

3 Project Description

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3 Project Description

3.1 Executive Summary

3.1.1 The Proposed Development would consist of up to four wind turbines, associated transformers and switchgear at each turbine as well as an energy storage system. The overall capacity of the Proposed Development would be approximately 22.8 MW¹. A number of ancillary elements are also proposed:

- turbine foundations & crane hard-standings;
- two new site entrances off the A836 (one permanent and one temporary);
- temporary and permanent access tracks;
- watercourse crossings;
- a network of underground cables;
- switching station and control building;
- temporary construction compound, storage area and car park;
- two temporary access compounds;
- three temporary borrow pit search areas; and
- a permanent 10m meteorological mast.

3.1.2 The word 'permanent' in the above description refers to the infrastructure being in situ for the lifetime of the Proposed Development and which will be decommissioned on cessation of operation.

3.1.3 The proposed site layout is shown in Figure 1.2.

3.1.4 It is anticipated that the construction phase would take approximately 12 months and environmental impacts will be controlled, mitigated and monitored through the implementation of a Construction Environmental Management Plan (CEMP).

3.2 Introduction

3.2.1 This chapter provides a description of the site and its geographical context and 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. In addition, this Chapter also describes the construction, operational and decommissioning processes.

3.2.2 Schedule 4, 1 (a) and (b) of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017) require that the EIA Report must include *"a description of the location of the development; and a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases"*

3.3 Site Status and Context

3.3.1 The Proposed Development site is located approximately 8km north of Lairg and 4km east of Loch Shin. The site is located within a single land holding at Shinness which is part of the wider Dalchork Wood and covers an area of approximately 79 hectares. The A836 runs parallel to the site western boundary for approximately 1km.

1 22.8MW is target capacity. Actual installed capacity may be greater or less dependent on turbine model and energy storage system selection but will not be greater than 50MW.

- 3.3.2 The site slopes gently down in a south-westerly direction with elevation across the site ranging from approximately 155m above ordnance datum (AOD) in the north-eastern site area to approximately 130m AOD in the south-west. The site is centred on British National Grid (BNG) Easting: 257880, Northing: 914516. The site boundary and location are shown in Figure 1.1.
- 3.3.3 The site comprises mainly plantation commercial forestry and scrub birch interspersed with areas of open moorland. One watercourse, Feith Osdail, flows from north-east to south-west through the southern portion of the site before joining the River Tirry, approximately 150 m from the south-western site boundary.
- 3.3.4 The nearest properties to the site boundary are a single residence known as Dalmichy, located 891m to the south, and a row of four dwelling known as Blairbuie, which are 1.2 km to the west.
- 3.3.5 The wider area around the site is a mixture of commercial forestry and agricultural land, with scattered residential properties and settlements. There are six operational and/or consented wind farms within 20 km of the Proposed Development site, with the closest being over 10 km from the Proposed Development.

3.4 Description of the Proposed Development

- 3.4.1 The Proposed Development would consist of up to four wind turbines, associated transformers and switchgear at each turbine as well as an energy storage system. The overall capacity of the Proposed Development would be approximately 22.8 MW². A number of ancillary elements are also proposed:
- turbine foundations & crane hard-standings;
 - two new site entrances off the A836 (one permanent and one temporary);
 - temporary and permanent access tracks;
 - watercourse crossings;
 - a network of underground cables;
 - switching station and control building;
 - temporary construction compound, storage area and car park;
 - two temporary access compounds;
 - three temporary borrow pit search areas; and
 - a permanent 10m meteorological mast.
- 3.4.2 The word ‘permanent’ in the above description refers to the infrastructure being in situ for the lifetime of the Proposed Development and which will be decommissioned on cessation of operation.
- 3.4.3 The proposed site layout is shown in Figure 1.2.
- 3.4.4 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 its 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. No micro-siting will be undertaken that results in an increase in the significance of adverse effects. It is proposed that the micro-siting of all infrastructure will be subject to an appropriately worded planning condition.
- 3.4.5 The assessments within this EIA report have included the considerations of this 50 m micro-siting and it does not alter the conclusions formed as to worst case effects.

