# Chapter 3 Proposed Development Description

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## List of Abbreviations

| Abbreviation | Description |
|---|---|
| AIL | Abnormal Indivisible Loads |
| AOD | Above Ordnance Datum |
| BEMP | Biodiversity Enhancement Management Plan |
| BESS | Battery Energy Storage System |
| BNG | Biodiversity Net Gain |
| CAA | Civil Aviation Authority |
| CEMP | Construction Environmental Management Plan |
| $CO_2$ | Carbon Dioxide |
| CMS | Construction Methodology Statement |
| DEMP | Decommissioning Environmental Management Plan |
| DMP | Drainage Management Plan |

| | |
|---|---|
| ECoW | Environmental Clerk of Works |
| EIA | Environmental Impact Assessment |
| GHG | Greenhouse Gas |
| GWh | Gigawatt hour |
| ha | Hectares |
| HES | Historic Environment Scotland |
| HV | High Voltage |
| km | Kilometres |
| kV | Kilovolt |
| m | metres |
| MOD | Ministry of Defence |
| MW | Megawatt |
| OEMP | Operation Environment Management Plan |
| PMP | Peat Management Plan |
| PPP | Pollution Prevention Plan |
| SAC | Special Area of Conservation |
| SEPA | Scottish Environment Protection Agency |
| SSSI | Site of Special Scientific Interest |
| SWMP | Site Waste Management Plan |
| THC | The Highland Council |
| TMP | Traffic Management Plan |
| UK | United Kingdom |

# 3. Proposed Development Description

## 3.1. Introduction

3.1.1. This chapter provides a description of the site and the geographical context. It presents a description of the Proposed Development for which consent is being sought, for the purposes of informing the identification and assessment of likely significant environmental effects. This includes the anticipated construction and operation activities connected with the Proposed Development. A brief description of likely decommissioning activities is also provided.

## 3.2. Site Status and Context

### *Background and Context*

3.2.1. The Proposed Development site is located approximately 900 m south of Fort Augustus in The Highland Council (THC) area (as shown on **Figure 1.1**) in close proximity to Loch Ness and the Great Glen. The site is located across two wards within THC. The proposed turbines are located within Ward 11: Caol and Mallaig, whilst the site access and some of the associated infrastructure is located within Ward 12: Aird and Loch Ness.

3.2.2. The site area is approximately 682 ha and is on rolling upland moorland and elevation varies from 200 m to 650 m Above Ordnance Datum (AOD). It is within the Culachy Estate ("the Estate") which is primarily a stalking estate. The Estate is in the process of implementing a number of carbon sector and conservation projects.

3.2.3. A number of tributaries to the Black Burn intersect the site in the north, and the watercourses Allt Lagan a Bhainne and Allt Coire Uchdachan intersect the site in the south.

3.2.4. The Beauly-Denny 400 kilovolt (kV) overhead line runs broadly north-south across the site to the west of Wade's Road and the Corrieyairack Pass.

3.2.5. The principal settlement in the nearby locality surrounding the site is Fort Augustus, which lies approximately 900 m to the north of the site boundary. The closest proposed turbines are located approximately 6.5 km from Fort Augustus. Inverness, the nearest city to the site lies around 47 km to the north-east.

3.2.6. No residential properties (either existing or for which there is a live planning permission) lie within the site boundary. The closest residential property is 3.6 km from the proposed turbine locations. There are eight properties located within 500 m of the Proposed Developments access junction and new access track. Five of the properties are within the Estate, two are along the Ardachy Road, and one is along the A82.

### *Environmental Designations*

3.2.7. **Figure 3.1** shows sites with environmental designations within 10 km of the Proposed Development. A brief summary of these is provided below with full descriptions provided in the relevant technical chapters of this Environmental Impact Assessment (EIA) Report.

3.2.8. There are no statutory designations within the site boundary.

3.2.9. The following designations are located within the site boundary:

- Wild Land Area 19 Braeroy - Glenshirra - Creag Meagaidh;
- A small area of Ancient Woodland;

3.2.10. The following designations are situated within 5 km of the site boundary (distances below from the site boundary to the designation at its nearest point) (**Figure 3.1**):

- Three SSSIs: Glendoe Lochans (~3 km north-east), Easter Ness Forest (~3.8 km north), and Parallel Roads of Lochaber (~4.3 km south)
- One SAC: River Spey Ness Woods (~3.8 km north)
- One Special Protection Area (SPA): Loch Knockie and nearby Lochs (~3.1 km north-east)
- Two Geological Conservation Review Sites (GCR): Fort Augustus (~1.2 km north), and Glen Roy and the Parallel Roads of Lochaber (~4.4 km south)
- One Conservation Area: Fort Augustus (~1.6 km north)
- A number of areas of Ancient Woodland
- 11 Scheduled Monuments
- 40 Listed Buildings

3.2.11. Additionally, the following designations are situated between 5 and 10 km from the site boundary (**Figure 3.1**):

