CHAPTER 3: DESCRIPTION OF DEVELOPMENT

Figures (Volume 3)

Technical Appendices (Volume 4)

3. Description of Development

3.1 Introduction

3.1.1 This Chapter describes the elements that constitute the Proposed Development. It provides a description of the key development components and information regarding the construction, operation and decommissioning phases.

3.1.2 The Proposed Development is located on both Glendoe and Garrogie Estates within the Monadhliath Mountains, approximately 11km south-east of Fort Augustus and 14km west of Newtonmore, within the Highland region of Scotland.

3.1.3 The Proposed Development sits adjacent to Stronelairg Wind Farm and the operational 100MW Glendoe Hydroelectric Scheme. The Proposed Development comprises two main areas of turbines; an eastern cluster and a western cluster. It is intended that the Proposed Development would be designed, permitted, constructed and operated as a single project.

3.1.4 The Proposed Development would include the following key components, which are described in further detail in this Chapter and shown on Figure 3.1: The Proposed Development:

- Thirty six wind turbines of up to 149.9m tip height with internal transformers;
- Crane hardstanding and associated laydown area at each wind turbine location;
- On site access tracks (of which approximately 26km are new access tracks and approximately 29km are existing tracks where upgrades may be undertaken to facilitate delivery of the wind turbine components);
- A new on-site substation;
- A network of underground cabling to connect each wind turbine to the on-site substation;
- Up to two LiDAR units to collect meteorological and wind speed data, and associated hard stand; and
- Any associated ancillary works required.

3.1.5 In addition to the permanent components, the construction phase would comprise the following temporary facilities:

- Reuse of former main site compound area (utilised for Stronelairg Wind Farm and Glendoe Hydroelectric Scheme) adjacent to the B862, including welfare facilities, site cabins, and parking;
- Reuse of further site compound areas on the plateau, as well as storage areas;
- Batching plant facilities on the plateau for up to two temporary concrete batching plants;
- Temporary telecommunications infrastructure; and
- Borrow pits, comprising a combination of reuse of existing borrow pits created for Stronelairg Wind Farm, and new borrow pits.

3.1.6 The Proposed Development would utilise existing access tracks constructed for the Glendoe Hydroelectric Scheme and Stronelairg Wind Farm where possible, including the site entrance off the B862 and the main access track up to the plateau and through the wind farm site.

3.1.7 It is estimated that the maximum permanent development footprint of the Proposed Development would be approximately 32.77ha. During the construction period it is estimated that a further 28.35ha would be temporarily required which would be reinstated following completion of the construction works. The anticipated land-take requirements are set out in Table 3.1.

Table 3.1: Land Use

Wind Farm Component	Temporary Land Use (m^2)	Permanent Land Use (m^2)
Turbines, including adjacent Crane Hardstandings and Laydown Areas	70,969	129,992
New Cut Track	0	153,670
New Float Track	0	12,195
Passing Places	0	1,875
LiDAR		34.78
Borrow Pits	190,000	0
Temporary Construction Compounds, including concrete batching plant area	22,500	
Substation and Operations Building		30,000
Total (m2)	**283,469**	**327,766.78**
Total (ha)	**28.35**	**32.77**

3.2 Site Access

3.2.1 Access for the construction and operation of the site would be from the B862. Access to the site would be achieved by utilising the existing track infrastructure in place, initially built as part of the Glendoe Hydroelectric Scheme, upgraded and modified more recently during the construction of Stronelairg Wind Farm, as shown on Plate 3.1. The tracks are typically built to a high standard capable of accommodating construction vehicles and large wind turbine deliveries. The access track layout is shown on Figure 3.1: The Proposed Development.

Plate 3.1: Existing Track Infrastructure, Stronelairg Wind Farm

3.2.2 The preferred access strategy for the delivery of turbine components would be the same as that used during the construction of Stronelairg Wind Farm. It is anticipated that wind turbine blades would be delivered by sea to Kyle of Lochalsh and then transported by road via the A87 to Invergarry, the A82 to Fort Augustus and the B862 to the site entrance. The nacelle and hub sections would be delivered by sea to Corpach, and then transported by road via the A830 and the A82 to Fort Augustus, and the B862 to the site entrance. Further details are provided within Technical Appendix 13.2: Route Survey Report.

