# VOLUME 1: CHAPTER 3 - PROJECT DESCRIPTION



**Appendices (Volume 5 of this EIA Report)**

Appendix V1-3.1: Indicative Pole and Tower Schedule

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# 3. PROJECT DESCRIPTION

## 3.1 Introduction

3.1.1 This Chapter describes the various elements of the works that constitute the Proposed Development for the construction and operation of the proposed 132 kV transmission connection between Fort Augustus Substation and Ardmore Substation. As previously stated, the Proposed Development is interchangeably referred to as the Skye Reinforcement Project unless the context requires otherwise. Details in relation to the dismantling of the existing 132 kV OHL are also provided.

3.1.2 The Proposed Development described within this Chapter and assessed within the technical chapters of **Volume 2** of this EIA Report, comprises the Proposed Alignment (see **Figures V1-1.1a to 1c: Overview of the Proposed Development**). As outlined in **Volume 1: Chapter 1 (Part 1.2)**, the Applicant is also presenting an Alternative Alignment as part of the consent application in Section 3 of the project between Broadford and Kyle Rhea, via Glen Arroch. The Alternative Alignment is discussed and assessed within **Volume 6** of this EIA Report, and cross reference is made to this Chapter within **Volume 6: Chapter 2 - Project Description (Alternative Alignment)** where elements of the Alternative Alignment are as described in general terms for the Proposed Development.

## 3.2 Development for which Section 37 Consent and deemed planning permission is sought

3.2.1 The Proposed Development would include the following works, for which section 37 consent under the 1989 Act and deemed planning permission is sought:

- The installation and operation of approximately 110 km of new double circuit 132 kV OHL supported by steel lattice towers;
- The installation and operation of approximately 27 km of new single circuit 132 kV OHL supported by trident wood poles (H Poles); and
- Temporary diversion of the existing 132 kV OHL at Inchlaggan for approximately 750 m to facilitate construction of the new OHL.

## 3.3 Ancillary Development for which Deemed Planning Permission is sought

3.3.1 The following works would be required as part of the Proposed Development, or to facilitate its construction and operation:

- The installation of approximately 24 km of new double circuit 132 kV underground cable;
- The construction of Cable Sealing End (CSE) compounds to facilitate the transition between the OHL and sections of underground cable, including permanent access to these compounds;
- The formation of access tracks (permanent, temporary, and upgrades to existing tracks) and the installation of bridges and culverts to facilitate access;
- The upgrade of existing, or creation of new, bellmouths at public road access points;
- Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);
- Working areas around infrastructure to facilitate construction;
- Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development, to comply with the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002[1];
- Foundation works required at existing crossing and anchor towers at Kyle Rhea that are to be utilised as part of the Proposed Development; and

[1] The Electricity Safety, Quality and Continuity Regulations (2002), available at https://www.legislation.gov.uk/uksi/2002/2665/contents/made

- Dismantling of the existing 132 kV OHL following completion and commissioning of the Skye Reinforcement Project. A Dismantling Plan explaining the works involved is provided in **Appendix V1-3.8** to this Chapter.

3.3.2 These different forms of ancillary development are described in further detail in this Chapter.

### 3.4 Associated Works

3.4.1 Other associated works are required to facilitate construction of the Proposed Development, or would occur as a consequence of its construction and operation. These works, listed below, do not form part of the description of the Proposed Development and are therefore not included in the application for statutory consents. On that basis they are therefore not assessed in detail in this EIA Report. However, further detail on some of these elements is provided where available, as noted within the relevant appendices to this Chapter. The associated works are:

- Borrow pits and quarries would be required to source stone for the construction of access tracks. Indicative locations and a preliminary appraisal of the potential environmental constraints associated with these works is included in **Appendix V1-3.3**. Separate planning applications for these works would be sought by the Principal Contractor;
- Temporary construction compounds would be required along the route of the Proposed Development to facilitate its construction. Indicative locations and a preliminary appraisal of the potential environmental constraints at these locations is included in **Appendix V1-3.3**. The final location and design of temporary site compounds would be confirmed by the Principal Contractor and separate planning permissions would be sought as required;
- Modification of the existing 11 kV and 33 kV distribution network in some areas to accommodate the new OHL. These works are likely to comprise short sections of undergrounding within the vicinity of the Proposed Development, and would be undertaken by Scottish Hydro Electric Power Distribution (SHEPD). Consent would be sought by SHEPD as required;
- Public road improvements would be required in some areas to facilitate construction traffic. These are largely expected to be undertaken under permitted development rights held by The Highland Council. Indicative areas and a preliminary appraisal of the potential environmental constraints of public road improvement works is included in **Appendix V1-3.4**; and
- Extensions to Broadford and Edinbane Substations, and a new switching station at Quoich Tee, near to the existing tee off at Kingie. Separate consent under the Town and County Planning (Scotland) Act 1997 would be sought by the Applicant for these developments.

### 3.5 Limits of Deviation

3.5.1 In general terms a Limit of Deviation (LoD) defines the maximum extent within which a development can be built. In the case of the Proposed Development, an LoD is required for each of the key components of the project i.e. each of the new H poles and steel lattice towers being installed, cable sealing end compounds, underground cable alignments and access track routes.

3.5.2 It should be noted that the design of the Proposed Development described within this EIA Report has been established following the identification of detailed environmental and technical considerations. The design process has included the appointment by SSEN Transmission of an OHL Contractor to inform the design process and the constructability of the Proposed Development, covering both overhead and underground cable elements of the project, including construction access. This has involved carrying out ground investigation works along the majority of the route to determine ground conditions. There is therefore a high degree of certainty with respect to the location of infrastructure, as presented within this EIA Report. Nevertheless, it is possible that further micro-siting may be required during the construction process to reflect localised land, engineering and environmental constraints, and therefore the LoD provides some flexibility in this regard.

