan to be implemented to restore areas affected by construction activity.

Construction Transport Management Plan

4.9.12. A CTMP will be produced and agreed with the Local Authority in advance of commencement of development. The CTMP would address traffic related planning conditions and would include, but not be limited to:

- Communication – The CTMP would include a strategy for communication with local residents and businesses. The strategy would include procedures to keep affected parties aware of when works would be carried out, if / when roads would be closed (and diversionary routes to be used if there are closures) and how to contact the construction team with a query or complaint;
- Traffic Management – Detailed traffic management strategies would be provided for each stage of the construction works alongside finalised road traffic signage arrangements and a proposed programme of safety inspections on the public highway. This would include details of proposed timings of deliveries and transportation during the construction period;
- Road Condition Survey pre and post construction;
- Remedial Works – Details of procedure for conducting emergency road maintenance, on-going remedial work, and final remedial work along with an agreed maintenance period for any repairs carried out on the public road; and
- Contact and Liaison – Details would be outlined with respect to road safety and condition monitoring, including a named individual who would be responsible for liaising and coordinating with PEDW and the Local Planning Authorities (i.e. BCBC, RCTCBC, and NPTC).

4.9.13. A Draft Outline CTMP is provided as **Appendix 12B** of this Draft ES.

Water Management Plan

4.9.14. A Water Management Plan (WMP) would be produced and agreed prior to the commencement of development. The WMP would provide specific information in relation to the management of water on the construction Site. Practices set out in the WMP would be incorporated into the final CEMP once agreed and where they relate to the construction phase. This would draw on the specific measures set out in **Chapter 10: Water Environment**. An Outline Water Management Plan will be provided as an appendix to the Final ES.

Habitat Management Plan

4.9.15. A Habitat Management Plan would be produced and would include detail of the management, maintenance and monitoring measures requiring delivery over the lifetime of the Proposed Development.

Dust and Air Quality

4.9.16. Particular care would be required to maintain dust emissions at a practicable minimum when working in the vicinity of residential properties and environmentally sensitive areas. Good practice mitigation would be required during dry conditions. The use of Best Practicable Means (as defined in Part III of the Environmental Protection Act 1990) and dust control measures as defined within Institute of Air Quality Management (IAQM) guidance[8] would be employed.

4.9.17. The environmental measures to be implemented to control dust emissions during construction and decommissioning are:

- The use of dust suppression facilities on-site. This would include the provision of water bowsers with sufficient capacity and range to dampen down all areas which may lead to dust escape on-site;
- Any storage on-site of aggregate or fine material would be properly enclosed and screened so that dust escape is avoided. Adequate sheeting would also be provided for the finer materials which are prone to 'wind whipping';
- Wheel wash facilities would be installed for vehicles entering and exiting the Development Site where required. This facility would be able to automatically clean the lower parts of the HGVs by removing mud, clay etc from the wheels and chassis in one drive through operation;
- HGVs entering and exiting the Site would be fitted with adequate sheeting to totally cover any load carried which has the potential to be 'wind whipped' from the vehicle;
- Good housekeeping or 'clean up' arrangements would be employed so that the Site is kept as clean as reasonably practicable. There will be daily inspections of the working areas and immediate surrounding areas to ensure that any dust accumulation or spillages are removed / cleaned up as soon as reasonably practicable; and
- The appointment of a contact to whom complaints / queries about construction dust can be directed. Any complaints to be investigated and action taken where appropriate.

4.9.18. Dust and air quality are not considered any further within this Draft ES because no likely significant effects are anticipated in this regard and have been scoped out of the assessment. This approach was set out in the Scoping Report (**Appendix 1A**) and no objections were raised in the Scoping Direction (**Appendix 1B**).

Site Waste Management

4.9.19. Site waste management practices to be implemented by the appointed contractor for the construction works for the Proposed Development are included in the Draft Outline CEMP (**Appendix 4A**) provided alongside this Draft ES.

Re-Use and Recycling of Decommissioned Materials

4.9.20. All decommissioned materials would be stored on Site in segregated areas. The principal contractor would provide method statements for the collection, storage, and transportation of

[8] IAQM (2024). Guidance on the assessment of dust from demolition and construction [online]. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf [Accessed: June 2026].

materials / waste. Where appropriate, materials / waste would be segregated on the Site in skips or bunded tanks and transported to appropriate Sites or recycling facilities.