3.2.3 The full extent of any required improvement works would be determined following selection of the wind turbine for the site.

3.2.4 A Traffic Management Plan (TMP) would be prepared and agreed with The Highland Council (THC) and Transport Scotland prior to works commencing. Full details of the assessment of effects on the local road network are provided in Chapter 13: Traffic and Transport of this EIA Report, and a Framework TMP is included in Technical Appendix 13.1: Transport Assessment.

3.3 Core Development Components

Wind Turbines

Turbine Specification

3.3.1 The Proposed Development comprises 36 three-bladed horizontal axis wind turbines. The turbines are automatically controlled to ensure each turbine faces directly into the wind.

As a result of this, the orientation of the wind farm would alter with changes in wind direction.

3.3.2 The final choice of turbine would be dependent on economics and available technology at the time of construction, but would have a maximum blade tip height of 149.9m. Figure 3.2: Indicative Turbine Geometry shows dimensions and elevations for the proposed turbine. For the purposes of assessment within this EIA Report, where it has been necessary to identify a candidate turbine for assessment of a particular environmental topic (e.g. noise), this is specified within the relevant chapter and summarised in Table 3.2 below.

Table 3.2: Turbine Parameters Assumed for the Purposes of Assessment within this EIA Report

Topic	Nominal Rotor Diameter (m)	Nominal Hub Height (m)	Maximum Tip Height (m)	Turbine Model
General	138	80.9	149.9	Not specified
Landscape and Visual	138	80.9	149.9	Not specified
Ecology	138	80.9	149.9	Not specified
Ornithology	138	80.9	149.9	Not specified
Hydrology and Hydrogeology	138	80.9	149.9	Not specified
Geology and Carbon Balance	138	80.9	149.9	Not specified
Cultural Heritage	138	80.9	149.9	Not specified
Traffic and Transport	136	81.9	149.9	Vestas V136 4.3MW
Land Use and Recreation	138	80.9	149.9	Not specified
Aviation	136	81.9	149.9	Not specified
Noise	136	81.9	149.9	GE 3.8-130 3.8MW
Socio-Economic	136	81.9	149.9	Vestas V136 4.3MW

3.3.3 Turbine grid references for each turbine are as listed in Table 3.3.

Table 3.3: Turbine Grid References

Turbine Number	Grid Reference	Turbine Number	Grid Reference
C1	246783 804218	C19	247940 801628
C2	247321 804180	C20	247944 800942
C3	247972 803060	C21	248380 800690
C4	247289 802902	C22	248999 800802
C5	247084 803411	C23	248496 801189
C6	247759 804458	C24	248479 802007
C7	248149 804689	C25	249090 802015
C8	248433 805039	C26	249193 801495
C9	248141 802548	C27	249798 800871
C10	247133 802313	C28	249475 800443
C11	246917 801717	C29	255605 801455
C12	247584 801964	C30	256001 801903
C13	246624 801159	C31	256641 802276
C14	246598 803094	C32	257165 802794
C15	246328 802556	C33	256751 803157
C16	246665 802253	C34	257337 803339
C17	246200 802005	C35	257234 803946
C18	246029 801215	C36	256658 804129

3.3.4 Whilst the layout has been informed by detailed engineering modelling and consideration of environmental constraints, in practice more detailed topographical and geotechnical surveys would precede the start of construction works and turbine positions and track routes could be micro-sited up to 50m subject to the approval of specialist advisors in order to avoid or minimise environmental or engineering constraints identified during works.

3.3.5 The turbines would generate electricity in wind speeds between approximately 3 and 30m/s (6.7 to 67mph). At wind speeds greater than this the turbines would shut down for self-protection.

3.3.6 The turbine towers would be of tapering tubular rolled steel plate construction. The blades would be made from fibre-reinforced epoxy. The finish of the turbines is proposed to be semi-matt pale grey colour.

3.3.7 A transformer would be required for each turbine. This would be located internally to each turbine.

3.3.8 Full details of the proposed turbines would be provided to the Energy Consents Unit and THC prior to the commencement of development.