3.5.3 The horizontal LoD, for which consent is sought is typically as follows:

- OHL (Wood Pole and Steel Lattice) – 80 m LoD (40 m either side of the centre line);
- Underground Cable – 80 m LoD (40 m either side of the centre line);
- CSE Compound – 40m LoD from the edge of the CSE compound; and
- Access Tracks – 50 m LoD (25 m either side of the centre line).

3.5.4 In some areas, the LoD is increased or decreased to account for local constraints or known engineering challenges and environmental sensitivities. These areas can be seen on **Figures V1-3.1a to 3.1qq: The Proposed Development** and summarised in **Table V1-3.1**.

**Table V1-3-1: Summary of LoD Variations**

| LoD Variation | Section / Area | LoD Variation | Reason |
|---|---|---|---|
| 1 | Section 0: DA159 to DA168 | Reduced to 10 m on western side and extended up to 120 m on eastern side of wood pole alignment. | To ensure sufficient flexibility to avoid interference with Beinn na Mointeich radio station. |
| 2 | Section 1: Track within vicinity of Glenmore River and Abhainn an Acha-Leathain | Shift of track LoD to west. | To allow micro-siting of tracks to maintain a suitable buffer between the rivers and track construction, except at crossing points. |
| 3 | Section 1: Within vicinity of CSE Compound (BE32 to BE34) | Up to 50 m either side of OHL on approach to CSE Compound, in addition to the CSE compound LoD | To allow for tie in of OHL towers with CSE compound. |
| 4 | Section 2: Within vicinity of Abhainn Torra-mhichaig | Shift of LoD to west | To maintain a buffer of 10 m between underground cabling works and the Abhainn Torra-mhichaig, apart from at crossing points. |
| 5 | Section 2: Within vicinity of CSE Compound (BE29 to BE31) | Up to 50m either side of OHL on approach to CSE Compound, in addition to the CSE compound LoD | To allow for tie in of OHL towers with CSE compound. |
| 6 | Section 2: Between BE19 and BE20. | Up to 180 m at widest point. | Following existing access track, LoD widens in this location due to terrain and potential for micro-siting. |
| 7 | Section 2: Track to BE17 | Restricted on eastern side | To exclude the Allt Strollamus from the new temporary track LoD. |
| 8 | Section 3: Track between BF20 and BF21. | Restricted on southern side at SAC boundary. | To avoid works within the Mointeach nan Lochain Dubha SAC. |
| 9 | Section 3: Track between BF57 to BF62. | Up to 80 m (40 m to either side). | Widened to allow for further micrositing in an area with difficult terrain. |
| 10 | Section 3: BF59 to BF60 | Up to 60 m on southern side of OHL alignment | Widened by up to 60 m on southern side of alignment to allow for further micrositing in an area with difficult terrain. |
| 11 | Section 3: BF77 to BF79 | Up to 100 m either side | To allow for works within the vicinity of anchor and crossing towers, including wiring requirements. |
| 12 | Section 4: BF80 to BF81 | Up to 100 m either side | To allow for works within the vicinity of anchor and crossing towers, including wiring requirements. |
| 13 | Section 4: Track to BF81 | Up to 50 m on east side | To allow greater flexibility at this access point. |
| 14 | Section 4: BF102 | Up to 50m on east side | To allow flexibility in tower position |

| LoD Variation | Section / Area | LoD Variation | Reason |
|---|---|---|---|
| 15 | Section 4: Track within vicinity of Glenmore River | Restricted on northern side. | To exclude the river from the track LoD. |
| 16 | Section 4: Track from Balavoulin to BF106 | Up to 40 m either side | To allow flexibility in micrositing track due to difficult terrain. |
| 17 | Section 4: Track within vicinity of Abhainn a' Ghlinne Bhig and Srath a' Chomair | Restricted on riverbank side of track. | To restrict access works to one side of the rivers, except at crossing points. |
| 18 | Section 4: Track between BF134 and BF145 | Up to 100 m wide | To allow flexibility in micrositing track due to difficult terrain. |
| 19 | Section 4: Track within vicinity of Gleanndubhlochain | Restricted on riverbank side of track. | To restrict access works to one side of the river, except at crossing points. |
| 20 | Section 4: Track between BF166 and BF169 | Restricted on southern side of track. | To maintain a 10 m buffer between the Lochan Torr a' Choit and track upgrading works and restrict works to one side of the Allt a' Choire Reidh, except at the crossing point. |
| 21 | Section 4: Construction access within vicinity of Loch Coire Shubh | Restricted on southern side. | To exclude the loch from the track LoD. |
| 22 | Section 5: BF261 to BF264 | Up to 100 m either side of OHL | To allow for micro-siting and tie in of OHL towers within vicinity of proposed Quoich Tee Switching Station. |
| 23 | Section 5: BF284 to BF288 | Up to 125 m wide. | To accommodate a temporary diversion to the existing OHL during construction works. |
| 24 | Section 5: Track to BF332 | Up to 80 m wide | To allow flexibility in upgrading track either side of fence line. |
| 25 | Section 6: Within vicinity of Doire Mor | Up to 120 m | To allow for flexibility in siting cable route to minimise effects on blanket bog and deeper areas of peat. |
| 26 | Section 6: Within vicinity of Doire Daraich | Up to 130 m | To allow for flexibility in siting cable route to minimise effects on blanket bog and deeper areas of peat. |
| 27 | Section 6: On approach to Fort Augustus Substation | Up to 200 m | To ensure flexibility on cable entry into Fort Augustus Substation. |

3.5.5 An operational corridor is required through areas of woodland and commercial forestry to ensure the safe operation of the OHL (discussed further in paragraph 3.9.13). The width of the operational corridor would be variable depending on the nature of the woodland or forestry, but would typically require a distance of 40 m either side of the OHL. Therefore, in areas of woodland or commercial forestry, a 40 m extension to the OHL LoD would be required for felling operations. Similarly, for new tracks (temporary or permanent) a 10 m wayleave corridor is required either side of the track. As such, a 10 m extension would be required around new access track LoD's in areas of commercial forestry or woodland for felling operations.