- Five SSSIs: River Spey (5.9 km south-east), West Inverness-shire Lochs (~6.5 km and ~8.8 km west), South Laggen Fen (~6.8 km south-west), Garry Falls (~8.6 km west), and Creag Meagaidh (~9.2 km south)
- Two SACs: River Moriston (7.8 km north) and Creag Meagaidh (~9.2 km south)
- Three SPAs: West Inverness-shire Lochs (~6.5km and 8.8 km west), Loch Knockie and nearby Lochs (~8.4 km north-east) and Creag Meagaidh (~9.2 km south)
- A number of areas of Ancient Woodland
- Two National Nature Reserves: Creag Meagaidh (~10 km south) and Glen Roy (~9.4 km south-west)
- One Historic Battlefield: Blar na Léine (6.6 km south-west)
- 19 Scheduled Monuments
- 29 Listed Buildings

### *Cumulative Developments*

3.2.12. **Figure 6.19 and 6.20** shows the locations of other relevant large wind developments in planning, consented/under construction, and operational within 45 km and 60 km of the Proposed Development at the time of assessment (August 2023). Potential cumulative effects with these developments have been assessed throughout the EIA Report.

3.2.13. Further detailed discussion on the approach to cumulative assessment is presented in each technical assessment chapter as relevant.

### *Description of the Proposed Development*

3.2.14. The Proposed Development will comprise eight wind turbines, transformers and switchgear located in each turbine tower, as well as a Battery Energy Storage System (BESS). The overall capacity of the turbines will be approximately 57.6 MW, supported by additional energy storage provision with an output capacity of approximately 10 MW. The associated infrastructure is shown in **Figure 3.2** and will include:

- site access;
- access tracks;
- crane hardstandings;
- underground cabling;
- on-site substation and maintenance building;
- Battery Energy Storage System (BESS);
- temporary construction compound;
- batching plant; and

- potential excavations/borrow pit workings.

3.2.15. The Proposed Development will include four areas for compensation and enhancement activities (678 ha in total). These are shown on **Figure 3.2** and outlined below. There are further details on these measures provided in **Appendix 3.3** and **Appendix 8.6**.

- Peatland Restoration Area (424.63 ha)
- Golden Eagle Management Area (231 ha)
- Black Grouse Woodland Planting (19.11 ha)
- Ancient Woodland Expansion, Natural Regeneration (3.88 ha)

3.2.16. A Biodiversity Net Gain (BNG) Assessment has been undertaken for the Proposed Development (**Appendix 8.6**). This assessment calculates the biodiversity baseline of all habitats within the site, habitat losses due to permanent and temporary infrastructure and potential indirect loss, and biodiversity gains following implementation of the Biodiversity Enhancement Management Plan (BEMP), to determine the overall impact on biodiversity value of the site from the Proposed Development. This assessment has shown that the Proposed Development would result in a result in a 12% net gain from the baseline.

### *Micro-siting*

3.2.17. Whilst the location of the infrastructure described above has been determined through an iterative environmental based design process, there is the potential for these exact locations to be altered through micro-siting allowances prior to construction. A micro-siting allowance of up to 50 m in all directions is being sought in respect of each turbine and all other associated infrastructure in order to address any potential difficulties which may arise in the event that pre-construction surveys identify unsuitable ground conditions or environmental constraints that could be avoided by relocation. It is proposed that the micro-siting of all infrastructure will be subject to an appropriately worded planning condition.

### *Turbines and Turbine Foundations*

3.2.18. The Proposed Development will comprise eight turbines up to 200 m blade tip height when vertical. The indicative combined generation capacity of the turbines is anticipated to be 57.6 MW. The specific turbine manufacturer and model has not yet been selected as this will be subject to a pre-commencement tendering exercise and will be confirmed post consent. Therefore, for the purposes of the EIA, maximum turbine dimensions and operational attributes have been established as the development scenario.

3.2.19. The turbine parameters for the Proposed Development will be eight turbines with a maximum overall height (to blade tip) of 200 m and an indicative hub height of 119 m. The rotor diameter will be approximately 162 m for all turbines.

3.2.20. These dimensions are indicative and final turbine dimensions will be determined based upon turbine availability and procurement prior to construction. The tip height of the chosen turbine will not exceed a blade tip height of 200 m. Given this committed maximum tip height, and the range of turbine models likely to be available and suitable for the local wind conditions, there is considered to be negligible potential for the significance of environmental effects to be different than as assessed based on the candidate turbine model. It is anticipated that confirmation of the final selected turbine dimensions will be required by a suitably worded planning condition.

3.2.21. The proposed final locations of the turbines have been defined in order to enable the EIA Report to describe fully the Proposed Development for which permission is being sought. The British National Grid coordinates denoting where each of the turbines are proposed to be located are listed in **Table 3.1**.