Turbine Installation

3.3.9 Turbine components including towers, blades, drivetrains, hubs and nacelles are likely to be transported from the port of entry (see Section 3.2) to the Proposed Development using suitable abnormal load vehicles.

3.3.10 On arrival onto the site, the wind turbine components would be delivered and offloaded at the hardstanding of the wind turbine to be erected.

Turbine Bases

Foundations

3.3.11 Dependent on the ground conditions at each wind turbine location, a piled or gravity foundation would be used to support the wind turbines. A typical foundation arrangement showing a gravity foundation solution is shown on Figure 3.3: Typical WTG Foundation, although these would vary depending on the final turbine selection, the applied loads from the wind turbine and ground conditions at each turbine location. Piled foundations may also be used dependant on site ground conditions. Site-specific designs would be developed once the turbine is selected and detailed intrusive ground investigations are undertaken during the detailed design phase.

3.3.12 Construction of a gravity foundation would generally require the excavation of subsoil and rock to a specified sub-formation level, usually up to 5m below existing ground level. The depth of the excavation would depend on the depth to a competent bearing stratum with the excavation slopes graded to a safe angle to ensure they remain stable during construction. The sub-formation would then have a layer of structural fill placed across it to create a level platform, prior to the in-situ casting of a steel-reinforced concrete foundation. Foundations would likely be circular and consist of a main base section with a smaller pedestal section cast above this. The foundations would have a diameter of approximately 22.5m.

3.3.13 Where a piled foundation is required, the construction process follows that of the gravity base, with the pile group installed following the completion of the structural fill platform. The construction process would then be completed as per the gravity base.

3.3.14 Each foundation would require approximately 750m^3 of concrete and 100 tonnes of steel reinforcement.

3.3.15 Dependent on the wind turbine selected, the connection piece used between the wind turbine and foundation can vary. Possible solutions include cans, pedestal length bolts and full-length bolts. Cans and pedestal bolts would be cast into the foundation pedestal, full length bolts would extend through the pedestal and into the main base section. The construction process would be as per the above for gravity and piled bases with the connection piece placed at the appropriate stage during the process.

3.3.16 The foundation excavation would be backfilled with compacted layers of suitable graded material from the original excavation. The finished surface around the turbines would be capped with graded, crushed rock to allow for safe personnel access to each turbine via the hardstanding.

3.3.17 Plate 3.2 to Plate 3.6 display the general construction process for wind turbine foundations, as employed at Stronelairg Wind Farm.

Plate 3.2: Turbine Foundation Construction – Excavation

Plate 3.3: Turbine Foundation Construction – Formation

Plate 3.4: Turbine Foundation Construction – Steel Reinforcement

Plate 3.5: Turbine Foundation Construction – Concrete Pour

Plate 3.6: Turbine Foundation Construction – Completed Foundation

3.3.18 Electrical cable ducts and other ancillary services would be installed into the foundations as required.

Hardstandings

3.3.19 As shown on Figure 3.6: Typical Crane Hardstanding Detail, the turbine foundations would be surrounded by a hardstanding. It is anticipated an area of approximately 3,600m² would be required for the hardstanding at each turbine. The hardstanding areas would accommodate the cranes required for construction and maintenance, and provide a laydown area for temporary storage of components adjacent to each turbine location.

3.3.20 Crane hardstandings would be constructed level to ensure the safe operation of the cranes. The final detail of the crane hardstandings would depend on the exact specification of the wind turbine supplier. It is anticipated that a large crawler or wheeled / mobile crane (up to 1,000 tonne capacity) would be required for turbine erection, with one smaller erector crane assisting with the lift procedure.

3.3.21 Hardstanding construction would involve stripping the topsoil (and peat where present) to expose a suitable bearing stratum on which to build the hardstanding. The hardstanding would then be constructed by placing and compacting suitable crushed rock (obtained from suitable on-site borrow pits) to the required level. The upper soil / peat horizon, together with any vegetation, would be placed to one side for later reinstatement, if appropriate.

Access Tracks

3.3.22 The access track layout[1] is shown on Figure 3.1: The Proposed Development. From the site entrance on the B862, access to the site would be achieved by utilising the existing main track developed up to the plateau and through Glendoe Hydroelectric Scheme and Stronelairg Wind Farm. Other track infrastructure would also be utilised where possible (see Plate 3.7, 3.8 and 3.9).