3.5.6 A vertical LoD, i.e. the maximum height of a pole or tower above ground level, is also sought to allow a height increase or decrease of 3 m on the proposed pole or tower height presented within **Appendix V1-3.1: Pole and Tower Schedule**. The 3 m variation is consistent with the extensions to which steel lattice towers are designed, and therefore any increase or decrease of steel lattice towers would be no greater than 3 m. This also allows sufficient variation for wood pole structures. As noted within paragraph 3.5.2 with respect to the location of infrastructure, there is also a high degree of certainty in relation to the height of infrastructure given the engineering design work undertaken to date. The vertical LoD provides some flexibility nonetheless.

3.5.7 Where there is a requirement to vary the location (or height) of infrastructure within the LoDs, the relevant environmental information within the EIA Report would be reviewed to establish any potential constraints or adverse change in effect. Further advice on LoD changes would be sought from environmental specialists, and where relevant consultation would be sought from The Highland Council (as local authority) and any relevant statutory consultees as required.

### 3.6 Project Overview

3.6.1 Between Fort Augustus Substation and Edinbane Substation, the Proposed Development would primarily comprise the construction of a new double circuit steel structure 132 kV OHL, totalling approximately 110 km in length. In two distinct areas within this part of the route of the Proposed Development; in Section 2 within the vicinity of the Cuillins, and in Section 6 between Loch Lundie and Fort Augustus Substation, underground cabling is proposed to either mitigate likely significant landscape and visual effects (in the case of Section 2) or rationalise the existing OHL network (in the case of Section 6). CSE compounds would be required to facilitate the transition between OHL and underground cable.

3.6.2 Between Edinbane Substation and Ardmore Substation, approximately 27 km of new single circuit trident wood pole (H pole) OHL is proposed.

3.6.3 The total length of the new transmission connection would be approximately 160 km in length. An overview of the Proposed Development is shown on **Figures V1-1.1a to 1.1c: Overview of the Proposed Development**.

3.6.4 The formation of new access tracks would be required to facilitate both the construction and, in places, the maintenance of the Proposed Development. Existing tracks would be utilised where practicable, subject to upgrades where required.

3.6.5 Following completion of the Skye Reinforcement Project, the existing 132 kV OHL would be dismantled and removed.

3.6.6 An overview of each geographical Section of the project is provided in **Volume 2: Chapter 2 - Section by Section Overview**, together with a description of the elements of the Proposed Development, ancillary development and associated works located within each Section. **Table V1-3.2** provides a summary of the main elements of the Proposed Development on a Section by Section basis. Reference should also be made to **Figures V1-3.1a to 3.1qq: The Proposed Development**. Elements of the Proposed Development of relevance to the Alternative Alignment are discussed in **Volume 6: Chapter 2 - Project Description (Alternative Alignment)**.

**Table V1-3.2 Summary of main elements of the Proposed Development**

| Section | Design Solution | Other Ancillary / Associated Works |
|---|---|---|
| Section 0: Ardmore Substation to Edinbane | Wood pole OHL for the entirety of this Section (approximately 27 km) from Ardmore Substation to Edinbane Substation. | Ancillary Works<br>• Temporary construction access via tracked vehicles. Use of helicopters proposed to deliver materials;<br>• Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);<br>• Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and<br>• Dismantling of the existing 132 kV wood pole OHL.<br>Associated Works<br>• Public road improvement works as required;<br>• Temporary construction compounds; and<br>• Edinbane Substation Extension. |
| Section 1 – Edinbane to | Steel lattice OHL for the entirety of this Section | Ancillary Works |

| Section | Design Solution | Other Ancillary / Associated Works |
|---|---|---|
| North of Sligachan | (approximately 20 km in length) from Edinbane Substation to a terminal tower and CSE compound at approximate grid reference 148068 832110. | • CSE compound to facilitate the transition between OHL and underground cable;<br>• Temporary and permanent construction access via;<br>  ◦ Existing access tracks (approx. 788 m);<br>  ◦ Existing access tracks to be upgraded (approx. 12.3 km);<br>  ◦ New permanent access tracks (approx. 4 km);<br>  ◦ New temporary access tracks (approx. 21 km); and<br>  ◦ Temporary spurs to tower positions.<br>• The upgrade of existing, or creation of new bellmouths at public road access points;<br>• Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);<br>• Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and<br>• Dismantling of the existing 132 kV wood pole OHL.<br>Associated Works<br>• Public road improvement works as required;<br>• Temporary construction compounds; and<br>• Borrow pits and / or quarries. |
| Section 2 – North of Sligachan to Broadford | Underground cable for approximately 15 km, from a new CSE compound at approximate grid reference 148068 832110 (as per Section 1) to a new CSE compound near Luib (approximate grid reference 156389 827438). From here, a new steel lattice OHL is proposed to Broadford Substation (for approximately 8 km). | Ancillary Works<br>• Approximately 15 km of new double circuit 132 kV underground cable;<br>• CSE compound to facilitate the transition between OHL and underground cable;<br>• Temporary and permanent construction access via;<br>  ◦ Existing access tracks to be upgraded (approx. 2.7 km);<br>  ◦ New permanent access tracks (approx. 4.3 km);<br>  ◦ New temporary access tracks (approx. 17.2 km); and<br>  ◦ Temporary spurs to tower positions.<br>• The upgrade of existing, or creation of new bellmouths at public road access points;<br>• Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);<br>• Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and<br>• Dismantling of the existing 132 kV wood pole OHL.<br>Associated Works<br>• Public road improvement works as required;<br>• Temporary construction compounds; and<br>• Borrow pits and / or quarries. |
| Section 3 – Broadford to Kyle Rhea | Steel lattice OHL for the entirety of this Section (approximately 20 km in length) from Broadford | Ancillary Works |

