

4 Project Description

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4. Project Description

Executive Summary

This chapter of the EIA Report provides a description of the site and its geographical context and presents a description of the Proposed Development. This includes details of the turbine locations, infrastructure components, and details of construction, operation and decommissioning details.

4.1 Introduction

4.1.1 This chapter provides a description of the site and its geographical context and presents a description of the Proposed Development. This includes details of the infrastructure components, and construction, operation and decommissioning details.

4.1.2 This chapter is supported by the following figures and technical appendices:

- Figure 1.2 – Proposed Development Layout
- Figure 4.1 - Turbine Elevation
- Figure 4.2 – Typical Foundation Design
- Figure 4.3 – Typical Hardstanding
- Figure 4.4 – Typical Access Track Cross Section
- Figure 4.5 – Proposed Access Track and Watercourse crossing Plan
- Figure 4.6 – Typical Watercourse Crossing Cross Section
- Figure 4.7 – Indicative Substation Compound
- Appendix 4.1 – Hydro Tunnel Assessment Report
- Appendix 4.2 – Outline Construction Environment Management Plan

4.2 Site Status & Context

4.2.1 The Proposed Development site is located in Sutherland approximately 18.3 km north-west of Lairg on the shores of Loch Shin. The central grid reference for the site is BNG 240730, 921063 and it occupies an area of approximately 1,044 ha. The site location and boundary are shown within Figure 1.1.

4.2.2 The site sits within Sallachy Estate, which has two holiday cottages, one lodge and approximately 6,000 hectares of Forest Stewardship Council (FSC) certified woodland. The site itself comprises largely open moorland which slopes down to the south shore of Loch Shin and is intersected by several minor watercourses draining down to the loch. The current land use for the site is mainly game stalking, and there is evidence across the site of the presence of deer.

4.2.3 The site is located within the Reay – Cassley Wild Land Area and is adjacent to the Strath an Loin Site of Special Scientific Interest (SSSI) which is part of the Caithness and Sutherland Peatland Special Protected Area (SPA), Special Area of Conservation (SAC) and Ramsar site.

4.2.4 There are few residential properties in the locality, the closest of which are across Loch Shin, approximately 2.3 km north-east (to the nearest turbine). The closest settlement is Lairg, approximately 18.3 km to the south-east.

- 4.2.5 Access to the site is off the A838, along an existing access track which runs along the north-western boundary of the site. This is owned by Scottish and Southern Energy (SSE) and connects the A838 with the two hydropower stations which are located at the north end of Loch Shin and on River Cassley to the south-west of the site. There is infrastructure associated with the hydropower stations in the vicinity of the site, including a substation, an underground tunnel connecting the two, a ventilation shaft and a power line.
- 4.2.6 There is a telecommunication mast located adjacent to the site, on the northern side of the existing access track.

4.3 Description of the Proposed Development

4.3.1 The Proposed Development is comprised of the following main components:

- 9 wind turbines, up to 149.9 m from ground to blade tip;
- turbine foundations and crane hardstandings;
- 8.9 km of existing access track and 7.0 km of new access track;
- approximately 48 new watercourse crossings;
- underground electrical cabling;
- 1 temporary construction compound; and
- 1 temporary borrow pit search area.

4.3.2 The Proposed Development will connect to the National Grid via an onsite substation. The proposed location of the substation compound is on the edge of Loch Shin near to the hydro power station. This proposed location is for indicative purposes only as the substation will be subject to a separate planning application.

4.3.3 The final Proposed Development layout is illustrated in Figure 1.2 and each of the components are described in more detail below.

Turbines and Turbine Foundation

4.3.4 The Proposed Development will comprise nine wind turbines which would be a maximum height of 149.9 m from ground to blade tip. The total anticipated installed capacity of the Proposed Development will be up to but no greater than 49.9 MW.

4.3.5 The specific turbine manufacturer and model has not been selected yet and will be dependent on the available technology at the time of construction. For the purposes of the EIA, a candidate turbine with an applicable scale and capacity has been used for assessments.

4.3.6 The proposed final locations of the turbines have been defined in order to enable the EIA to describe fully the Proposed Development for which permission is being sought. The BNG coordinates denoting where each of the turbines are proposed to be located are detailed in Table 4.1 below.