Plate 3.7: On-site Access Tracks (1 of 3)

Plate 3.8: On-site Access Tracks (2 of 3)

[1] Subject to a 50m micro-siting limit subject to approval of specialist advisers.

Plate 3.9: On-site Access Tracks (3 of 3)

3.3.23 There is currently an extensive track network at the site constructed as part of the Glendoe Hydroelectric Scheme and Stronelairg Wind Farm developments. Existing tracks are typically to a high standard with a width of around 4.5-5m. Approximately 29km of the existing tracks would be utilised to access the Proposed Development. Localised widening of the existing track may be required to facilitate the delivery of the wind turbine components dependent on the wind turbine chosen to be used on the Proposed Development.

3.3.24 Approximately 26km of new tracks with a minimum 4.5m wide running surface (plus 0.5m shoulders each side) and localised widening on corners would be required to access the turbines from the existing access tracks, during both construction and operation. The access tracks would be designed to incorporate passing places that would be suitable for construction plant and 4x4 traffic (approximately 25no. at 25m x 3m).

Access Track Construction

3.3.25 Site access tracks would be constructed with locally (on site) won graded rock from borrow pits and, where necessary, geotextiles with the surface course comprising of a durable unbound graded rock surfacing material. This construction broadly matches the existing access tracks of Stronelairg Wind Farm, an example of which is shown in Plate 3.10 below.

Plate 3.10: Access Track Construction

3.3.26 Depending on local ground conditions, access tracks would be constructed using a combination of ‘floating track’ or ‘cut track’ designs:

- Generally, a ‘floating track’ design does not involve excavation and would be utilised on the site in areas where peat depth is greater than 1m, where practical[2]. Geotextile material is laid onto the unbroken existing surface at a width to suit the track. Layers of crushed stone would then be laid on the geotextile to form a track capable of supporting the turbine delivery vehicles and construction plant. This type of track construction is typically used in peaty areas across Scotland including other constructed wind farm developments and public roads. The benefits of the floating track design are that it allows access track construction on soft terrain and does not require excavation of deep peat as the surface layer is not broken, resulting in reduced peat volumes for re-use across the site. There is minimal disruption of the sub-surface flow of water within the peat body, and no new channels are formed by which water can drain from the peat mass.
- In areas of shallow or no peat (0-1m), a ‘cut track’ design would be utilised for which the topsoil and peat would be stripped to expose a suitable bearing stratum on which to build the track. The track would then be constructed by placing and compacting suitable crushed rock (obtained from suitable on-site borrow pits) to the required level. Where site topography is variable or undulating, earthwork

[2] This is not always feasible due to peat stability risk associated with a combination of peat depth, gradient and underlying soil parameters. In addition, consideration will be given to the transition lengths between floating and founded track construction where a proportion of this transition may be in areas where the peat is in excess of 1m. Where isolated pockets of peat are greater than 1m in depth it may not be possible to transition from a cut track to a floated track due to the length of transition required.

cuttings and embankments would be required to achieve the required gradients for tracks and crane hardstandings. The upper soil / peat horizon, together with any vegetation, would be placed to one side for later reinstatement, if appropriate.

3.3.27 It is anticipated that approximately 23.7km of cut track and 2.2km of floating track design would be utilised for the Proposed Development (see Figure 3.1).

3.3.28 Where appropriate, peat and soil from excavations on site would be utilised for reinstatement along both sides of the track verges and allowed to regenerate naturally. Further details are provided in Technical Appendix 3.1: Draft CEMP.

Access Track Drainage

3.3.29 Construction of site access tracks requires robust drainage. Run-off from the access tracks would be shed via a crossfall into track side ditches and settlement lagoons / ponds to attenuate flows and remove sediments before discharging to land. Further details are provided in Technical Appendix 3.1 Draft CEMP. Existing drainage infrastructure would be utilised where possible.

3.3.30 Where practical, interceptor (cut-off) ditches would be formed on the upslope side of the track to collect and divert clean water away from the access tracks.

3.3.31 Cross drains would be installed at regular intervals to prevent flooding / surcharging of trackside drainage and maintain hydraulic pathways. As far as possible, these would coincide with naturally occurring drainage channels.