<table>
<tr><th>Section</th><th>Design Solution</th><th>Other Ancillary / Associated Works</th></tr>
<tr><td></td><td>Substation to the existing crossing towers at Kyle Rhea (to be retained).<br>For the Alternative Alignment within Section 3, refer to Volume 6 of this EIA Report.</td><td><ul><li>Temporary and permanent construction access via;<ul><li>Existing access tracks (approx. 1.8 km);</li><li>Existing access tracks to be upgraded (approx. 4.8 km);</li><li>New permanent access tracks (approx. 6.1 km);</li><li>New permanent access tracks (floating construction within SAC) (approx. 4.1 km);</li><li>New permanent access tracks (floating construction outwith SAC) (approx. 1.75 km);</li><li>New permanent access tracks (cut / fill construction within SAC) (approx. 3.5 km)</li><li>New temporary access tracks (approx. 9.2 km); and</li><li>Temporary spurs to tower positions.</li></ul></li><li>The upgrade of existing, or creation of new bellmouths at public road access points;</li><li>Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);</li><li>Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development;</li><li>Foundation works required at existing crossing and anchor towers at Kyle Rhea that are to be utilised as part of the Proposed Development; and</li><li>Dismantling of the existing 132 kV steel lattice OHL.</li></ul><u>Associated Works</u><ul><li>Public road improvement works as required;</li><li>Temporary construction compounds;</li><li>Borrow pits and / or quarries; and</li><li>Broadford Substation Extension.</li></ul></td></tr>
<tr><td>Section 4 – Kyle Rhea to Loch Cuaich</td><td>Steel lattice OHL for the entirety of this Section (approximately 38 km in length) from the existing crossing towers at Kyle Rhea to Loch Quoich Dam (approximate grid reference 207192 802419).</td><td><u>Ancillary Works</u><ul><li>Temporary and permanent construction access via;<ul><li>Existing access tracks (approx. 13.4 km);</li><li>Existing access tracks to be upgraded (approx. 20.8 km);</li><li>New permanent access tracks (approx. 24.8 km);</li><li>New temporary access tracks (approx. 7.9 km); and</li><li>Temporary spurs to tower positions.</li></ul></li><li>The upgrade of existing, or creation of new bellmouths at public road access points;</li><li>Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);</li><li>Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and</li><li>Dismantling of the existing 132 kV steel lattice OHL.</li></ul></td></tr>
</table>

| Section | Design Solution | Other Ancillary / Associated Works |
|---|---|---|
| | | Associated Works<br>• Public road improvement works as required;<br>• Temporary construction compounds; and<br>• Borrow pits and / or quarries. |
| Section 5 – Loch Cuaich to Invergarry | Steel lattice OHL for the entirety of this Section (approximately 24 km in length) from Loch Quoich Dam (approximate grid reference 206992 802484) to a new CSE compound near Loch Lundie (approximate grid reference 229695, 802602).<br><br>A temporary diversion of the existing 132 kV OHL at Inchlaggan for approximately 750 m would also be required. | • CSE compound to facilitate the transition between OHL and underground cable (into Section 6);<br>• Temporary and permanent construction access via;<br>  • Existing access tracks (approx. 10 km);<br>  • Existing access tracks to be upgraded (approx. 4.7 km);<br>  • New permanent access tracks (approx. 6.5 km);<br>  • New temporary access tracks (approx. 12.6 km); and<br>  • Temporary spurs to tower positions.<br>• The upgrade of existing, or creation of new bellmouths at public road access points;<br>• Establishment of temporary measures to protect road and water crossings (e.g. scaffolding);<br>• Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and<br>• Dismantling of the existing 132 kV wood pole (Quoich to Aberchalder) OHL and steel lattice towers.<br>Associated Works<br>• Public road improvement works as required;<br>• Temporary construction compounds; and<br>• Borrow pits and / or quarries. |
| Section 6 – Invergarry to Fort Augustus | An underground cable for the entirety of this Section, from a new CSE compound near Loch Lundie (approximate grid reference 229695, 802602) to Fort Augustus Substation, a distance of approximately 9 km. | Ancillary Works<br>• Approximately 9 km of new double circuit 132 kV underground cable;<br>  • Construction access via Existing access tracks (approx. 12.7km); and<br>  • New temporary access tracks (approx. 8.9km).<br>• Tree felling and vegetation clearance to facilitate construction and operation of the Proposed Development; and<br>• Dismantling of the existing 132 kV wood pole OHL (Fort Augustus to Skye Tee).<br>Associated Works<br>• Temporary construction compounds; and<br>• Borrow pits and / or quarries. |

## 3.7 Description of Overhead Line Infrastructure

*Steel Lattice Towers*

3.7.1 The steel lattice towers to be used for this project would be constructed from fabricated galvanised steel and would be grey in colour. The towers would likely comprise a 'L7' series of steel lattice tower (an example photograph of which is shown in **Plate 3.1**). Three types of tower are proposed to be used, as described below:

- suspension towers: these are used for straight sections of OHL where there is no need to terminate the conductor. There are 244 suspension towers proposed;
- angle / tension towers: these are typically used where there is a need to change the orientation of the OHL. There are 186 angle / tension towers proposed; and
- Terminal towers; where the OHL terminates at a substation, or transitions to underground cable, via a CSE compound. There are 6 terminal towers proposed.