Table 4.1 - Wind Turbine Coordinates (BNG)

Turbine No.	Easting	Northing
T1	243439	919342
T2	243065	919527
T3	242694	919707

Turbine No.	Easting	Northing
T4	242305	919882
T5	241969	920124
T6	241612	920316
T7	241085	920462
T8	240594	920682
T9	240252	920909

4.3.7 As noted in Chapter 1, a micro-siting allowance of 50 m in all directions is being sought for each of the turbine locations and its associated infrastructure in order to address any potential difficulties which may arise in the event that preconstruction surveys identify unsuitable ground conditions or environmental constraints that can be avoided. It is proposed that the final positioning will be addressed through an appropriately worded condition. The assessments within this EIA Report have included for this 50 m micro-siting allowance and does not alter the conclusions formed.

4.3.8 Each of the turbines will comprise the following components:

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

4.3.9 The turbines will be a typical modern, three-blade, horizontal axis design in semi-matt white or light grey. Each turbine will be mounted on a tapered tubular steel tower and consist of a nacelle containing the gearbox or direct drive, generator and associated equipment, to which are attached a hub and rotor assembly including three blades. Figure 4.1 provides an elevation drawing of a typical turbine. A transformer will be sited within the base of each tower.

4.3.10 The turbine foundations are anticipated to be an inverted “T” in section consisting of a reinforced central concrete pedestal with a reinforced concrete slab. The tower is proposed to be attached to the foundations via an anchor cage which is then screwed to the tower. The actual foundation design will be specific to site conditions verified during detailed site investigations undertaken prior to construction commencing. Figure 4.2 provides an illustration of a typical foundation design.

4.3.11 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 approximate dimensions of the reinforced concrete foundations are assumed to be 25 m in diameter and 3 m in depth.

Crane Hardstanding

4.3.12 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 crushed stone hardstanding area measuring approximately 4,575 m², with a typical thickness of approximately 0.5 m. 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. Figure 4.3 provides an illustration of a typical hardstanding.

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

Access to the Proposed Development Site

- 4.3.14 All traffic will access the site from the A838, travelling north from Lairg, then along the shores of Loch Shin to the junction with the existing access track at Corriekinloch. Once a turbine model is selected and site-specific topographical survey work has been completed, detailed design works will be undertaken to confirm the extent and nature of works required at the site access junction.
- 4.3.15 It is anticipated that turbines will be delivered to port at Invergordon. Further details of this can be found within the Transport Assessment (refer to Chapter 11).
- 4.3.16 As mentioned above, the existing access track is owned by SSE for access to the two hydropower stations. There is a gate at the junction at Corriekinloch which prevents any access by unauthorised vehicles, however access on foot is permitted. Should consent be granted, access conditions for members of the public will remain as they currently are, in accordance with the Land Reform (Scotland) Act 2003 (Scottish Government, 2003).
- 4.3.17 The existing access track has a width of approximately 2.5 m and is approximately 8.9 km in length from the A838 to the site. It is anticipated that to allow the delivery of turbine components the access track will need to be widened to 5 m width. The existing access track also has two watercourse crossings which will require upgrading.
- 4.3.18 Prior to construction, appropriate highway safety measures will be agreed with The Highland Council (THC), with necessary signage or traffic control measures implemented throughout the construction phase on the agreed basis.

On-Site Access Tracks

- 4.3.19 The new access tracks within the site will be approximately 5 m wide, with greater widths on bends and at junctions. It is anticipated that approximately 7.0 km of new access track will be constructed. Approximately 3.9 km of this will be excavated and 3.1 km will be floated.
- 4.3.20 Construction of the excavated access tracks will require stripping existing unsuitable material to a suitable bearing or the designed formation and placing a filter membrane and/or geotextile reinforcement membrane on the ground, dependent on the site conditions. Aggregate will then be layered, with the access track capped with a layer of Type 1 (unbound aggregate mixture) or similar material. Figure 4.4 provides an illustration of a typical access track cross section.
- 4.3.21 Construction of the floating access tracks will require the placing of a geotextile membrane on existing topsoil and vegetation followed by aggregate layers. Depending on ground conditions two or more layers of geotextile will be placed and the access tracks will be capped with a layer of Type 1 or similar material.
- 4.3.22 The proposed layout of access tracks within the site is shown on Figure 4.5.

Watercourse Crossings

- 4.3.23 A number of minor watercourses will be crossed by the proposed access tracks within the site. The design of each crossing will depend on the watercourse.
- 4.3.24 A total of approximately 48 new watercourse crossings will be constructed on site. The watercourse crossings comprise four watercourses identified in OS 1:25,000 mapping, and the remainder being

minor land drains. Figure 4.5 shows the location of all the watercourse crossings and these are discussed in more detail in Appendix 12.3. Figure 4.6 provides an illustration of a typical watercourse crossing cross section.