**Table 3.1: Wind Turbine Coordinates**

| Wind Turbine | Easting | Northing |
|---|---|---|
| T1 | 237545 | 801578 |
| T2 | 237008 | 800757 |
| T3 | 237755 | 800986 |
| T4 | 237450 | 800354 |
| T5 | 238136 | 800504 |
| T6 | 237829 | 799937 |
| T7 | 238345 | 799618 |
| T8 | 238998 | 799794 |

3.2.22. Each of the wind turbines will comprise the following components:

- three blades;
- tower;
- nacelle;
- hub; and
- transformer and switchgear.

3.2.23. Each wind turbine will have a nacelle mounted on a tapered tubular steel tower. The nacelle will contain the gearbox or direct drive, the generator, the transformer, and other associated equipment. The hub and rotor assembly, including three blades, will be attached to the nacelle.

3.2.24. An elevation drawing of an indicative wind turbine and dimensions is illustrated in **Figure 3.3**. The wind turbines will be of a typical modern, three-blade, horizontal axis design in semi-matt white or light grey with no external advertising or lettering except for statutory notices.

3.2.25. The switchgear will be sited either within the base of each tower or externally sited, on the ground inside its own enclosure, a few metres away from the tower. For the purpose of the EIA it has been assumed that the switchgear will be contained within each tower base.

3.2.26. Wind turbine foundations are expected to comprise a mix of pile and gravity bases. Until detailed ground investigations have been undertaken, the exact size and depth of foundations required cannot be determined. Therefore, for the purposes of this EIA Report, the following approximate dimensions have been used:

- a round reinforced concrete slab approximately 1,000 $m^3$; and
- depth of the foundations approximately 4 m.

3.2.27. An illustration of an indicative wind turbine foundation is provided in **Figure 3.4**. The actual foundation design will be specific to the site conditions as verified during detailed pre-construction site investigations. In the unlikely event that ground conditions are unsuitable for the standard foundation design as described above, an alternative foundation design may be required, although it is not expected that this would materially affect the conclusions of the EIA.

### *Crane Hardstandings*

3.2.28. To enable the construction of the turbines, a crane hardstanding area and turning area at each turbine location will be required to accommodate assembly cranes and construction vehicles. This will comprise a permanent crushed stone hardstanding area measuring approximately 3,260 $m^2$. The actual dimensions will be subject to the specifications required by the selected turbine manufacturer and crane operator and following detailed site investigations prior to construction commencing.

3.2.29. The crane hardstandings will remain in place during the lifetime of the Proposed Development to facilitate maintenance work.

3.2.30. Indicative crane hardstandings are illustrated in **Figure 3.5**. Detailed construction drawings with final dimensions will be provided prior to commencement once the final turbine model has been selected.

### *Site Access Tracks and Site Tracks*

3.2.31. The proposed site access point is a newly constructed junction on the U1667 Ardachy Road, entering the site from the north. An indicative drawing of the Abnormal Indivisible Load (AIL) access junction is shown in **Figure 3.6**.

3.2.32. The Proposed Development will include approximately 8 km of new access tracks and 5.5 km of existing tracks which will be upgraded. They will be formed largely of locally sourced stone and from the on-site borrow pits and will have a typical running width of 6 m plus drainage provision in verges. An indicative track drainage layout is shown in **Figure 3.7**.

3.2.33. Where proposed access tracks cross areas of deep peat, floated track construction is proposed, to avoid the requirement for excavation of peat. It is proposed that approximately 2 km of the new access track would be floated if, following detailed site investigations, deep peat cannot be avoided by micro-siting. This would involve placing of a geotextile membrane on existing topsoil and vegetation followed by aggregate layers. Floating tracks would be designed to ensure suitability for site traffic during construction and operation.

3.2.34. The total length of tracks for the Proposed Development is approximately 13.5 km and can be sub-divided into the categories detailed in **Table 3.2** New and existing access tracks are shown in **Figure 1.2.**

**Table 3.2 Access Track Composition**

| Type | Approximate Length (km) | Percentage of Total |
|---|---|---|
| Existing track, to be upgraded / widened where necessary | 5.5 | 41% |
| New cut track | 6 | 44% |
| New floated track | 2 | 15% |

3.2.35. Prior to construction, any required improvements to public roads will be undertaken and appropriate highway safety measures will be agreed with THC and Transport Scotland, with necessary signage or traffic control measures implemented throughout the construction phase on the agreed basis. An example of directional signage is shown in **Figure 3.8**.

### *Watercourse Crossings*

3.2.36. The tracks providing access to the turbines and other infrastructure will need to cross surface watercourses at several locations. Watercourse crossings have been avoided in the design of the access track layout as far as possible, however there will be seven new permanent watercourse crossings within the site (coordinates provided in **Table 3.3**). Four of these watercourse crossings are to be new crossings for vehicular access, and three are existing but will likely require upgrading.

3.2.37. **Table 3.3** below summarises the new watercourse crossings that will be required, and these are shown on **Figures 9.2a-c and 9.3a-c.** Further details of the water crossings (existing and proposed) are included in **Appendix 9.5** and discussed within **Chapter 9: Hydrology, Geology & Hydrogeology**.