Access Track Watercourse Crossings

3.3.32 The proposed routes for the site tracks have been designed to minimise watercourse crossings by a combination of avoidance and by using existing crossings wherever possible. Twelve new watercourse crossings (as identified on 1:50k OS Mapping) would be required for the Proposed Development. An appropriate crossing would be designed, in consultation and agreement with the Scottish Environment Protection Agency (SEPA), to suit each location, dependent on the width of the crossing, the nature of the substrate, local conditions and the amount of traffic that would use it. Crossings (and culverts) will be designed to ensure protection of the existing channel and substrate, allow free passage of fish and include provision of suitable ledges or mammal crossings to ensure free passage to otters during periods of high water-flow. These crossings would be designed based on best practice, including:

- SEPA (1998): Policy No 26: Policy on the Culverting of Watercourses;
- Scottish Executive (2000): River Crossings and Migratory Fish: Design Guidance;
- The Water Environment (Controlled Activities) Regulations (Scotland) 2011, as amended;
- Construction Industry Research and Information Association (CIRIA) (2015): C741: Environmental Good Practice on Site, 4th edition; and
- CIRIA C689 Culvert Design and Operation Guide.

3.3.33 Further details of the proposed watercourse crossings and the environmental controls afforded by the above legislation and guidance are included in Chapter 10: Hydrology and Hydrogeology.

Temporary Construction Compounds

3.3.34 Temporary construction compounds containing welfare; offices; parking for cars and plant; and storage facilities, would be required for construction workers at the locations shown on Figure 3.1: The Proposed Development. An indicative layout of a construction compound is provided in Figure 3.7. It is proposed that the areas used for temporary construction compounds for Stronelairg Wind Farm, would be reused during the construction of the Proposed Development.

LiDAR

3.3.35 Up to two permanent Light Detection and Ranging (LiDAR) stations would be constructed to collect meteorological data for the operational life of the Proposed Development and have been located to ensure they obtain the best quality data for the site. Figure 3.1: The Proposed Development indicates their location and a typical plan and elevation are shown on Figure 3.5a: Proposed LiDAR Unit Plan and Figure 3.5b: Proposed LiDAR Unit Elevation. It is assumed that the LiDAR would have a maximum reinforced concrete foundation of 4.7m x 3.7m.

3.3.36 The inclusion of LiDAR stations would negate the requirement for a permanent or temporary meteorological mast.

Substation and Control Building

3.3.37 The Proposed Development would connect to the electricity transmission network using a new on-site substation, developed specifically for Cloiche Wind Farm. The location of the new on-site substation is shown on Figure 3.1: The Proposed Development. A typical plan and elevation of the substation is shown on Figure 3.8a and 3.8b respectively. A Control Building would also be accommodated within the substation compound, providing operational equipment and welfare facilities.

On-site Electrical Cabling

3.3.38 Turbines are likely to be connected by electrical circuit ‘arrays’, with the output connecting to the new on-site substation. The cabling for this would be laid in trenches of varying width (depending on the number of cables) and approximately 1m in depth alongside the site access tracks where suitable, or otherwise in agreement with THC in consultation with SEPA and the site ECoW. These trenches would also carry earthing and communications cables.

3.3.39 Cables would be laid directly in trenches with a sand surround and then backfilled with excavated sub-soil and peat topsoil. Alternatively, cable ducts could be installed underground. Backfill materials would be as per those aforementioned, and the cables pulled through following completion of the duct installation or cables could be installed directly into the ground by use of cable ploughs. Earthing cables and communications cables would be included in the same trench.

Grid Connection

3.3.40 The grid connection from the on-site substation to the National Grid would be subject to a separate consent application by the Network Operator (Scottish Hydro Electric Transmission). Details of the grid connection solution are unknown at this time but it is anticipated that the grid connection would connect to Melgarve Substation.

3.4 Associated Development Components

Concrete Batching

3.4.1 It is anticipated that concrete batching would be undertaken on site. The location of the batching plant would be in the same location as that used for Stronelairg Wind farm construction. The allowance for a secondary batching plant has been included at the site compound located within the vicinity of the reservoir, to the north of the main access track. The batching facilities would comprise batching towers and a number of feeder hoppers used to store the constituent parts (water, fine and course aggregates and cement), which are mixed to form concrete.