4.9.21. No materials would be burned on the Site. Hazardous waste would be held in a separate skip (or suitable bunded facility) and disposed of at a suitably licensed Site.

4.9.22. No waste would leave the Site until the appropriate waste carriers' license and management certificates for the disposal Site or transfer station have been inspected and authenticated by the relevant parties.

Control of Hazardous Materials

4.9.23. All hazardous materials and substances stored on the Site would be stored in a 'Haz-bin' or similar secure lockable container located within the temporary decommissioning compound.

4.9.24. Control of Substances Hazardous to Health (CoSHH) assessments would be completed by all contractors for activities using hazardous substances.

4.9.25. Any on Site facilities for the storage, transportation or refuelling of chemicals, oils or fuels shall be sited on suitable impervious bunds. No discharge to any watercourse, land or underground strata would be permitted.

4.10 Implementation of embedded environmental measures

4.10.1. **Table 4.3** summarises the environmental measures that form part of the Proposed Development, as well as the mechanisms which would be used to ensure that these measures are implemented as part of the Proposed Development. Greater detail on these measures can be found in each of the technical assessment chapters.

Table 4.3 Summary of environmental measures to be implemented

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Construction			
Some instances of habitat loss would be temporary and reinstated post-construction within working areas and temporary construction compounds. Existing Forestry access points, roads and tracks have been used where possible to minimise vegetation loss.	Developer / Contractor	CEMP and Landscape and Ecological Management Plan (HMP) secured via DNS condition.	Chapter 6, Table 6.11
Impacts to known and previously unknown archaeology within the Site would be mitigated through a programme of archaeological works in order to make provision for archaeological recording where loss of or disturbance to archaeological remains cannot be avoided. Consultation with Heneb will determine the requirement, if any, for further works; of which would be secured through a DNS planning condition	Developer / Contractor	DNS Planning Condition	Chapter 7, Table 7.8
Construction works would be undertaken using good practice measures to minimise the release of additional sediment-laden run-off into nearby watercourses. Full measures are detailed in Chapter 10: Water Environment.	Developer / Contractor	Outline Construction Environmental Management Plan (CEMP) secured via DNS condition. Construction Method Statement (CMS) secured via DNS condition	Chapter 8, Table 8.9
Appropriate pre-construction surveys or inspections will be carried out. A method statement would be prepared under which: ■ Vehicle movement outside of daylight hours would be restricted, vehicle speeds controlled, and operatives warned of the presence of certain species in order to reduce the risk of collisions. ■ All excavations would have sloped sides or have a means of escape for entrapped animals. Excavations to be checked each morning by operatives prior to work within the excavation. ■ Construction activities would be restricted to normal working hours (so largely avoiding the hours of darkness, particularly in the summer when species are most active).	Developer / Contractor	Outline CEMP secured via DNS condition	Chapter 8, Table 8.9

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
▪ Site lighting will be controlled to prevent incidental spillage on to features that may be used by nocturnal species.			
The wind farm infrastructure layout has been designed to avoid the loss of habitats of high ecological value as far as is practicable.	Developer / Contractor	Embedded in design	Chapter 8, Table 8.9
Habitats which would be subject to temporary loss will be re-vegetated and reinstated as soon as possible after construction.	Developer / Contractor	Outline CEMP secured via DNS condition. Outline HMP. To be appended to the Final ES.	Chapter 8, Table 8.9
The wind farm infrastructure layout has been designed to avoid trees which have been identified as having suitability for use by roosing bats, with all such trees, falling outside of the ZoI of predicted impact pathways.	Developer / Contractor	Embedded in design	Chapter 8, Table 8.9
Biosecurity measures, such as boot wash stations, will be implemented throughout construction to avoid the introduction or spread of INNS An INNS Management Plan will also be prepared.	Developer / Contractor	INNS Management Plan secured via DNS condition.	Chapter 8, Table 8.9
Proposals have sought to minimise habitat losses. Measures to prevent impacts on breeding birds will include: ▪ Vegetation clearance outside of the breeding bird season (i.e., between September and February inclusive); ▪ Use of dedicated working areas and construction access routes; ▪ Ecological Clerk of Works (ECoW) to carry out pre-works checks and monitoring of construction areas where they cannot be completed outside of the breeding bird season (March to August inclusive); and ▪ Any active bird nests in or immediately adjacent to working areas would be identified and provided with appropriate exclusion zones.		Construction Environmental Management Plan (CEMP) and Construction Method Statement (CMS) secured by DNS condition.	Chapter 9, Table 9.15
Construction methods and programme will consider the location of identified nest sites and roost sites. The timing and duration of works will be managed to avoid direct conflict. Additional measures such as the use of protection zones and visual/noise screens would be considered.	Developer / Contractor	CEMP secured by DNS condition.	Chapter 9, Table 9.15