3.2.38. It is proposed that the final detailed design for all water crossings, including any potential upgrades or amendments required to existing crossings, will be addressed through an appropriately worded condition and in accordance with the requirements of the *Water Environment (Controlled Activities) (Scotland) Regulations 2011*.

**Table 3.3: New Watercourse Crossing Detail**

| ID | Easting | Northing | Watercourse | Proposed Crossing Type |
|---|---|---|---|---|
| WC01 | 237473 | 806874 | Tributary to River Tarff | New bottomless pipe culvert |
| WC03 | 236747 | 805252 | Tributary to River Tarff | Existing culvert |
| WC04 | 236742 | 805128 | Tributary to River Tarff | Existing span steel bridge |
| WC06 | 237050 | 804438 | Tributary to Allt na Leitire | Existing culvert |
| WC07 | 237384 | 803543 | Tributary to River Tarff | Existing culvert |
| WC08 | 237561 | 802648 | Tributary to River Tarff | Existing culvert |
| WC09 | 237675 | 802445 | Tributary to River Tarff | Existing culvert |
| WC10 | 237631 | 802190 | Tributary to River Tarff | Existing culvert |
| WC11 | 237623 | 802114 | Allt Doire Thulaichan | Existing culvert |
| WC12 | 237500 | 801708 | Tributary to River Tarff | New bottomless pipe culvert |
| WC13 | 237782 | 801984 | Tributary to River Tarff | Existing culvert |
| WC16 | 237403 | 806660 | Tributary to River Tarff | New bottomless pipe culvert |
| WC20 | 236747 | 804861 | Tributary to River Tarff | New bottomless pipe culvert |
| WC21 | 237831 | 799833 | Tributary to Allt Lagan a' Bhainne | New bottomless pipe culvert |
| WC22 | 237818 | 799674 | Tributary to Allt Lagan a' Bhainne | New bottomless pipe culvert |
| WC23 | 237900 | 799612 | Allt Lagan a' Bhainne | New single span bridge |

### *Temporary Construction Compounds*

3.2.39. Two secure construction and material storage compounds will be required during the construction period. The locations of these compounds are shown in **Figure 1.2**. The compounds will comprise an area of approximately 10,000 $m^2$ and 2,500 $m^{2,}$ respectively. An indicative layout of a typical construction compound is provided in **Figure 3.9**.

3.2.40. The compound areas will house temporary portable cabin structures to be used as the main site office and welfare facilities, including toilets, clothes drying and kitchen, with the provision for sealed waste storage and removal. They will also be used for the storage and assembly of wind turbine components, parking for vehicles, containerised storage for tools and small parts, and storage for cables, oil and fuel as required.

3.2.41. A concrete batching plant will be located within the southern construction compound and will comprise aggregate and cement hoppers, water bowsers/tanks, a mixer and a control cubicle. Aggregates and sand would be stockpiled and contained adjacent to the plant. An indicative batching plant compound is shown in **Figure 3.10** with an approximate area of 5,000 $m^2$.

3.2.42. The proposed locations of the compounds are on firm ground and avoid habitats of highest sensitivity. Prior to commencing construction work, a detailed appraisal of the areas will be required, including an assessment by the project ecologist and also trial pits and/or boreholes to confirm the nature of the sub-strata.

3.2.43. The detailed location, size and engineering properties of the construction compounds will be confirmed prior to the start of construction, after the turbine supplier and model have been confirmed.

3.2.44. On completion of construction works, it is proposed that all temporary structures be removed and the compound areas be restored.

### *Batteries Compound, Substation, Energy Storage and Cabling*

3.2.45. The electrical power produced by the individual turbines will be fed to an onsite substation and energy storage facility via underground cables. The location of the proposed substation and energy storage facility is shown on **Figure 1.2.** The design of the substation and control room building is relatively flexible and where appropriate may be clad in local materials to match in with the surroundings. Technology continues to develop in the field of energy storage, therefore the design of that element of the compound is proposed to be secured by an appropriately worded suspensive planning condition.

3.2.46. The wind farm array cables on site will be laid in trenches, typically approximately 0.5 m deep and 1 m wide, laid on a sand bed and backfilled using suitably graded material. The trenches will also carry earthing and communication cables for the operation of the Proposed Development. Cabling will mainly be located adjacent to the access tracks within the wind farm itself. An indicative cable trench is shown in **Figure 3.11**.

3.2.47. The substation facility will be approximately 3600 $m^2$ to incorporate a substation and control room building, and potentially some external electrical equipment. The substation and control building will accommodate all the equipment necessary for automatic remote control and monitoring of the Proposed Development, in addition to the electrical switchgear, fault protection and metering equipment required to connect the Proposed Development to the electricity transmission network. Depending on the nature of the connection, there may be external electrical infrastructure adjacent to the control building. An indicative substation layout and elevation drawing are provided in **Figure 3.12 and Figure 3.13**.

3.2.48. A separate energy storage facility with battery capacity with an output of around 10 MW will be located adjacent to the control building. The energy storage facility will be approximately 2000 $m^2$. An indicative layout for the energy storage facility is shown in **Figure 3.14**.