Borrow Pits

Predicted Aggregate Requirements

3.4.2 It is estimated that approximately 132,895m^3 of stone would be required for construction of the Proposed Development (including access tracks, structural fill beneath turbine foundations, and hardstandings at turbine bases and compounds).

Borrow Pit Locations

3.4.3 Stone required during construction is expected to be obtained from a combination of previously consented borrow pits located in close proximity to the main access track, created for Stronelairg Wind Farm, as well as new borrow pits located in close proximity to the proposed new turbines (as shown on Figure 3.1: The Proposed Development). Where the borrow pits do not yield suitable material for certain construction operations such as concrete batching or access track capping, it may be necessary to import material to the site. This would be determined following detailed ground investigation works.

3.4.4 The volumes provided in Table 3.4 are considered to be indicative of the volume of stone each borrow pit would provide but this is subject to detailed ground investigation and design during the pre-construction design phase. It is anticipated the extraction volumes from each borrow pit would vary as further information becomes available following ground investigation and detailed design. Further details are provided in Technical Appendix 11.1: Borrow Pit Assessment.

Table 3.4: Borrow Pits

Borrow Pit Reference	Location Coordinates	Indicative Volume (m^3), including 20% wastage and 1.3 bulking factor
BP1	248128, 803116	118,560
BP2	246509, 802428	78,000
BP3	249282, 802057	104,000
BP4	247515, 801782	60,320
BP5	249578, 800713	152,880
BP6	256447, 804132	93,600
BP7	255569, 801592	16,640
BP8	248721, 803761	50,960
BP9	250795, 803613	34,320

3.4.5 The borrow pits would require the use of plant to both win, crush and screen the resulting rock to the required grades. It is anticipated that rock would be extracted by breakers and some blasting may be required.

Borrow Pit Reinstatement

3.4.6 Following construction, the borrow pits would be reinstated with a suitable restoration profile (refer to Technical Appendix 11.1: Borrow Pit Assessment).

3.5 Construction Programme

3.5.1 It is expected that many of the above operations would be carried out concurrently, although predominantly in the order identified in Table 3.5, to minimise the overall length of the construction programme. A typical construction period for a wind farm of this size is estimated to be between 24 and 36 months. The indicative construction programme is illustrated in Table 3.5, with the final period dependent on weather and ground conditions experienced at the site.

3.5.2 Site reinstatement would be programmed and carried out to allow rehabilitation of disturbed areas as early as possible in order to minimise storage of excavated material on vegetation. Details on reinstatement would be provided within the CEMP, a draft of which is included as Technical Appendix 3.1.

Table 3.5: Indicative Construction Programme

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment												
Borrow Pit Operation												
Access Track Construction												
Turbine Bases and Hard Standings												
Concrete Works												
Cable Delivery and Installation												
Turbine Delivery and Erection												
Wind Farm Commissioning												
Reinstatement / Restoration												

3.5.3 It is likely that up to three site compound areas would be required during construction. One of the site compounds would be located at the site entrance adjacent to the B862 and the others would be located on the plateau, utilising areas that were previously used during the construction of Stronelairg Wind Farm (see Figure 3.1: The Proposed Development). The site compounds would include site cabins and welfare facilities for construction workers and could also be used as a laydown area for the delivery of some materials. Concrete batching plants would also be in operation at the upper site compound areas. These would be temporary facilities for use during the construction period only.

3.5.4 All statutory legislation would be fully complied with during construction and other best practice guidance (e.g. SEPA Pollution Prevention Guidelines and Good Practice during Wind Farm Construction (Version 4), Scottish Renewables et al, (2019)) would be adhered to.

Working Hours

3.5.5 Construction activities are anticipated to be between 07.00 and 19.00 hours Mondays to Fridays, and 07.00 to 14.00 hours on Saturdays. No working activities would be planned on Sundays. In the event of work being required outwith these hours, e.g. abnormal load deliveries, commissioning works or emergency mitigation works, the Planning Authority would be notified prior to these works taking place, wherever possible.