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
The use of lighting around the proposed construction compound will be restricted			
The Proposed Development layout has been developed to avoid watercourses and riparian corridors where practicable, with crossings and works near watercourses minimised. Where required, crossings have been designed to maintain flow conveyance, hydrological connectivity and water quality. Construction drainage and pollution prevention measures would be implemented through the Outline CEMP (Appendix 4A), secured by planning condition.	Developer / Contractor	Outline CEMP (Appendix 4A), secured by planning condition. Watercourse Crossing Schedule. Ordinary Watercourse Consent where required.	Chapter 10, Table 10.8
Existing drainage pathways would be retained where practicable and runoff managed within the same hydrological catchments. SuDS and pollution prevention measures (to be implemented through the outline CEMP (Appendix 4A) would be used to control runoff rates, sediment and water quality before discharge to receiving watercourses. Surface water runoff would be managed through appropriately designed drainage systems to control discharge rates, volumes and sediment mobilisation. Runoff and sediment would be intercepted and treated prior to discharge where required, with drainage features designed to minimise erosion and sediment deposition. Existing riparian vegetation and natural drainage features would be retained where practicable, and pollution prevention measures implemented to protect water quality and WFD objectives (further detail within Annex D of the Water Framework Directive Assessment (Appendix 10B).	Developer / Contractor	Outline CEMP (Appendix 4A). WFD Assessment; Outline Drainage Strategy / detailed drainage design.	Chapter 10, Table 10.8
New impermeable areas would be limited where practicable. Access tracks, crane pads and ancillary infrastructure would use semi-permeable construction where appropriate. Temporary and permanent drainage would be designed using SuDS principles to attenuate runoff, mimic natural drainage pathways and manage flows within the same catchments where practicable.	Developer / Contractor	FCA; Outline Drainage Strategy; CEMP (Appendix 4A); SAB approval where required.	Chapter 10, Table 10.8
Pollution prevention measures would be included within the outline CEMP, including controlled storage of fuels and chemicals, bunding, spill response procedures and appropriate management of concrete, wastewater and dewatering. Dewatering, where required, would be localised, temporary and managed to avoid adverse effects on groundwater and connected receptors.	Developer / Contractor	Outline CEMP (Appendix 4A), groundwater management measures; environmental permit where required.	Chapter 10, Table 10.8

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Pollution prevention measures would be included within the outline CEMP, including controlled storage of fuels and chemicals, bunding, spill response procedures and appropriate management of concrete, wastewater and dewatering. Dewatering, where required, would be localised, temporary and managed to avoid adverse effects on groundwater and connected receptors.	Developer / Contractor	PWS Monitoring and Method Statement; outline CEMP (Appendix 4A); consultation with relevant authority.	Chapter 10, Table 10.8
The design would continue to avoid sensitive wet habitats where practicable. Cross-drainage and appropriate drainage design would be used to maintain hydrological connectivity where infrastructure could intercept shallow flow pathways.	Developer	GWDTE assessment; Outline Drainage Strategy; Outline CEMP (Appendix 4A).	Chapter 10, Table 10.8
A soil resources survey will be completed by a soil scientist / experienced soil specialist for the Northern Array, Southern Array and sections of Forestry Access Track that require upgrades prior to construction. The findings of the soil resources survey will be used to inform the Outline SMP and Soil Resources Plan (which may be part of a Materials Management Plan, MMP, or a Site Waste Management Plan, SWMP). A peat survey may be needed for the proposed Forestry access track, this will provide information on the soils present and the findings of the survey will be used inform soil handling during construction. Excavated topsoil will be stored separately from excavated subsoil. Soil will be reinstated in reverse order to replace the original soil profile in the original order. Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure and help to minimise soil compaction, and associated measures will be detailed in the Outline SMP. The Outline SMP will be submitted to the local authority for comment prior to construction. If Ground Conditions require it, a temporary trackway of either metal, wood, or plastic, would be used for vehicles to access the working areas. This would be removed once construction is complete. During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction, including during construction of the access tracks, the tracks will then be available for heavier vehicles to use to avoid impacts on other areas. Temporary storage of soils will be carried out in accordance with the Outline CEMP. This document will outline where excavated non-waste materials will	Developer / Contractor	Outline SMP, this may form part of a Materials Management Plan (MMP) or a Site Waste Management Plan (SWMP), and Construction Environmental Management Plan (CEMP) secured via DNS condition	Chapter 11, Table 11.20