3.2.49. Details of the final design of all components of the substation and energy storage compound are proposed to be secured through an appropriately worded condition.

### *Borrow Pits*

3.2.50. To minimise the volume of imported material brought onto the site and any associated environmental impact, borrow pits located within the site will be used to source stone for access track and compound construction.

3.2.51. Two borrow pit search areas (BP-A and BP-B) have been identified within the Proposed Development boundary; these are shown on **Figure 3.2.** As described in **Chapter 2: Site Selection and Design Iteration**, these search areas were identified as areas anticipated to have suitable bedrock geology (based on British Geological Survey mapping), shallow peat depth and suitable topography, sited to minimise visual impacts as well as making use of an existing borrow pit utilised for the construction of the Beauly Denny line (BP-A).

3.2.52. Detailed site investigations prior to construction will be carried out to further confirm the rock type, rock characteristics and suitability, as well potential volumes to be extracted from the search area. The final borrow pit(s) identified during the geotechnical evaluation will be defined within the Construction Environmental Management Plan (CEMP) (refer to **Appendix 3.1** Outline CEMP). The pollution control measures to be implemented during usage of the borrow pit(s) and its reinstatement will also be covered within this document.

3.2.53. The borrow pits will require the use of plant to both win and crush the resulting rock to the required grading. It is anticipated that rock will be extracted by breakers and other relevant methods that may be required. Noise associated with stone extraction is discussed further in **Chapter 10: Cultural Heritage.**

3.2.54. Environmental considerations have influenced the location of the borrow pit search areas to minimise the effect on ecology, hydrology and landscape, and to allow successful reinstatement measures to be put in place as appropriate. Following, the borrow pit(s) will be restored and reinstated to agreed profiles.

## 3.3. Construction

3.3.1. The Proposed Development will be constructed over a period of approximately 24 months. Construction would include the principal activities listed within the indicative construction programme as provided in **Table 3.4** below.

**Table 3.4: Indicative Construction Programme**

| Task | Year 1 (quarters) | | | | Year 2 (quarters) | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Mobilisation | | | | | | | | |
| Access & Site Tracks | | | | | | | | |
| Foundations | | | | | | | | |
| On-site Cabling | | | | | | | | |
| Substation civils works | | | | | | | | |
| Substation construction | | | | | | | | |
| Crane Hardstanding | | | | | | | | |

| Task | Year 1 (quarters) | | | | Year 2 (quarters) | | | |
|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Turbine Delivery | | | | | | | | |
| Turbine Erection | | | | | | | | |
| Commissioning & Testing | | | | | | | | |
| Site Reinstatement | | | | | | | | |

3.3.2. Normal construction hours will be between 07:00 and 19:00 Monday to Friday and 07:00 and 13:00 on Saturdays. These times have been chosen to minimise disturbance to local residents. It must, however, be noted that out of necessity due to weather conditions and health and safety requirements, some generally quiet activities, for example abnormal load deliveries (which are controlled by Police Scotland) and the lifting of the turbine components, may occur outside the specified hours stated.

### *Construction Materials*

3.3.3. The main materials likely to be required in part or total for the construction of the track, turbine and substation foundations, and hardstanding areas are described below:

- crushed stone
- geotextile;
- cement;
- concrete;
- steel reinforcement; and
- electrical cable.

3.3.4. Excavations will be made, initially by stripping back the soil from the area to be excavated. This soil will typically be stored separately either in a mound adjacent to the excavation area for backfill, if required, or stored at a designated area on site for further use or reinstatement of temporary works areas. The handling of soils will be undertaken in accordance with best practice techniques.

3.3.5. For the purposes of the transport assessment, it has been assumed that concrete will be batched on site within the identified concrete batching areas and materials will be delivered to site on a spread programme.

3.3.6. Should surface water run-off or groundwater enter the excavation during construction of the turbine foundations, appropriate pumping measures away from watercourses will be implemented to ensure the works are safely carried out and the excavation is sufficiently dry to allow concrete placement. Once the concrete is cast, the excavated material will be used for backfill and compacted to the required design density. Once this backfill is completed, the crane hardstanding areas will be constructed.

3.3.7. The proposed method for constructing the turbines is as follows. The turbines will be erected using a large mobile crane or crawler crane, positioned on the hardstanding adjacent to the turbine base. A smaller tail crane will be positioned adjacent to the delivery position of the turbine components. The two cranes will lift the tower sections and blades into their assembly positions, and the main crane will lift the tower sections, nacelle and blades into their operational positions.

3.3.8. As soon as practical, once installation is complete, the immediate construction area will be restored to its original profile, although the crane hardstandings will be retained for future

maintenance. The soils will be replaced and reseeded where appropriate and as advised by the on-site Environmental Clerk of Works (ECoW). Any surplus soils will be used to restore track edges after construction. This progressive reinstatement has been found to assist with re-establishment of the local habitats as it minimises the time soils are in storage.