- 4.3.25 The design of each crossing will be determined at detailed design, following ground investigations and it is proposed that the final solution and detailed design for all water crossings will be addressed through an appropriately worded condition in order to ensure that the works comply with the Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011 (Scottish Government, 2011). Where necessary CAR licences for work affecting watercourses will be applied for post-consent, prior to construction commencing once final design has been reached.

Temporary Construction Compound

- 4.3.26 A principal temporary construction compound for the site will be required as a control centre for all site activities and to provide facilities for the day-to-day needs of the project and the workforce. The compound will be located adjacent to the existing access track, at the western edge of the main site area, as shown on Figure 1.2. It will be centred on BNG 238777, 923487 and will comprise an area of approximately 4,200 m².
- 4.3.27 The compound will house temporary portable cabin structures to be used as the main site office and welfare facilities, including toilets, kitchen and provision for sealed waste storage and removal. The area will also be used for the storage and assembly of turbine components, parking for vehicles, containerised storage for tools and small parts, and oil and fuel storage.
- 4.3.28 The detailed size and engineering properties of the construction compounds will be confirmed prior to the start of construction, after the turbine manufacturer and model have been confirmed. On completion of construction works, all temporary structures will be removed and the compound area will be restored to its previous state.

Temporary Borrow Pit Search Areas

- 4.3.29 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 track construction. A borrow pit is an area where material is excavated for use at another location.
- 4.3.30 One temporary borrow pit search area has been identified within the site, centred on BNG 238577, 922253 and approximately 20,000 m² in size. It is proposed that the actual borrow pit would be located within this search area. The location of the borrow pit search area is shown on Figure 1.2.
- 4.3.31 Detailed site investigations prior to construction will be carried out to further confirm the rock type, rock characteristics and suitability, as well as potential volumes to be extracted from the search area. The final borrow pit identified during detailed site investigations will be agreed with the Scottish Environment Protection Agency (SEPA) and THC prior to construction.
- 4.3.32 Appendix 4.1 contains an initial assessment of the potential risk of the borrow pit search area in relation to the hydro power tunnel which passes nearby. This was undertaken for the previously proposed twenty-two turbine scheme, and is still deemed relevant with relation to the proposed borrow pit search area as the location has remained relatively unchanged. The assessment determined that the tunnel could sustain appreciable levels of vibration such as those observed during construction. Blasting trials will be undertaken as part of detailed site investigation works prior to construction to determine the site vibration characteristics and appropriate levels for compliance. These would be agreed in consultation with SSE.

Grid Connection & Substation Compound

- 4.3.33 A substation will be installed on site that contains the necessary switchboards and metering system for operation of the Proposed Development. The substation compound will be approximately 5,000 m² in size and centred on BNG 239420, 923334 (refer to Figure 1.2). It is anticipated the substation compound will contain a control building and outdoor substation switchgear. An indicative drawing of the substation compound is illustrated in Figure 4.7. The final location and design of the substation compound is indicative only, as it is subject to a separate planning application, and will be subject to Scottish and Southern Electricity Networks (SSEN) specification and standards.
- 4.3.34 It is anticipated that from this substation an underground cable would be laid adjacent to the existing access track to connect to the existing substation at Corriekinloch.
- 4.3.35 Cables connecting the turbines to the substation will be laid in trenches adjacent to the access tracks and are anticipated to require lengths of approximately 18.5 km in total.
- 4.3.36 Negotiations are currently ongoing with National Grid regarding the grid connection proposal.

4.4 Construction

- 4.4.1 The Proposed Development will be constructed over a period of approximately 18 months, and construction is anticipated to commence in 2023. Normal construction hours will be between 07:00 and 18:00 Monday to Friday and 07:00 to 12:00 on Saturdays. No working will, under normal conditions, be undertaken on Sundays or public holidays, however it is noted that if required, certain activities such as abnormal load deliveries may occur outside of these specified hours. Advance warning of any works out with the normal working hours will be provided to THC Environmental Health Officer (EHO) and local residents. Details of the construction programme will be provided to THC in the Construction Environment Management Plan (CEMP) prior to the commencement of construction.
- 4.4.2 The construction programme will consist of the following principal operations, listed sequentially wherever possible. The Proposed Development will likely be phased so that certain activities will take place concurrently:
- construction of the temporary site compounds and establishment of temporary site facilities;
 - construction of access tracks, including construction of watercourse crossings, and excavation of cable trenches;
 - construction of wind turbine foundations, crane pad hardstanding areas and substation;
 - installation of underground cabling;
 - construction of concrete batching plant;
 - erection of wind turbines;
 - connection of on-site electrical power and signal cables;
 - commissioning of site equipment; and
 - site reinstatement and restoration of temporary works area.