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
be reused. If peat cannot be avoided, then a Peat Management Plan (PMP) will be developed for the Proposed Development and appended to the CEMP. Vegetation stripping will be carried out on an as-needed basis to minimise the period of time that bare soils are left exposed. Storage of excavated soils intended for reuse will be kept local to the point of excavation wherever possible, to avoid mixing of soil types. Soils will be reinstated at the earliest opportunity to avoid long-term (e.g., > six months) soil storage.			
A soil resources survey will be completed for the Northern Array, Southern Array and sections of Forestry Access Track that require upgrades by a soil scientist / experienced soil specialist prior to construction and the findings of the soil resources survey will be used to inform the Outline SMP for soil handling and measures to minimise soil erosion from exposed (stripped) soils or stockpiled soils. Measures to avoid soil compaction (which can result in soil erosion by increasing surface run-off) are integrated into the Outline CEMP to avoid damage to soil. The CEMP will detail how temporary storage of soils is to be managed. Soil stockpiles will be stored for the shortest amount of time possible. If peat cannot be avoided, then a Peat Management Plan will be developed for the Proposed Development.	Developer / Contractor	Outline SMP and CEMP secured via DNS condition	Chapter 11, Table 11.20
Where the Proposed Development cannot avoid soils, areas with soils of lower sensitivity will be preferred to soils with the highest sensitivity (e.g., by design refinement and micrositing). The footprint of the permanent hard development will be kept to that required for the safe construction and operation of the wind farm and associated infrastructure. Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure. This measure included in the Outline CEMP (Appendix 4A) will be updated following the proposed peat and soil survey (in support of the Final ES). Permanently displaced soil will be reused within the Site where practicable in accordance with the CEMP and/or MMP or SWMP. The measures contained in the Outline CEMP (Appendix 4A) will be updated in support of the Final ES.	Developer / Contractor	Outline SMP, this may form part of an MMP or SWMP, and CEMP secured via DNS condition	Chapter 11, Table 11.20

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
A soil resources survey will be completed for the wind farm development site by a soil scientist / experienced soil specialist prior to construction and the findings of the soil resources survey will be used to inform the Outline SMP for soil handling and storage, which will allow excavated soil that is surplus to the Proposed Development to be retained in good condition and potentially reused offsite (in accordance with the MMP or SWMP. Where it is identified through soil resource and materials management planning that topsoil or subsoil cannot be reinstated at its original location, sampling and testing of excavated topsoil and subsoil will be completed in accordance with BS:3882:2015 and BS:8601:2013, respectively, at the earliest opportunity, to inform the reuse of these soils elsewhere within the Proposed Development or at a suitable offsite receptor site. Peat depth survey has been completed for the Northern & Southern Array Site and has confirmed the absence of peat. Phase 2 Peat survey will be completed for sections of the access track to collect data on where peat is present along the route. This data will inform detailed design, to enable the Proposed Development to avoid peat where possible and will inform the assessment in the Final ES. If peat cannot be avoided, then a Peat Management Plan will be developed for the Proposed Development.			
A PRA study has been completed for the Proposed Development (Appendix 11A) for the Northern and Southern Arrays. The need for a PRA to cover all or part of the Forestry Access Track will be considered during the next stage of the assessment and included in the Final ES as needed to update the baseline and inform the assessment. Phase 2 intrusive geo-environmental ground investigation will be completed during the pre-construction phase, including soil sampling and chemical testing, to confirm the Ground Conditions. Potential risks to human health from any known, suspected or unexpected ground contamination will be avoided by adopting appropriate working methods and all aspects of construction will be completed in compliance with the Construction (Design and Management) Regulations 2015, CAR 2012 and the Health and Safety at Work Act (1974) and regulations made under the Act. These legal obligations include the requirement for risk assessments and method statements for all construction related activities and the use of	Developer / Contractor	CEMP, to include MMP or SWMP, secured via DNS condition	Chapter 11, Table 11.20