## 3.4. Environmental Management

### *Construction Environmental Management Plan (CEMP)*

3.4.1. As part of the construction contract, the contractor responsible for undertaking the construction and/or decommissioning works (the Contractor) shall sign up to produce, and adhere to, a CEMP. The CEMP shall be developed in accordance with *'Good Practice During Wind Farm Construction'* (Scottish Government et al., 2019).

3.4.2. The CEMP shall describe how the Applicant will ensure suitable management of the following environmental issues during construction of the Proposed Development:

- noise and vibration;
- dust and air pollution;
- surface and ground water;
- ecology (including protection of habitats and species);
- ornithology;
- cultural heritage;
- waste (construction and domestic);
- pollution incidence response (for both land and water); and
- site operations (including maintenance of the construction compound, working hours and safety of the public).

3.4.3. The CEMP is anticipated to include or cross-refer to the following documentation:

- Construction Methodology Statement (CMS);
- Traffic Management Plan (TMP);
- Pollution Prevention Plan (PPP);
- Site Waste Management Plan (SWMP);
- Drainage Management Plan (DMP);
- Borrow Pit Management Plan (BPMP)
- Peat Management Plan (PMP) (refer to an outline plan in **Appendix 9.2**); and
- Biodiversity Enhancement Management Plan (BEMP) (refer to an outline plan in **Appendix 8.6**).

3.4.4. The contractor and/or Applicant shall consult with THC, Scottish Environment Protection Agency (SEPA), NatureScot and Historic Environment Scotland (HES) on relevant aspects of the CEMP. The contractor shall amend and improve the CEMP as required throughout the construction and decommissioning period.

3.4.5. The CEMP shall contain details of all environmental mitigation required during construction and details on how the contractor will implement and monitor this mitigation. The CEMP will also contain details on how the contractor will liaise with the public and landowners and how queries or complaints will be responded to.

3.4.6. Specific requirements of the CEMP for each of the environmental topics assessed within the EIA are provided in the relevant EIA Report chapters and an outline CEMP is provided in **Appendix 3.1.**

### *Pollution Prevention & Health and Safety*

3.4.7. Prior to commencement of construction activities, a pollution prevention strategy, contained within a CEMP, will be agreed with the SEPA to ensure that appropriate measures are put in place to protect watercourses and the surrounding environment.

3.4.8. As with any development, during the construction stage there is the potential for threats to the quality of the water environment in waterbodies, watercourses and local ditches. These mostly arise from poor site practice so careful attention will be paid to the appropriate guidance and policies to reduce the potential for these to occur.

3.4.9. Any fuel or oil held on-site will only be of an amount sufficient for the plant required. This will be stored in a bunded area to prevent pollution in the event of a spillage. There will be no long-term storage of lubricants or petrochemical products on-site at the Proposed Development.

3.4.10. High standards of health and safety will be established and maintained. At all times, all activities will be undertaken in a manner compliant with applicable health and safety legislation and with relevant good practice, as defined under applicable statutory approved codes of practice and guidance.

3.4.11. Further details of site-specific storage and management of fuel and oil and protection of watercourses during construction are presented in **Chapter 9: Hydrology, Geology and Hydrogeology** of this EIA Report.

### *Traffic & Transportation*

3.4.12. A detailed Transport Assessment has been undertaken which provides details regarding transport and access to the site (refer to **Chapter 12: Traffic and Transport**).

3.4.13. Traffic associated with the construction and maintenance of the Proposed Development falls into two main categories, namely Abnormal Indivisible Loads (AIL) and Construction / Maintenance Loads. The abnormal loads are those that will require an escort, either by private contractor or by police escort. Construction / maintenance loads are those that do not require any special escort or permissions and are only influenced by normal traffic regulations.

3.4.14. The Applicant will ensure that the vehicles will be routed as agreed with THC, Transport Scotland and Police Scotland, to minimise disruption and disturbance to local residents and road users. Further details regarding transport and access can be found in **Chapter 12: Traffic and Transport** of this EIA Report.

### *Pre-construction Surveys*

3.4.15. Detailed surveys have informed the design process of the Proposed Development. However, certain design elements are dependent on turbine model and manufacturer, therefore detailed construction details will be decided once the turbine has been selected.

3.4.16. Pre-construction surveys will be undertaken to update the ecological and ornithological baseline and to perform detailed geotechnical ground surveys, further details of these are provided in the relevant technical chapters.

3.4.17. The Applicant will engage an ECoW onsite during the construction phase. The ECoW will be responsible for pre-construction surveys and will monitor the construction process on site to provide advice and ensure that the measures within the CEMP are followed.

## 3.5. Operation & Maintenance

3.5.1. The lifetime of the Proposed Development is envisaged to be 35 years from the date of final commissioning to commencement of decommissioning.