2 22.8MW is target capacity. Actual installed capacity may be greater or less dependent on turbine model and energy storage system selection but will not be greater than 50MW.

Turbines and Turbine Foundation

3.4.6 The Proposed Development will comprise up to four wind turbines (refer to Figure 1.2).

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

Table 3.1 – Wind Turbine Coordinates (British National Grid)

Wind Turbine	Easting	Northing
Turbine 1	258083	914757
Turbine 2	257684	914717
Turbine 3	257800	914382
Turbine 4	258190	914303

3.4.8 Each of the wind turbines comprises of the following components:

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

3.4.9 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.

3.4.10 An elevation drawing of a typical wind turbine is illustrated in Figure 3.1. 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. The specific wind turbine manufacturer and model has not yet been selected as this is subject to an on-going tendering exercise and will be confirmed post consent. Therefore, for the purposes of the EIA, likely wind turbine dimensions and operational attributes, have been established as maximum development parameters.

3.4.11 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 from the tower. For the purpose of the EIA it has been assumed that the switchgear enclosure would be external and have approximate dimensions 3.6m long by 3.5 m wide by 3.8m high.

3.4.12 Wind turbine foundations are expected to comprise 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 20-25 m in diameter; and
- depth of the foundations approximately 3.5 m.

3.4.13 An illustration of a typical wind turbine foundation is provided in Figure 3.2. The actual foundation design will be specific to the site conditions as verified during detailed site investigations undertaken

before construction commences. In the unlikely event that ground conditions are unsuitable for the standard foundation design described above, an alternative foundation design may be required.

Hardstandings

- 3.4.14 To enable the construction of the turbines, a hardstanding area at each wind turbine location will be required to accommodate assembly cranes and construction vehicles. These will be constructed from crushed stone to an appropriate depth which will be informed by the turbine manufacturer specifications and the ground investigations. The hardstandings will remain in place during the lifetime of the Proposed Development to facilitate maintenance works.
- 3.4.15 In addition to the permanent hardstanding, temporary blade finger and crane pad areas will be constructed adjacent to each wind turbine. These will consist of crushed stone hardstandings, approximately 300mm in depth, covering an area of approximately 314 m². These temporary hardstandings will be removed and completely reinstated following construction.
- 3.4.16 The hardstanding areas are illustrated as part of the site layout on Figure 1.2.

Access to the Proposed Development Site

- 3.4.17 There are two proposed site accesses, both along the A836, one temporary during construction and the second permanent. The temporary access is located immediately north of the private Dalnessie Estate track on the south-west corner of the site boundary, while the permanent access is located approximately 840 m further north at the north-western corner of the site boundary.
- 3.4.18 The southern access would be temporary in nature and would be removed immediately following the construction phase of the Proposed Development.
- 3.4.19 The southern access would be the main inbound access for construction traffic. All loaded HGV traffic would enter the site at this location to avoid loaded vehicles crossing the Feith Osdail bridge.
- 3.4.20 The northern access junction would be permanent and is located to the north of the Feith Osdail bridge. This junction will be used for operational and maintenance access, as well as providing an exit for empty HGV traffic from the construction site. A small number of construction deliveries would be made to the northern access junction at the start of the construction phase for the delivery of plant and initial construction materials in advance of the internal track river crossing being complete.
- 3.4.21 The access junction would be designed to accommodate all predicted loads and traffic for both the construction and operational phases of the proposed development.
- 3.4.22 The access junctions would have the first 2m surfaced in a bituminous macadam and have appropriate junction markings and reflective junction markers. The throat of the junctions would be widened to a minimum of 5.5 m to ensure that opposing vehicles can pass in safety.
- 3.4.23 Visibility splays of 160 m in both directions with a set-back distance of 4.5 m from the centre of the junction would be provided.
- 3.4.24 The southern access will be fully restored and re-instated following construction.
- 3.4.25 A Transport Assessment (refer to Chapter 12 and Appendix 12.1) has been prepared in support of the application for the Proposed Development. This assessment provides greater details on access routes to the site for construction vehicles and includes a review of the proposed route, construction traffic impacts, and an abnormal load route review.
- 3.4.26 Prior to construction, appropriate highway safety measures will be agreed with The Highland Council (THC) and secure by condition, and any necessary signage and traffic control measures will be implemented throughout the construction phase on the agreed basis. A Construction Traffic Management Plan is provided in Appendix 12.2.