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
appropriate working methods, training and Personal Protective Equipment (PPE). Temporary storage of excavated materials will be in accordance with the MMP or SWMP. Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development. The CEMP will include an unexpected contamination protocol (Appendix 4A). Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction 2024, version 2.2[9].			
In accordance with LCRM, PRAs have been completed for the Northern & Southern Array, and the report is appended to the Draft ES (Appendix 11A). Further investigation or remediation will also be undertaken in accordance with LCRM.	Developer / Contractor	CEMP and DNS planning condition	Chapter 11, Table 11.20
Coal Mining Risk Assessments (CMRAs) will be completed for the Site prior to the Final ES and will include recommendations to address potential ground instability risks associated with former deep coal mining and possible unrecorded shallow mine workings. The CMRAs will ensure that land stability issues are understood and adequately addressed in the design, and that appropriate measures, such as intrusive investigation, are considered or completed during the pre-construction phase, as recommended in the CMRA, i.e., boreholes and trial pits. Remediation may subsequently be needed. The potential intrusive investigations and any remediation work required based on the findings of these investigations will be communicated to the Mining Remediation Authority in advance of undertaking the works. Further peat investigation and assessment will be undertaken and as part of this work and the requirement for a PLHRA will be assessed. The basis of the structural design for the Proposed Development will be completed in general accordance with design standards to minimise the risk of future structural or geotechnical instability.	Developer / Contractor	DNS planning condition	Chapter 11, Table 11.20
Materials selected for the above and below ground wind farm equipment will be suitably resistant to weather and Ground Conditions and have sufficient	Developer / Contractor	CEMP secured via DNS condition	Chapter 11, Table 11.20

[9] Institute of Air Quality Management, Assessment of Dust from demolition and construction (2024). Available at: Construction-Dust-Guidance-Jan-2024.pdf (Accessed July 2026).

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
anticipated lifespan to ensure that they are unlikely to significantly degrade during the operational phase. In the event that damage to above ground equipment is observed, appropriate action will be taken to investigate any potential impacts to ground (soils and groundwater) in accordance with LCRM. Underground electrical cables installed for the Proposed Development will not be oil-filled. Buried cables will be protected from damage/ deterioration by the use of sand/ soil cushioning to avoid them being in contact with sharp stones/ objects, and placement of marker tape above the cables will help to alert anyone digging to their presence.			
The Outline CTMP (Appendix 12B) provides an overview of likely measures that will be included within the final CTMP. The final CTMP will confirm the abnormal loads delivery route and be accompanied by a route survey report.	Developer / Contractor	CTMP (final CTMP to be produced and submitted to the relevant highways authorities) which would be secured by planning condition.	Chapter 12, Table 12.8
The Outline PRoWMP (Appendix 12A) provides an overview of likely measures that will be provided within the full PRoWMP.	Developer / Contractor	PRoWMP (final PRoWMP to be produced and submitted to the relevant PRoW officers) which would be secured by planning condition.	Chapter 12, Table 12.8
Best Practicable Means (BPM) as defined in Section 72 of the CoPA.	Developer / Contractor	CEMP, delivery secured through DNS condition.	Chapter 13, Table 13.9
The Site will remain open for access. However, temporary measures, such as fencing of construction sites, will be required during construction to restrict access and ensure safety of potential users.	Developer / Contractor	CEMP, delivery secured through DNS condition.	Chapter 15, Table 15.11
To facilitate safe flight, day or night, there are regulations governing the procedures that must be followed to ensure the timely dissemination of information regarding the construction of anemometer masts and wind turbines. Information regarding construction of the Proposed Development will be passed to the Defence Geographical Centre (DGC) and the General Aviation	Developer	DNS Condition	Chapter 16, Table 16.8