3.5.2. The Proposed Development would be maintained throughout its operational life by a service team. The service team would comprise of operation management, operations technicians and support functions undertaking the scheduled and unscheduled maintenance throughout the year. This team would either be employed directly by the developer or by the turbine manufacturer. Management of the wind farm would typically include turbine maintenance, health and safety inspections and civil maintenance of tracks, drainage and buildings. Turbine and BESS maintenance includes the following:

- Civil maintenance of tracks and drainage;
- Scheduled routine maintenance and servicing;
- Unplanned maintenance or call outs;
- High Voltage (HV) and electrical maintenance; and
- Blade inspections.

3.5.3. In the unlikely event that a major turbine component requires replacement, vehicles will use the new access tracks and crane pads, which will be retained during the operational phase to allow access.

3.5.4. Health and safety will be controlled as set out in the construction phase.

### *Operation Environmental Management Plan (OEMP)*

3.5.5. The Applicant will implement an Operation Environmental Management Plan (OEMP). Similar to the CEMP, the OEMP will set out the mitigation measures proposed in the EIA Report and how the Applicant will manage and monitor environmental effects throughout the operation of the Proposed Development. The OEMP will also be developed in consultation with THC, SEPA, NatureScot and HES where relevant.

### *Aviation Lighting*

3.5.6. As the turbine structures are over 150 m high, there is a statutory requirement to install visible aviation lighting on the turbines. Proposed lighting scheme has been agreed with the Civil Aviation Authority (CAA) and Ministry of Defence (MoD) (**Appendix 14.1**). The specification of the lighting proposed is provided in **Chapter 14: Aviation.**

## 3.6. Decommissioning

3.6.1. Consent is being sought for an operational lifespan of 35 years from the date of commissioning the turbines. For the purpose of the EIA Report, it is assumed that the Proposed Development will be decommissioned unless further consents to extend operational life are sought.

3.6.2. It is expected that decommissioning will take approximately 12 months. The environmental effects of decommissioning are considered to be similar to those during construction, excluding the loss of habitat which will have already occurred under construction. Decommissioning is anticipated to be a much shorter process than the approximate 24-month construction period.

3.6.3. Prior to decommissioning, a Decommissioning Environmental Management Plan (DEMP) will be produced to reflect then current legislation and policy and will be agreed with the relevant statutory authorities.

3.6.4. During decommissioning vehicles will access the site by the same route used for delivery and construction of the Proposed Development.

3.6.5. It is anticipated that certain components of the turbines will be dismantled and removed from site for disposal and/or recycling as appropriate and in accordance with regulations in place at the time. It is proposed to leave the buried portion of the foundations of the turbines in situ on decommissioning. This is considered to have less impact on the hydrological system which will

have established itself during the lifetime of the wind farm than complete removal of the foundations.

## 3.7. Climate Change & Carbon Considerations

3.7.1. Increasing atmospheric concentrations of greenhouse gases (GHGs), including carbon dioxide ($CO_2$) (also referred to as carbon emissions) are resulting in climate change. A major contributor to this increase in GHG emissions is the burning of fossil fuels. With concern growing over climate change, reducing its cause is of utmost importance. The replacement of traditional fossil fuel power generation with renewable energy sources provides high potential for the reduction of GHG emissions. This is reflected in UK and Scottish Government climate change and renewable energy policy and commitments. The relevant aspects of such policies are summarised in **Chapter 5: Planning and Energy Policy.**

### *Energy Generation*

3.7.2. Whilst the Proposed Development will reduce carbon emissions by replacing the need to burn fossil fuels for power, carbon emissions will result from the component manufacturing, transportation and installation processes associated with the Proposed Development. There is also the potential for carbon fixers and sinks to be lost through the clearing of vegetation during construction. There must, therefore, be a sufficient balance between the carbon reduction associated with renewable energy development and that which is produced through construction and fabrication processes and lost through site preparation (see Carbon Calculator in **Appendix 9.4**).

3.7.3. The combined electrical installed capacity from the wind turbine generators within the Proposed Development is currently estimated to be approximately 57.6 MW, with the exact capacity depending on the model and type of turbine selected. Based on the Proposed Development's location and estimated capacity factor, the annual indicative total electricity wind turbine output for the site would be an estimated 199,307 megawatt-hours (MWh), per annum[1]. This is a minimum overall output for the Proposed Development.

3.7.4. Based on the average electricity consumption per UK household in 2021 of 3.295 MWh/year (BEIS, 2021) and assuming generation of 199,307 MWh annually, the Proposed Development would generate enough power to supply approximately 60,487 average Scottish households[2].

### *Carbon Emission Savings*

3.7.5. Whilst the wind turbines will reduce carbon emissions by replacing the need to burn fossil fuels for power, there is the potential for carbon fixers and sinks to be lost through the clearing of vegetation and peat for construction. There must therefore be a sufficient balance between the carbon reduced and that which is produced and lost through associated processes.

3.7.6. The Scottish Government's online Carbon Calculator Tool V1.7.0 has been completed for the Proposed Development. Input parameters are based on the proposed site design, infrastructure dimensions, results from peat depth surveys and laboratory testing of peat, and other information gained from site survey work, desk study and, where applicable, assumptions relating to groundwater, drainage, and habitat regeneration. See **Appendix 9.4**.