3.5.6 Any blasting on site shall only take place between the hours of 10.00 to 16.00 on Monday to Friday inclusive and 10.00 to 12.00 on Saturdays with no blasting taking place on a Sunday or on National Public Holidays, unless otherwise approved in advance in writing by the Planning Authority.

3.6 Environmental Management during Construction

3.6.1 Prior to construction works, sensitive ecological areas, and other specific sensitive locations (e.g. cultural heritage assets, watercourses) would be marked out as appropriate on site by specialist advisers in order to avoid unnecessary encroachment and protect sensitive areas during construction. The Principal Contractor would ensure that no vehicle movements or other activities take place outwith the approved working area.

Micro-siting

3.6.2 There may be a requirement to microsite elements of the Proposed Development as a result of additional constraints encountered during site works. Turbines, access tracks, underground cables and crane hard standing areas may be micro sited within 50m of the positions shown on Figure 3.1: The Proposed Development. Beyond this, agreement would be sought from the Planning Authority in consultation with SEPA. Any micrositing would require agreement of the specialist advisors (e.g. the ECoW) as appropriate.

Construction Environmental Management Plan (CEMP)

3.6.3 A CEMP for Stronelairg Wind Farm was implemented during the construction of that project following agreement with THC, Scottish Natural Heritage (SNH) and SEPA. The same principles of the approved Stronelairg Wind Farm CEMP would be adopted for the Proposed Development, updated as required to reflect recent legislation or guidance documents, best practice techniques and lessons learned from Stronelairg Wind Farm.

3.6.4 The CEMP would be submitted to THC (in consultation with SNH and SEPA as required) outlining site specific details of all on-site construction works, post-construction reinstatement, drainage and mitigation, together with details of their timetabling. A draft CEMP is provided in Technical Appendix 3.1 of this EIA Report.

Site Environmental Management

3.6.5 The Principal Contractor would have overall responsibility for environmental management on the site. The services of specialist advisors, such as the project ECoW, would be retained as appropriate to be called on as required to advise on specific issues. The Principal Contractor and the Applicant would ensure construction activities are carried out in accordance with the mitigation measures outlined in this EIA Report. A summary of mitigation measures is included as Chapter 18: Schedule of Mitigation.

3.6.6 Contractors would be required to adhere to the following in order to reduce or mitigate the environmental effect of the construction process:

- the conditions of any granted consent;
- relevant environmental regulations; and
- any other relevant mitigation measures identified in this EIA Report (see Chapter 18: Schedule of Mitigation).

3.6.7 A copy of any conditions of consent would be incorporated into tender documents and the CEMP as appropriate. The selection criteria for the Principal Contractor would include their record in dealing with environmental issues, and provision of evidence that they have incorporated all environmental requirements into their method statements.

Waste Management

3.6.8 Waste management is addressed in detail in the Draft CEMP (Technical Appendix 3.1). It is not anticipated that any excavated waste materials would be generated during the works, as all would be re-used on site, as described within Technical Appendix 11.3: Draft Peat Management Plan. Any materials to be removed from site (packaging etc.) would be segregated on site and removed to suitable recycling facilities or disposed of to a suitably licensed waste management facility, in accordance with current waste management regulations.

3.6.9 Demolition material removed from site during decommissioning would also be disposed of as above and recycled where possible. All material would be disposed of in accordance with the waste regulations and best practice applicable at the time.

3.6.10 A Waste Management Plan would be provided by the Contractor as part of the CEMP.

Health and Safety Related Issues

3.6.11 Health and safety would be initially addressed as part of the Pre-Construction Information Pack prepared by the Principal Designer for the project under the Construction (Design and Management) Regulations 2015. The Principal Contractor would be required to prepare a Construction Phase Health and Safety Plan and forward information to the Principal Designer during the works to enable the Health and Safety File to be completed.

3.6.12 Turbines are designed to be safe and are built to withstand extreme wind conditions. The turbines selected for the Proposed Development would have the appropriate health and safety certification.

3.6.13 In accordance with Sections 6(1)(g) and (h) of the Land Reform (Scotland) Act 2003, access rights are not exercisable while building or civil engineering works, or working of minerals, are being carried out. This will be applied throughout the construction working area for health and safety reasons. A draft Outdoor Access Plan is included as Technical Appendix 15.1.