Construction Materials

- 4.4.3 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.
- 4.4.4 For the purposes of the transport assessment, it has been assumed that concrete will be batched on site and materials will be delivered to site on a spread programme. A batching plant will be within the construction compound. It is anticipated that a total volume of 6,450 m³ of concrete will be required for the Proposed Development. Mitigation measures to ensure the protection of watercourses and habitats from the batching of concrete are detailed in Chapter 12.
- 4.4.5 Necessary 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. Principles for storage of excavated peat are defined in the Outline Peat Management Plan (Appendix 12.2).

Traffic & Transportation

- 4.4.6 A detailed Transport Assessment has been undertaken which provides details regarding transport and access to the site (refer to Chapter 11).
- 4.4.7 Construction 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 Police Scotland or a private contractor. Construction / Maintenance Loads are those that do not require any specific escort or permissions and are only influenced by normal traffic regulations.
- 4.4.8 The Applicant will ensure that vehicles will be routed as agreed with THC, Transport Scotland and Police Scotland, to minimise disruption and disturbance to local residents and road users.

Pollution Prevention & Health & Safety

- 4.4.9 Prior to commencement of construction activities, a pollution prevention strategy, contained within a CEMP, will be agreed with SEPA to ensure that appropriate measures are put in place to protect watercourses and the surrounding environment. Further details regarding the contents of the CEMP are provided later in this chapter.
- 4.4.10 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 (refer to Chapter 12 for further details).
- 4.4.11 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 and an oil interceptor will be installed in the construction compound to prevent pollution in the event of a spillage.
- 4.4.12 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.

4.4.13 Further details of site specific storage and management of fuel and oil and protection of watercourses during construction is presented in Chapter 12.

Construction Environmental Management Plan (CEMP)

4.4.14 As part of the construction contract, to ensure that all mitigation measures as set out within this EIA Report are carried out on site, the contractor responsible for undertaking the construction works shall 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).

4.4.15 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);
- agriculture (including protection of livestock and land);
- 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).

4.4.16 The CEMP is anticipated to include or cross-reference to, the following documentation:

- Construction Methodology Statement (CMS);
- Traffic Management Plan (TMP) (refer to outline proposals in Appendix 11.1);
- Pollution Prevention Plan (PPP);
- Site Waste Management Plan (SWMP);
- Drainage Management Plan;
- Peat Management Plan (PMP) (refer to an outline plan in Appendix 12.2); and
- Habitat Management Plan (HMP) (refer to an outline plan in Appendix 7.6).

4.4.17 The contractor and/or Applicant shall consult with THC, 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.

4.4.18 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.

4.4.19 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 4.2.

Pre-Construction Surveys

- 4.4.20 As mentioned above, 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.
- 4.4.21 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.
- 4.4.22 The Applicant will engage an Environmental Clerk of Works (ECoW) onsite during the construction phase. The ECoW 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.

4.5 Operation & Maintenance

- 4.5.1 The lifetime of the Proposed Development is envisaged to be 30 years from the final commissioning to commencement of decommissioning.
- 4.5.2 During operation, regular maintenance and servicing will be performed on each turbine. It is anticipated that the turbines will be monitored remotely and routine maintenance inspections and servicing visits by site management/technicians will occur at least twice per year per turbine. Additionally, there may be a need to conduct irregular, ad hoc maintenance in the event of a breakdown.
- 4.5.3 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.
- 4.5.4 Health and safety will be controlled as set out in the construction phase.

Operation Environmental Management Plan (OEMP)

- 4.5.5 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.

4.6 Decommissioning

- 4.6.1 At the end of the Proposed Development's operational lifespan of 30 years, it will be decommissioned, unless further consents are sought. 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.
- 4.6.2 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.
- 4.6.3 During decommissioning vehicles will access the site by the same route used for delivery and construction of the wind farm.
- 4.6.4 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.

4.7 Summary

- 4.7.1 The above chapter provides a description of the Proposed Development and an overview of the construction, operation and decommissioning methodology.
- 4.7.2 Environmental impacts will be controlled through the implementation of a CEMP which will be developed in consultation with THC, SEPA, NatureScot and HES where relevant.

4.8 References

Scottish Government (2003). Land Reform (Scotland) Act 2003. Available at:

<http://www.legislation.gov.uk/asp/2003/2/contents>

Scottish Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations

2011. Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made>

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-farm-construction>