3.7.2 Towers would carry two circuits, each with three conductors supported from either glass, porcelain, or composite insulators attached to the horizontal cross arms on both sides of each steel lattice tower. An Optical Ground Wire (OPGW)[2] would be suspended between tower peaks, above the conductors.

3.7.3 The span length (distance between towers) would vary slightly depending on topography and land usage. Typically, span lengths for the L7 standard tower are 290 m. Tower heights would also vary, depending on local topography, but would typically be in the region of 27 m to 33 m in height. A small number of towers (30) would require further extensions to facilitate clearance distances in localised areas. 23 of these towers would be up to 36.23 m, whilst the remaining 7 would be up to 41.45 m. A tower schedule is included in **Appendix V1-3.1: Pole and Tower Schedule**. Schematics of the L7 steel lattice tower are provided in **Appendix V1-3.2: Further Engineering Design Information**.

3.7.4 It is proposed to use the existing crossing towers at Kyle Rhea. This includes two crossing towers at Kyle Rhea, along with adjacent anchor towers, which would require steel work strengthening to support the additional weight of the new OHL conductors. The existing foundations would also require to be reinforced using anchoring and reinforcement techniques to make them suitable for new tower loadings. A photograph of the crossing towers taken from the Skye side of Kyle Rhea is included in **Plate 3.2**.

[2] Optical Ground Wire is a dual functioning cable, providing a 'shield' to conductors from lightning, whilst also comprising optical cables for telecommunication purposes.

**Plate 3.1: Photograph of Steel Lattice Tower Double Circuit (L7 series)**

**Plate 3.2: Photograph of Existing Crossing Towers at Kyle Rhea**

*H Wood Poles*

3.7.5 Within Section 0, it is proposed that the existing 132 kV wood pole OHL would be replaced with a new 132 kV trident wood pole (H pole) OHL. The new OHL would have a nominal height of approximately 13 m (this could range between 10 m and 16 m in height above ground level (including insulators and support), depending on local terrain and ground conditions). The spacing between individual poles would vary depending on topography and altitude and would be determined after a detailed line survey but would be approximately 80 m to 100 m apart. A pole schedule is included in **Appendix V1-3.1: Pole and Tower Schedule**.

3.7.6 Much like steel lattice towers (see paragraph 3.7.1), the wood pole OHL would be composed of a combination of suspension poles, angle / tension poles and terminal poles (at substations).

3.7.7 A schematic of a wood pole (suspension pole) is shown in **Plate 3.3**, while a photograph of a H pole is shown in **Plate 3.4**.

3.7.8 Three conductors in horizontal formation and made from aluminium alloy would be strung between each H pole forming a single circuit. Stays would be required at angle poles and in areas of soft ground.

3.7.9 An All Dielectric Self Supporting (ADSS) fibre optic cable would be strung approximately 2 metres under the conductors for operational telecommunication purposes.

**Plate 3.3: Wooden H Pole Schematic**

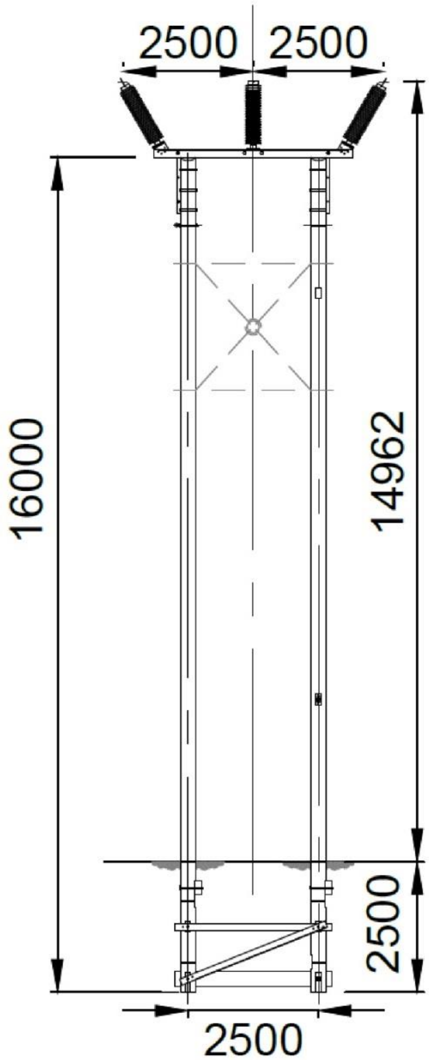
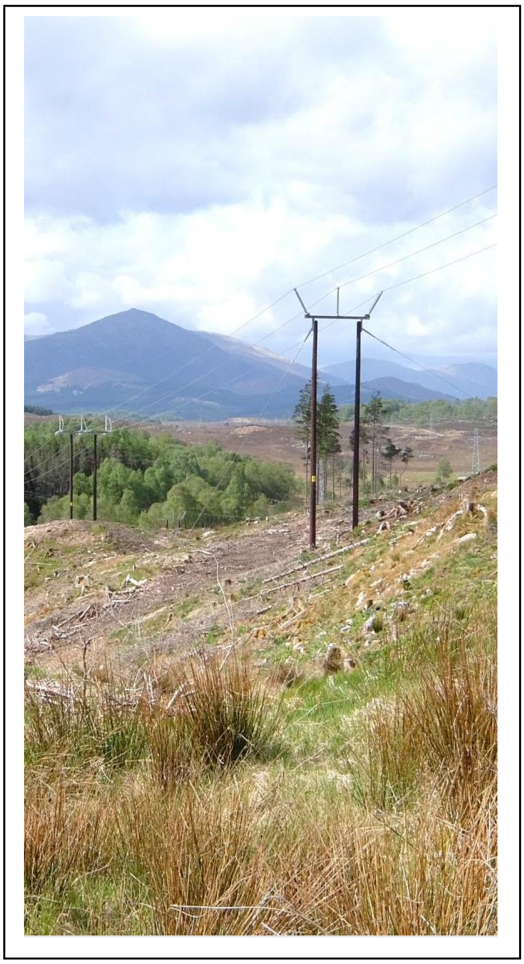