3.6.14 An Operations and Maintenance Manual for the design life of the wind farm would be prepared, which would cover all operational and decommissioning procedures.

Site Reinstatement

3.6.15 Reinstatement works are generally undertaken during construction (and immediate post-construction phase) and aim to address any areas of ground disturbance and changes to the landscape as part of the construction works. Reinstatement is undertaken as soon as practical following the construction works in each area, such as the re-dressing of road and track verges and turbine bases (and other areas that may be disturbed as a result of the construction process).

3.6.16 Such works would involve the reinstatement of areas disturbed during the construction phase. This would be undertaken to provide a natural ground profile with non-geometric surfaces and tie-ins with existing undisturbed ground levels to prevent the collection of surface water. It would in all instances be undertaken at the earliest opportunity to minimise storage of turf and other materials and to provide completed reinstatement at the earliest opportunity. Typical reinstatement works are outlined in Section 15 of the draft CEMP (see Technical Appendix 3.1).

3.6.17 Site tracks and hardstanding areas at each turbine location would be retained for use in ongoing maintenance operations (including component replacement) and decommissioning of the wind farm. The edges would as far as possible be blended to the adjacent contours, with natural vegetation being allowed to re-establish.

3.6.18 Any other temporary hardstanding areas would be re-graded with peat or soil to a natural profile and reinstated as appropriate.

3.6.19 All construction equipment and other temporary infrastructure would be removed from site and the temporary storage areas would be reinstated.

Consultations with the Local Community during Construction

3.6.20 Consultation with the local community during the construction of the Proposed Development would be an important consideration for the Applicant and the Principal Contractor. For Stronelairg Wind Farm, a community liaison group was set up which provided the local community with information about key construction activities and a mechanism by which concerns from within the local community could be shared and discussed. A similar working group would be established during the construction of the Proposed Development.

Site Operation and Maintenance

3.6.21 Once commissioned, it is expected that the Proposed Development would require the continued use of the current existing infrastructure within the site boundary.

3.6.22 Routine maintenance, inspections and servicing would be carried out on each turbine as required at the Proposed Development, including major component and blade inspections. Appropriate maintenance works would be carried out immediately following any unexpected events on site, such as failure of a generator or gearbox.

Track Maintenance

3.6.23 Frequency of track maintenance depends largely on the volume and nature of the traffic using the track, with weathering of the track surface also having an appreciable effect. Heavy plant is particularly wearing and on-going track maintenance would be undertaken as necessary throughout the year. Safe access and management of silt run off from weathered track material would be maintained all year round, as is the case for Stronelairg Wind Farm.

3.6.24 There would be no public vehicular access to the site.

Site Decommissioning

3.6.25 The decommissioning period for a wind farm of this size is estimated to be 12 months.

3.6.26 Detailed decommissioning proposals would be established and agreed with relevant authorities prior to commencement of decommissioning activities.

3.6.27 Decommissioning of the wind farm would be undertaken at the end of its 50 year operational lifespan. This is anticipated to involve:

- Decommissioning and removal of the turbines and site substation;
- Removal to 1m below ground level of the turbine foundations;
- Removal of substation building foundations; and
- Re-instatement of all land affected, in accordance with best practice at the time.

3.6.28 It is not anticipated that the access tracks / spine road or underground cabling would be removed.

3.6.29 The turbines would be decommissioned and removed from the site in a manner similar to that of their erection. Cranes would be used to split the turbines into sections which would then be transported from the site.

3.6.30 It is anticipated that turbine foundations would be broken out to a level of 1m below the final ground level. Typically this would involve the removal of the upstand pedestal to the top surface of the main foundation base. All material arising from demolition would be disposed of responsibly and in accordance with relevant waste management regulations prevailing at the time.

3.6.31 All buildings and equipment would be removed including removal of fencing and of building foundations. All material arising would be disposed of responsibly (see Technical Appendix 3.1: Draft CEMP).

3.7 References

Construction Industry Research and Information Association (CIRIA), (2012). *C689 Culvert Design and Operation Guide (incorporates correction issued November 2012)*. Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=CIRIA&DocID=302323 (Accessed 23 January 2020).

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