On-Site Access Tracks

- 3.4.27 There will be approximately 2,655 m access tracks within the site boundary, of which 730 m will be of a temporary nature and will be removed and re-instated post construction (refer to Figure 1.2). Where possible the design of the access tracks has followed existing rides through the forestry in order to limit felling requirements (refer to Chapter 2 for further details).
- 3.4.28 Construction of the permanent 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 (depending on site conditions) on the ground. Aggregate will then be layered on the membrane, before being capped with a layer of Type 1 or similar material.
- 3.4.29 The methodology of construction of the temporary access tracks, in particular the southern access track will be determined following ground investigations and agreed with SEPA.
- 3.4.30 The proposed layout of access tracks within the site is shown on Figure 1.2 and an illustration of a typical access track is provided in Figure 3.3.
- 3.4.31 Floating stone road or trackway panel construction will be used where vegetation is considered to be sensitive such as areas where Ground Water Dependent Terrestrial Ecosystems (GWDTEs) have been identified and which cannot be avoided. The track construction will ensure hydraulic connectivity is maintained by including measures such as the inclusion of a non-alkaline porous horizon within the track sub-base to prevent the track structure acting as a barrier to natural hydrogeological process.

Drainage

- 3.4.32 An outline drainage strategy is presented in Appendix 3.1. This provides details on the management of surface waters and foul water across the site, as well as detailed information for drainage related to tracks and hardstandings (SuDS).
- 3.4.33 A detailed drainage design will be undertaken and provided to SEPA and THC prior to construction. It is assumed that this can be secured by planning condition. Illustration of typical drainage design is provided in Figure 3.4.

Watercourse Crossings

- 3.4.34 The proposed access tracks within the site will cross a single watercourse; the Feith Osdail. The crossing is likely to be a single span structure due to the crossing width and likely design flood envelope at the crossing location (refer to Figure 3.5c).
- 3.4.35 Additional crossings of ten drainage ditches will be required around the Proposed Development site. These will mostly be closed pipe culvert structures (refer to Figure 3.5a), with the potential for one bottomless arched culvert type structure (refer to Figure 3.5b). Closed pipe culverts will be twin wall uPVC or pre-cast concrete pipes with cast in-situ headwalls (if required). The arch culvert will have cast in-situ strip footings with precast concrete or galvanised steel arch segments and will be designed in accordance with SEPA Good Practice Guidance (2010). The headwalls, if required, will be precast concrete.
- 3.4.36 Figure 9.6 shows the location of the watercourse crossings and Appendix 9.3 provides details of the watercourses at the location of these crossings.
- 3.4.37 The design of the crossings will be determined during the detailed design process, following ground investigations. It is proposed that the final solution and detailed design for the 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 2011 (also known as the Controlled Activities Regulations (CAR). Where necessary, a CAR licence for work affecting any of the watercourses, will be applied for post-consent, and prior to construction.
- 3.4.38 Illustrations of typical watercourse crossings, single span structure, pipe and arch culverts, are provided in Figures 3.5a, 3.5b and 3.5c.