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Awareness Council (GAAC) in advance of the commencement of turbine construction and then be updated regarding location, height and lighting type. Information will then be promulgated within the civil UK Integrated Aeronautical Information Package (UK IAIP), the main resource for information for all of the UK airspace, as well as the Military Aeronautical Information Publications.			
If highlighted by operator, then mitigation options would be investigated such as micrositing or other technical solutions. A 50m micrositing allowance has been requested to mitigate potential interference.	Developer	DSN Condition	Chapter 16, Table 16.8
Operation			
The single storey substation building would be traditional blockwork construction and faced in stone with a slate roof. Associated fencing would be either moorland green/brown or dark grey in order to blend with either the existing landscape colours or traditional building colours for the area.	Developer	DNS planning condition.	Chapter 6, Table 6.11
The turbine rotors and upper towers will be largely visible against the sky and therefore a non-reflective pale grey colour (e.g., RAL 7035) will be selected to minimise contrast.	Developer	DNS planning condition.	Chapter 6, Table 6.11
A minimum of 200 m stand-off will be maintained between turbine blade tips and the nearest point of linear / foraging features considered likely to be well-used by bats such as treelines, woodland, and some waterbodies.	Developer	DNS planning condition.	Chapter 8, Table 8.9
Strategy developed to monitor the number and frequency of collisions to inform need for additional mitigation during operation such as curtailment or feathering.	Developer	A Collision Mitigation and Monitoring Strategy (CMMS) secured via DNS condition.	Chapter 9, Table 9.15
A minimum of 50m stand-off will be maintained between turbine blade tips and the nearest point of features that may cause commuting Nightjar to fly within the collision risk zone such as woodland.	Developer	Embedded in design - secured via DNS condition	Chapter 9, Table 9.15
A Habitat Management Plan (HMP) setting out the long-term management and enhancement of habitats for all wildlife including birds. An Outline HMP (oHMP) will be submitted alongside the Final ES.	Developer	HMP secured via DNS condition.	Chapter 9, Table 9.15
Maintenance methodology to be adopted via CMMS that ensures major maintenance works avoid the breeding season, where possible, and/or are completed sensitively where nest sites of Schedule 1 species are known.	Developer	CMMS and HMP.	Chapter 9, Table 9.15

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
HMP will include ongoing long-term management measures to enhance wider opportunities for any disturbed or displaced birds.			
Permanent drainage would remain in place and be designed to manage runoff using SuDS principles, including attenuation and water quality treatment where required. The drainage strategy (Appendix 10A) would seek to maintain existing hydrological connectivity and avoid increasing flood risk elsewhere.	Developer	Outline Drainage Strategy / detailed drainage design; operational drainage maintenance plan; SAB approval where required.	Chapter 10, Table 10.8
Operational maintenance activities would follow pollution prevention controls, including appropriate storage, handling and spill response procedures. Drainage features would be inspected and maintained to ensure they continue to function as intended.	Developer	Operational environmental management procedures; drainage inspection and maintenance plan.	Chapter 10, Table 10.8
The Outline PRoWMP (Appendix 12A) provides an overview of likely measures that will be provided within the full PRoWMP.	Developer / Contractor	PRoWMP (final PRoWMP to be produced and submitted to the relevant PRoW officers) which would be secured by planning condition.	Chapter 12, Table 12.8
In accordance with the AWTN, operational wind turbine noise will be controlled by the application of SSNLs at relevant noise-sensitive receptors locations. The cumulative operational noise levels of all acoustically relevant wind turbines will meet the TNAC.	Developer	DNS condition to include SSNLs at relevant noise-sensitive receptor locations.	Chapter 13, Table 13.9
Realistic candidate turbine, within the physical parameters for the development, selected for assessment, to demonstrate how appropriate SSNLs can be achieved.	Developer	DNS condition to require that the details of the final turbine selected for installation (including noise emission detail) are submitted to, and approved by, the Local Authorities prior to installation.	Chapter 13, Table 13.9

Environmental measure	Responsibility for implementation	Compliance mechanism	ES section reference
Implementation of a shadow flicker control module will reduce effects to an acceptable level.	Developer	DNS planning condition.	Chapter 14, Table 14.5
In the operational phase access will be permitted. No fencing etc will be used around the access roads or turbines that could limit access to the Site.	Developer	DNS planning condition.	Chapter 15, Table 15.11
Aviation lighting, including MoD compliant infra-red lighting will be fitted on the Proposed Development	Developer	DNS planning condition.	Chapter 16, Table 16.8
Mitigation options to be discussed with NATS	Developer	DNS planning condition.	Chapter 16, Table 16.8
If highlighted by operator, then mitigation options would be investigated such as micrositing or other technical solutions. A 50m micrositing allowance has been requested to mitigate potential interference.	Developer	DNS planning condition.	Chapter 16, Table 16.8

Monitoring

4.10.2. Monitoring, where it is required, is explained further within the relevant technical chapters.