[1] Calculated from 57.6 x 8760 (number of hours per year) x 0.395 (load factor for the Proposed Development turbines).
[2] Based on average annual Scottish household electricity consumption of 3.295 MWh, from BEIS Subnational Electricity and Gas Consumption Statistics, Regional and Local Authority, Great Britain, 2021 (UK Government, December 2022)

3.7.7. The output from the Carbon Calculator indicates the expected total carbon dioxide loss for the Proposed Development (from manufacture of turbines, construction, decommissioning, and carbon sink losses, also taking account of gains due to restoration of borrow bits) is 151,511 tonnes of carbon dioxide (tCO2 eq). Input and output parameters are detailed in **Appendix 9.4**.

3.7.8. Scottish Government guidance on wind farm carbon savings (Scottish Government, 2018), states: "carbon emission savings from wind farms should be calculated using the fossil fuel sourced grid mix as the counterfactual, rather than the grid mix." Taking account of the expected total CO2 loss from the Carbon Calculator result, the Proposed Development would be expected to result in a saving of approximately 86,101 tonnes of carbon dioxide (tCO2) per annum, meaning a total of over 3 million tonnes over the 35-year operational lifetime of the Proposed Development, through displacement of carbon-emitting generation.

3.7.9. The expected carbon payback time of the Proposed Development is 2 years. This is the period of time for which a wind farm needs to be in operation before it has, by displacing generation from fossil-fuelled power stations, avoided as much carbon dioxide as was released in its lifecycle.

3.7.10. As recommended in current guidance estimated savings are for replacement of fossil fuel electricity generation but, while this could be the case in the short term, it is not the most probable scenario in the longer-term. The grid-mix of electricity generation represents the overall carbon emissions from the grid per unit of electricity and includes nuclear and renewables as well as fossil fuels. Based on the grid-mix results, the Proposed Development is expected to result in a saving of approximately 38,542 tCO2 per annum with an expected carbon payback time of 4.5 years.

## 3.8. Public Access

3.8.1. Access to the site is to be taken from a new simple priority junction on the U1667 Ardachy Road, located approximately 520 m to the north-east of its junction with the A82 trunk road. There are some Core Paths in the vicinity of the site but access will not be restricted to any of these during construction or operation.

3.8.2. There are no Core Paths within the site boundary or the wider Culachy Estate. There are however a number of local tracks / paths which intersect the site. The most used path being the Corrieyairack Pass which runs between Laggan and Fort Augustus. Sections of the Corrieyairack Pass are designated as Scheduled Monuments.

3.8.3. The proposed site access track will cross the non-designated section of the Corrieyairack Pass, approximately 500 m south of the site access junction and a crossing point will be formed at this location.

3.8.4. An outline Outdoor Access Management Plan (oOAMP) is included in **Appendix 3.2**. Which outlines how public access will be managed during the construction and operation of the Proposed Development.

## 3.9. Community Benefit

3.9.1. Based on a total installed capacity of 57.6 MW and a community benefit contribution of £5,000 per MW of installed wind energy capacity, the Proposed Development could generate up to £288,000 per annum to support local groups and projects in the areas surrounding the site. Further information on the Proposed Development's socio-economic benefits can be found in **Chapter 13: Socio- Economics, Tourism and Recreation.**

## 3.10. Forestry

3.10.1. The extent of woodland within the site is limited to areas along the access route in the north-west of the site associated with the Connachie Burn and its minor tributaries including some small enclosures of more recently planted native and mixed woodlands.

3.10.2. As the Proposed Development utilises existing infrastructure in the sections it crossed through ancient woodland the impact of the infrastructure on the woodland is negligible. However, 20 m operational disturbance corridors have been considered as part of the forestry assessment (**Appendix 3.3**) with the potential to impact 1.53 ha of woodland or land with the potential to facilitate native woodland expansion.

3.10.3. A compensation area has been identified adjacent to the Glen Tarff SSSI which is suitable to provide 3.88 ha of woodland creation through natural regeneration. This would be achieved through deer fencing and excluding browsing animals from a total area of 6.62 ha. This exceeds compensatory planting guidelines in the Control of Woodlands Policy and NPF4 Forestry, while securing biodiversity enhancement with expansion of a designated area.

## 3.11. Summary

3.11.1. This chapter has provided a description of the site and the surrounding area, alongside details of the Proposed Development and a summary of the associated infrastructure. A description of the likely activities to occur during the construction, operation and decommissioning phases is also provided.

3.11.2. The Proposed Development also includes four areas for biodiversity compensation and enhancement activities (678 ha in total), giving the Proposed Development a 12% biodiversity net gain.

## References

Scottish Government, Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science, and AEECoW (2019). Good Practice during Wind Farm Construction (4th Edition). Available at: https://www.nature.scot/guidance-good-practice-during-wind-farmconstruction

BEIS - Department for Business, Energy and Industrial Strategy (2021). Digest of United Kingdom Energy Statistics 2021. Available at: https://www.gov.uk/government/statistics/renewablesources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

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