Electrical Connection & Energy Storage

- 3.4.39 The electrical power produced by the wind turbines and energy storage system will be fed to the switching station and control building via underground power cables. The energy storage system, switching station and control building location is shown on Figure 1.2. The design of the switching station and control building is relatively flexible, subject to Scottish Hydro Electric Power Distribution (SHEPD) specification and standards, 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 the energy storage system is proposed to be secured by an appropriately worded condition.
- 3.4.40 Cables installed by the Applicant within the site will be laid in trenches, typically up to a maximum of 1.2 m deep and 1 m wide. Along with the power cables, these trenches will also accommodate earthing and communication cables. Cabling will be located mainly adjacent to the access tracks and with a suitable set back distance from waterbodies. The cables will be surrounded by sand (below and above) and the rest of the trench will be backfilled using suitably graded material.
- 3.4.41 The energy storage system, switching station and control building will be located within a compound approximately 100 m by 20 m. The switching station and control building is anticipated to have a height to ridge of around 6.2 m and be approximately 14m long by 8m wide. This building will accommodate all the equipment necessary for automatic control and remote monitoring of the Proposed Development as well as the electrical switchgear and metering equipment required for connecting the Proposed Development to the electricity distribution network. Depending on detailed electrical design and final distribution connection compliance requirements, there may be a need for external electrical infrastructure to be located adjacent to the switching station and control building.
- 3.4.42 A separate energy storage system, providing at least 6MW of storage capacity, will be located adjacent to and within the same compound as the switching station and control building. Details for the final design of the energy storage system, switching station and control building compound are proposed to be secured through an appropriately worded condition. Indicative energy storage system, switching station and control building plan and elevation drawings are provided in Figures 3.6 and 3.8.
- 3.4.43 The Applicant has secured a connection to the Lairg Substation via a Connection Agreement with Scottish Power Energy Networks. This connection is subject to a separate planning application.

Meteorological Monitoring Mast

- 3.4.44 A permanent onsite meteorological monitoring mast will be required to monitor wind speeds for the operational life span of the Proposed Development. The mast will be approximately 10 m tall and will be installed upon on a reinforced concrete foundation, approximately 4 m by 4 m. The meteorological monitoring mast will be a tilt tower type mast as shown on Figure 3.9.
- 3.4.45 The final location and height of the meteorological monitoring mast will be determined prior to construction of the Proposed Development. An indicative location for this mast is shown in Figure 1.2. It is proposed that these details and any requirements for aviation lighting will be addressed through an appropriately worded condition.

Temporary Construction Compounds

- 3.4.46 Three secure, temporary construction and material storage compounds will be required during the construction period. The locations of these compounds are shown in Figure 1.2. Their dimensions and locations are provided in Table 3.2.

Table 3.2 – Temporary Construction Compounds

Compound	Centred around BNG	Dimensions
Northern site access compound	E: 257418, N: 914785	15 m by 25 m, total area of 375 m ²
Southern site access compound	E: 257550, N: 913946	15 m by 25 m, total area of 375 m ²
Main construction compound (southern boundary of the site)	E: 258004, N: 914174	45 m by 100 m, total area of 4,500 m ²

- 3.4.47 The main construction compound will house temporary portable cabin structures which will be used as the main site office and welfare facilities during construction. These facilities will include toilets, clothes drying area, kitchen, meeting room, and provisions for sealed waste storage and removal. This compound 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.
- 3.4.48 The compounds will be constructed using the same methodologies as for the site access tracks and crane pads will be removed, and the land will be restored, following completion of the construction phase.
- 3.4.49 The detailed location, size and engineering properties of the construction compounds will be confirmed prior to the start of construction, after the wind turbine supplier and model have been confirmed.

Temporary Borrow Pit Search Areas

- 3.4.50 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. A borrow pit is an area where material has been excavated for use at another location.
- 3.4.51 Three temporary borrow pit search areas have been identified within the Proposed Development boundary; these are listed Table 3.3.

Table 3.3 – Borrow Pit Search Areas

Borrow Pit Search Areas	Centred around BNG	Dimensions
Borrow pit search area A	E: 257350, N: 914739	40 m by 40 m, total area of 1,600 m ²
Borrow pit search area B	E:257829, N: 914533	40 m by 40 m, total area of 1,600 m ²
Borrow pit search area C	E: 257895, N: 914399	40 m by 40 m, total area of 1,600 m ²

- 3.4.52 The locations of these borrow pits are shown in Figure 1.2.
- 3.4.53 Detailed site investigations will be carried out prior to construction to confirm the rock type, rock characteristics and suitability, as well potential volumes to be extracted from these search areas. The final borrow pit(s) identified during the geotechnical evaluation will be defined within the Construction Environmental Management Plan (CEMP) (refer to Section 3.5 below) and agreed with

SEPA and THC prior to construction. The pollution control measures to be implemented during usage of the borrow pit(s) and reinstatement of the borrow pit(s) will also be covered within the CEMP.