**Plate 3.4: Photograph of H Pole**



### 3.8 Temporary 132 kV Diversion

3.8.1 At Inchlaggan, within Section 5 of the project, a temporary diversion of the existing 132 kV OHL is required during the construction phase of the Proposed Development as it is proposed to utilise the same alignment as the existing OHL for approximately 500 m. The temporary diversion is proposed for approximately 750 m and shown on **Figure V1-3.1: The Proposed Development (page KK)**. It is anticipated that the temporary diversion would be in place for a period of approximately 9 months.

### 3.9 Typical Construction Activities for Overhead Line Infrastructure

3.9.1 High voltage OHL construction typically follows a standard sequence of events as follows:

- Phase 1 – enabling works (as described in paragraphs 3.9.2 to 3.9.15 below);
- Phase 2 – OHL construction (as described in paragraphs 3.9.12 to 3.9.37 below);
- Phase 3 – OHL commissioning (as described in paragraph 3.9.38 below); and
- Phase 4 – re-instatement (as described in paragraphs 3.16.7 to 3.16.14 below).

*Phase 1 - Enabling works*

Distribution Infrastructure

3.9.2 Works would be required to the existing 33 kV distribution network infrastructure within some areas to facilitate safe working and operating conditions given the proximity of the distribution network to the existing (and proposed) 132 kV network. It is anticipated that these distribution network assets would be realigned or undergrounded to make way for the Proposed Development. These are associated works and do not form part of the consent application (see Part 3.4 of this Chapter).

Road Improvements and Access

3.9.3 Typically, construction access would be established through a combination of:

- Existing tracks, to be upgraded where required;
- Installation of new temporary stone tracks; and
- Installation of new permanent stone tracks.

3.9.4 In general, proposed construction access would be taken via the existing public road network and would make use of existing forest and estate tracks as far as practicable, upgraded as required. Existing bellmouths would be utilised where possible, subject to improvements. New bell mouths would be required at a number of locations. Indicative locations are shown on **Figures V1-3.1a to V1-3.1qq**. In some areas, public road improvement works would be required to facilitate construction traffic. These are largely expected to be undertaken under permitted development rights held by The Highland Council. Further detail on public road improvement works is included in **Appendix V1-3.4**.

3.9.5 It is anticipated that access would mainly be achieved through upgrade of existing and installation of new tracks, both temporary and permanent. Floating stone road or trackway panel construction (typically a short term solution) may be installed in sensitive areas such as over deeper areas of peat. All new tracks would be constructed in accordance with best practice construction methods, and with reference to NatureScot's good practice guide on constructing tracks in Scottish uplands[3]. Indicative access track cross sections and a matrix setting out the factors that would be considered in the type of track construction are included in **Appendix V1-3.2: Further Engineering Design Information**. Where new watercourse crossings are required, the design of the crossing would be in accordance with best practice guidelines, and taking account of any ecological or hydrological constraints. The design of crossings would be agreed with SEPA prior to construction and be

[3] Constructed tracks in the Scottish Uplands (Updated September 2015), Scottish Natural Heritage.

regulated by the Water Environment (Controlled Activities) (Scotland) Regulations 2011[4] (CAR). A watercourse crossing schedule for permanent watercourse crossings is provided in **Appendix V2-6.2: Schedule of Permanent Watercourse Crossings**.

3.9.6 **Table V1-3.3** sets out the approximate length of access track requirements across the project.

**Table V1-3.3: Access Track Requirements**

| Access Track Type | Approximate length required across the project (km) |
|---|---|
| Existing access tracks | 40.79 km |
| Existing access tracks to be upgraded | 45.43 km |
| New permanent access tracks | 55.27 km |
| New temporary access tracks | 77.14 km |
| Temporary spurs to tower positions | 11.59 km |

3.9.7 Access tracks (and their related LoDs) are shown on **Figures V1-3.1a to V1-3.1qq**. Deemed planning permission will be sought for these access tracks and access points as part of the section 37 consent application.

3.9.8 Track widths during construction are typically expected to have a running width of 6 m, with an overall construction corridor of approximately 8 m to allow for suitable drainage and pollution prevention measures. Where helicopters are proposed to be utilised to erect steel lattice towers, track widths can be reduced to approximately 4 m (not including drainage and pollution measures) as the requirement for cranes is removed. This is the case for access to towers for the Proposed Alignment within the Kinloch and Kyleakin Hills SAC / Site of Special Scientific Interest (SSSI), as denoted by floating and cut / fill construction tracks shown on **Figures V1-3.1v and V1-3.1w**.

3.9.9 To ensure safe access to the Proposed Development, operational access would be required in areas which are remote, or where terrain is difficult. This is essential for the maintenance and repair of the OHL and to ensure SSEN Transmission comply with their legislative obligations, particularly in relation to the Health and Safety at Work Act 1974[5] and Construction (Design and Management) Regulations 2015[6]. Parts of the existing OHL, which was built prior to these obligations being in force, do not comprise adequate access, meaning that operatives are often flown as near as practicable to tower locations for inspection and maintenance tasks, with access from helicopter drop off locations on foot over difficult terrain. At present, were more significant works required to the existing OHL, temporary tracks may need to be built to facilitate works, with the potential for outages until works were completed. Such constraints to access across parts of the existing OHL do not meet the standard or expectation for safe access under existing legislation and current working practices, and serve to highlight the requirement for permanent access along parts of the route of the Proposed Development.