- 3.4.54 The borrow pit locations 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 any other relevant methods, that may be required. Noise associated with stone extraction is discussed in Chapter 10.
- 3.4.55 Environmental considerations have influenced the location of the borrow pit search areas to minimise the effect on ecology, hydrology (i.e. watercourses), geology (i.e. peat) and landscape, and to allow successful reinstatement measures to be put in place as appropriate. Following construction, the borrow pit will be restored and reinstated to agreed profiles.

3.5 Construction

- 3.5.1 The estimated onsite construction period for the Proposed Development is expected to take approximately 12 months and includes a programme to reinstate all temporary working areas. Normal construction hours will be between 07:00 to 18:00 on weekdays and 07:00 to 13:00 on Saturdays. There will be no working on Sundays or bank holidays. These times have been chosen to minimise disturbance to local residents and if required to be controlled, this will be agreed with THC via an appropriately worded condition. Deliveries of turbine components and erection may take place outside these hours to minimise disturbance.
- 3.5.2 Details of the construction programme will be provided to THC in the CEMP prior to the commencement of construction and secured via an appropriately worded condition.
- 3.5.3 Any construction out with these hours, due to construction time constraints (e.g. specific works that are required to be undertaken within one session), weather windows and/or health and safety requirements, will be in line with the noise limits as assessed in Chapter 10 (Noise) and advance warning of any works out with the normal working hours will be provided to THC Environmental Health Officer and local residents and community councils.
- 3.5.4 The construction programme will consist of the following principal aspects, listed sequentially wherever possible. The Proposed Development will likely be phased so that certain activities will take place concurrently:
- felling of woodland required for construction;
 - excavation of borrow pits;
 - establishment of the construction compounds which will contain a storage area for wind farm components and temporary site facilities;
 - construction of access tracks, including construction of drainage, and excavation of cable trenches;
 - construction of wind turbine foundations, hardstanding areas, met mast, energy storage system, switching station and control building;
 - cable laying;
 - erection of wind turbines;
 - connection of power, earthing and communication cables;
 - commissioning of the site equipment; and
 - site reinstatement and restoration of temporary works areas.
- 3.5.5 An indicative programme is shown below:

Table 3.4 – Indicative Construction Programme

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment												
General Site Deliveries												
Access Track Works												
Timber Extraction												
Bridge Deliveries & Works												
Reinforcement Deliveries												
Ready Mix Concrete Deliveries												
Cable Deliveries												
Cabling Sand												
Geotextile Deliveries												
Energy Storage System, Switching Station and Control Building Deliveries												
Cranage												
Reinstatement												
Abnormal Indivisible Loads (AIL) Deliveries												
AIL Escorts												
Commissioning												
Staff												

3.5.6 The main materials likely to be required in part or total for the construction of the track, wind turbine foundations, switching station and control building, hardstanding areas, water crossings and cable trenches are described below:

- crushed stone;

- precast concrete pipes or uPVC twin wall pipes for culverts
 - geotextile;
 - ready mixed concrete;
 - sand;
 - steel reinforcement; and
 - cable.
- 3.5.7 It is proposed that all the concrete will be batched offsite from local suppliers and transported to the Proposed Development site.
- 3.5.8 Should surface water run-off or groundwater enter any of the excavations required for the wind turbine foundations during construction, appropriate pumping measures to divert the run-off will be taken 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 backfilling and compacted to the required design density. Once this backfilling process is completed, the hardstanding areas will be constructed. Any excess material will be re-used on site, for example, as part of track construction.
- 3.5.9 The proposed method for constructing the wind turbines is as follows. The turbines will be erected using a large mobile crane or crawler crane, positioned on the hardstanding adjacent to the wind turbine foundation. 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 will lift the tower sections, nacelle and blades into their operational positions. The tail crane would be on hand to offer stability support during this operation.
- 3.5.10 As soon as practical, once installation is complete, the immediate construction area will be restored to its original profile, although the crane hardstanding's will be retained for future maintenance. The topsoil will be replaced and reseeded where appropriate as advised by an onsite Environmental Clerk of Works (ECoW). The EcoW will be responsible for pre-construction surveys and will be onsite throughout construction and post-construction as required. Further details of their role will be provided in the CEMP.

Traffic and Transportation

- 3.5.11 A detailed Transport Assessment is provided within Chapter 12 and Appendix 12.1 of this EIA Report.
- 3.5.12 Construction traffic associated with the construction and maintenance of the Proposed Development falls into two categories, namely Abnormal Indivisible Loads (AIL) and Construction/Maintenance Loads. Details of both types of vehicles are as follows:
- AILs:
 - wind turbine blade transporter;
 - nacelle/tower section transporter; and
 - assembly crane.
 - Construction/Maintenance Loads:
 - 4-axle large tipper Heavy Goods Vehicle (HGV);
 - standard low loader; and
 - land rover/transit vans, general personnel transport (cars/minibuses).
- 3.5.13 Preferred access routes are detailed in Chapter 12.

- 3.5.14 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.
- 3.5.15 The Applicant will ensure that the vehicles will be routed as agreed with THC to minimise disruption and disturbance to local residents. Further details regarding transport and access can be found in Chapter 12 of this EIA Report and control of traffic in the Construction Traffic Management Plan (refer to Appendix 12.2).

Pollution Prevention and Health & Safety

- 3.5.16 Prior to commencement of construction activities, a detailed 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.
- 3.5.17 As with any development, during the construction stage there is the potential for threats to the quality of the water environment in 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 9 (Geology, Hydrology & Hydrogeology)) for further details).
- 3.5.18 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.
- 3.5.19 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.
- 3.5.20 Further details of site-specific storage and management of fuel and oil and protection of watercourses during construction is presented in Chapter 9.

Construction Environmental Management Plan (CEMP)

- 3.5.21 As part of the construction contract, the Applicant will produce, and adhere to, a CEMP. The CEMP shall be developed in accordance with the “Good Practice during Wind Farm Construction” guidance document (2019 version) produced by Scottish Renewables, SNH, SEPA, Forestry Commission Scotland, Marine Scotland Science, Association of Environmental Clerk of Works and Historic Environment Scotland.
- 3.5.22 The CEMP shall describe how the Applicant will ensure suitable management of, but not limited to, 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);
 - forestry;
 - 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).
- 3.5.23 The Applicant shall provide the following for integration within the CEMP:

- details of all the environmental mitigation measures which are described within this EIA Report (refer to Chapter 18 (Schedule of Environmental Commitments)), that are required during construction of the Proposed Development;
 - details of how the Applicant will implement, monitor implementation and measure the effectiveness of the environmental mitigation measures;
 - details of how the Applicant will abide by the local and national legislative requirements e.g. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (amended 2013);
 - details of how the Applicant will implement and monitor construction best practice techniques e.g. control of noise and dust;
 - details of a Waste Management Plan which will include opportunities to reduce and re-use waste on site, recycling of waste which cannot be reused and disposal of waste to landfill; and
 - details on how the Applicant will liaise with the public and local landowners and how they will respond to any queries and/or complaints.
- 3.5.24 The Applicant shall consult with NatureScot (formerly SNH), Scottish Environment Protection Agency (SEPA), Historic Environment Scotland (HES) and THC on the relevant aspects of the CEMP. The Applicant shall amend and update the CEMP as required throughout the construction and decommissioning period.
- 3.5.25 The CEMP shall, where applicable, cross-reference and correspond with the Construction Traffic Management Plan (CTMP). The CTMP will detail the management of traffic to and from site, including abnormal loads and workers daily commutes. It shall also include mitigation for impacts to public transport, local private access and public foot paths; where required. The Applicant shall amend and update the CTMP as required throughout the construction and decommissioning period.
- 3.5.26 Specific requirements of the CEMP for each of the environmental topics assessed in the EIA are provided in the relevant EIA Report chapters and an outline CEMP is provided in Appendix 3.3.