3.9.10 Where operational access is required, this would likely range from use of all-terrain vehicle (ATV) routes with no formal track to a stone road suitable for 4x4 vehicle access, approximately 2.5 m in width. The selection of the type of track required depends on the proximity to a public road, structure type and potential maintenance activities / vehicles required in future to a given location (taking legal health and safety requirements into account). Operational access track requirements are shown on **Figures V1-3.1a to V1-3.1qq: The Proposed Development**.

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4 Water Environment (Controlled Activities) (Scotland) Regulations 2011, available at https://www.legislation.gov.uk/ssi/2011/209/contents/made [Accessed November 2021]

5 https://www.legislation.gov.uk/ukpga/1974/37/contents - accessed 08/07/2022

6 https://www.legislation.gov.uk/uksi/2015/51/contents/made - accessed 08/07/2022

3.9.11 Access requirements throughout the project are discussed further in relation to each Section within **Volume 2: Chapter 2 - Section by Section Overview** of this EIA Report.

3.9.12 Borrow pits or quarries would be required to source stone for the construction of access tracks. These are associated works and do not form part of the consent application (see Part 3.4 of this Chapter). A review of potential borrow pit and quarry locations has been undertaken to establish indicative locations, likely yield and potential environmental effects. This review is contained within **Appendix V1-3.3: Preliminary Appraisal of Borrow Pit, Quarry and Temporary Site Compound Areas**.

Forestry Clearance and Vegetation Management

3.9.13 Whilst the design of the Proposed Development has sought to minimise impacts on woodland and commercial forestry plantations where possible, some felling during construction, and to create an operational wayleave corridor, is required. The width of the Operational Corridor (OC) would be variable depending on the nature of the forest or woodland. Within areas of commercial forestry the OC would require a distance of 40 m either side of the OHL, whilst in areas of native woodland the OC can be reduced (e.g. to 30 m either side of the OHL). Further detail on proposed felling requirements is set out within the Forestry Chapter (see **Volume 2: Chapter 9 - Forestry**) and woodland reports (See **Appendix V2-9.1: Woodland Reports**). Overall, the project would require 100 hectares (ha) of commercial woodland and 18 ha of ancient (11 ha) and semi-natural (7 ha) woodland to be felled to create an OC. In addition, some more minor vegetation management and felling may be required around the existing access track network in order to provide sufficient width.

3.9.14 The Applicant is committed to making arrangements to plant off-site the equivalent area of woodland as Compensatory Planting, meeting the Scottish Government's Control of Woodland Removal Policy objective of no net loss of woodland. On this basis, the Applicant will replant the 118 ha of woodland removed for the Proposed Development and this will be achieved within the regional land boundary of The Highland Council, of where the Proposed Development is geographically located.

Site Compounds

3.9.15 It is anticipated that a number of temporary construction compounds would be required along the route of the Proposed Development to facilitate its construction. Indicative temporary site compound locations, together with a preliminary appraisal of these locations, is included in **Appendix V1-3.3: Preliminary Appraisal of Borrow Pit, Quarry and Temporary Site Compound Areas**. These are associated works and do not form part of the consent application (see Section 3.4 of this Chapter). The location of site compounds would be confirmed by the Principal Contractor.

*Phase 2 – Construction works*

Tower Foundations – Steel Lattice Towers

3.9.16 Different approaches to forming foundations for steel lattice towers may be used, subject to ground conditions at each tower location. These are likely to comprise either pad and column, micro pile or rock anchor foundation solutions, as described below:

- Pad and column: Prior to construction, a 50 m x 50 m (approximately[7]) compound is established complete with stone access and laydown area for welfare, plant and materials. Each tower foundation (4 no. per tower) is excavated to a typical depth of 4 m with temporary shoring installed to allow for safe working. On average, dimensions for each foundation are approximately 4 m x 4 m x 0.5 m. Major items of plant required to construct the foundations typically include a 20 tonne excavator in

[7] It is anticipated that a 40 m x 40 m working area would be sufficient at the majority of tower locations throughout the route, but a 50 m x 50 m working area is assumed for the purposes of this EIA Report to ensure a worst-case scenario is assessed.

order to excavate to formation and place the shoring system, and a concrete wagon to supply the concrete.

- Micro Pile: Often utilised in areas of deeper peat. Prior to construction, a stone piling pad will be required, typically 625 m² in area providing a stable working platform for the piling rig. Major items of plant required to install the piles include a 20 tonne excavator and vibrating roller for the piling pad and a 14 tonne piling rig with a supply of cement and potable water to form the piles. A 20 tonne excavator will then be required to excavate and allow construction of the pile cap. Concrete is supplied via concrete wagon.
- Rock Anchor: Rock anchors are considered if suitable hard rock is encountered up to a depth of 2.5 m and is proven to have sufficient frictional and lateral resistance. Beyond this depth, pad and column foundations are typically utilised. A similar working area is required to that of micro piling, however in this instance the area is excavated down to rockhead and an access ramp formed with a nominal layer of stone placed to create a level working platform. Major items of plant required to install the anchors include a 20 tonne excavator and vibrating roller for the piling pad and a 14 tonne piling rig with a supply of cement and potable water to form the piles. A 20 tonne excavator will then be required to erect formwork and place concrete for the construction of the pile cap. Concrete is supplied via concrete wagon.

3.9.17 Foundation types and designs for each tower would be confirmed by the Principal Contractor following analysis of detailed geotechnical investigation at each tower position.