3.6 Operation and Maintenance

- 3.6.1 During operation, only site maintenance vehicles and local utility company vehicles will normally be required on the site. Less than two visits per week to the switching station and control building and/or energy storage system and or wind turbines by maintenance personnel in four-wheel drive or conventional passenger vehicles will occur following the operation phase.
- 3.6.2 Any diesel or oil stored on-site will be held within an appropriately bunded location within/outside the switching station and control building.
- 3.6.3 Health and safety will also be controlled as in the construction phase, as set out above in paragraph 3.5.19.
- 3.6.4 In the event that there is a major turbine component failure which requires replacement, the southern access track will be re-instated and AIL delivering the components will use the same route as delivery of components during construction.

Operation Environmental Management Plan

- 3.6.5 The Applicant will implement an Operation Environmental Management Plan (OEMP). Similar to CEMP the OEMP will set out how the Applicant will manage and monitor environmental effects throughout operation period of the Proposed Development. The OEMP will be developed in consultation with NatureScot, SEPA and THC and will include but not be limited to:
- details on the track, water crossings and turbine maintenance;
 - the control and monitoring of noise;

- the control and monitoring of surface and groundwater;
- a pollution prevention plan and a pollution incidence response plan;
- details of how the Applicant will abide by the local and national legislative requirements e.g. The Water Environment (Controlled Activities) (Scotland) Regulations 2011; and
- a Habitat Management Plan and relevant protected species management plans (if required).

Carbon Balance

- 3.6.6 During operation the Proposed Development will generate 1,175,284MWh of electricity over its lifetime, saving 17,629 t CO_{2e} per year compared to fossil fuel mix produced electricity.
- 3.6.7 The Scottish Government’s Carbon Calculator determines the volume of carbon released during the construction of wind farm, through the manufacturing of the infrastructure, disturbance to peat and felling of woodland. This has determined that the average “pay-back period” for the Proposed Development would be 1.9 years (compared to fossil fuel mix electricity), following which the Proposed Development would be carbon saving. Refer to Appendix 3.3 for details of the inputs and outputs of the Carbon Calculator.

3.7 Decommissioning

- 3.7.1 Decommissioning would take approximately six months. The environmental effects of decommissioning are considered to be no greater than construction effects but experienced over a much shorter time period.
- 3.7.2 Either the restored temporary construction compound would be re-established or a new construction compound would be developed as agreed with THC at the appropriate time, to temporarily store decommissioned plant and equipment. The nacelles and blades would be removed using cranes situated on the crane pads as previously constructed. The towers would then be dismantled.
- 3.7.3 The majority of components would be removed from the site for disposal and/or recycling as appropriate and in accordance with regulations in place at that time. Depending on their disposal/recycling the southern access and track leading to the switching station and control building and energy storage system compound may need to be re-instated for decommissioning.
- 3.7.4 It is likely that exposed parts of the concrete foundations would be removed down to below 1m below the surface and the remaining volume of the foundations would remain in situ. It is considered that leaving in situ will cause less environmental impact than that of complete removal.
- 3.7.5 Hardstandings will be removed and/or grassed over, however it is likely that the access junction and sections of access track may be left in situ to assist with agricultural access. The CEMP will be updated prior to decommissioning by the Principal Contractor to reflect current legislation and policy and will be agreed with THC, NatureScot, SEPA and HES.

3.8 Summary

- 3.8.1 The above chapter provides a description of the Proposed Development and the construction, operation and decommissioning methodology.
- 3.8.2 Environmental impacts will be controlled through the implementation of a CEMP which will be agreed in advance of construction with THC, NatureScot, SEPA and HES.

3.9 References

European Commission (1992). *EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC*. Available at:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm.

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