3.9.18 Dimensions of each foundation would be confirmed following micrositing. For the purposes of this assessment however it has been assumed that each foundation would be buried to depths estimated up to 2.5 m below ground level (bgl) although extending up to 4 m depth where ground conditions require. They would extend over an area suitable to deliver the loading characteristics required (which would be a function of the underlying ground conditions and the weight of the structures to be supported). Piled foundations may be required where low strength ground conditions exist, particularly where peat is encountered at over 1 m depth.

3.9.19 For the purposes of the EIA Report it has been assumed that a working area of approximately 2500 m² (50 m x 50 m) would be required around each individual tower foundation and associated construction activities. The exact dimensions of the working area around each tower will be confirmed following micrositing but would typically be no greater than 2500 m².

3.9.20 Where encountered, top soil (including peat) would be stripped from the tower working area to allow installation of tower erection pad(s) as necessary in order to accommodate construction plant. Concrete is likely to be brought to site ready-mixed with no requirement for concrete batching at individual tower locations. Once the concrete has been cast and set, the excavation would be backfilled, using the original excavated material where possible.

3.9.21 It is anticipated that formation of each tower foundation would take approximately 4 weeks. **Plate 3.5** provides and illustrative image of tower foundation construction.

**Plate 3.5: Illustrative Image of Tower Foundation Construction**

Tower Construction – Steel Lattice Towers

3.9.22 Tower construction can typically commence two weeks after the foundations have been cast, subject to weather conditions and concrete curing rates. Tower steelwork would be delivered to each tower construction site either as individual steel members or as prefabricated panels, depending on the method of installation and the available access, and placed within dedicated laydown areas ready for assembly. Sections are then assembled on the ground in preparation for sequential lifting operations. The tower sections are lifted into position with a 360 Roto telehandler. For sections of the tower that a 360 Roto cannot erect, an all-terrain mobile crane is deployed to complete the tower erection. A telehandler would be utilised for moving tower sections in to place for the crane and assisting in tandem lifts. A 360 telehandler and typically an 80 tonne all-terrain mobile crane would then be required to erect the tower. **Plate 3.6** provides an example of tower construction.

3.9.23 Major items of plant required for erection would also include a flatbed wagon to transport the steelwork to location.

**Plate 3.6: Illustrative Image of Steel Lattice Tower Construction**

Conductor Stringing – Steel Lattice Towers

3.9.24 Prior to stringing the conductors, temporary protection measures, (normally netted scaffolds) would be required across public roads and existing access tracks.

3.9.25 Conductor stringing equipment (i.e. winches, tensioners and ancillary equipment) are set out at either end of pre-selected sections of the OHL.

3.9.26 Prior to wiring operations, Equi-Potential Zones (EPZ) pulling positions need to be established. The typical size of a working area required for an EPZ pulling location is approximately 8 m x 12 m. This would likely be set up on trackway panels. As conductors are required to be pulled in opposite directions, two EPZ 8 m x 12 m trackway panelled pulling locations are required at each respective pulling tower (one on the upside and one on the downside of the tower).

3.9.27 Pilot wires would be pulled through the section to be strung. These would be hung on blocks (wheels) at each suspension tower and connected to a winch and tensioner at the respective end of the section. The winch, in conjunction with the tensioner is used to pull the pilot wires between the structures. The conductor is pulled via the pilot wires through the section under tension to avoid contact with the ground and any underrunning obstacles. Once the conductor has been strung between the ends of the section it is then tensioned and permanently clamped at each tower.

Foundations – Wood Pole

3.9.28 For wood poles (i.e. within Section 0 of the project), each pole hole is excavated approximately 4 m long and 2 m wide, and at a depth in the type of terrain present across Section 0 of the route for the Proposed Development, of approximately 2.5 m. Excavated turf and sub soils are stacked separately according to type so that they can be replaced in reverse order, with the turf being replaced on top.

3.9.29 Depending on topography, the type of pole and the ground conditions, the foundations for each H pole would be either:

- augered sleeve, typically requiring the use of a tracked vehicle mounted auger to create two holes approximately 700 mm in diameter and 2 to 3 m deep, into which the poles would be slotted before being grouted. Helicopters could also be used; or
- standard concrete foundation, involving the excavation of soils to create a concrete block foundation.

3.9.30 Foundation types and designs for each pole would be confirmed following detailed geotechnical investigation at each position.

Construction – Wood Pole

3.9.31 Pole erection teams would consist of 5/6 operatives per team, each team equipped with tracked excavators, specialist tracked vehicles, rock breaking equipment and excavation formwork.

3.9.32 The H poles are erected utilising one or two excavators, dependant on complete H pole assembled weight. Stays would be installed at the same time as a pole is erected.

3.9.33 It is anticipated that helicopters would be used for the delivery of materials to pole locations within Section 0. The key benefit of helicopter use for wood pole construction is that 'traditional' repeated vehicular access methods in and out of structure installation locations, hauling the various components that make up a pole structure, are removed.

3.9.34 Traditional machine access would still be required for the construction machinery (moving along the route of the OHL) and for daily access of staff. However, as there is no need for the machinery to carry heavy loads the impact on the ground being travelled over is much reduced.

3.9.35 Helicopter material collection points would be established by the Principal Contractor over the length of the route within Section 0. It is anticipated that collection points would be approximately 5 km apart, with helicopter operations planned to fly 2.5 km in each direction from the collection point to reduce flying times. Poles, steelwork and insulators are assembled/grouped as much as possible to minimise the number of loads to be flown out.

Conductor Stringing – Wood Pole

3.9.36 A typical stringing team would consist of approximately 12 operatives. Temporary backstays would be installed as required and pilot ropes pulled out through the section to be strung. The conductor drums would be mounted on stands at one end of the section to be strung and the conductor fed around a tensioning machine. At the opposite end, the pilot rope would be fed around the puller winch bullwheels.

3.9.37 The conductor would be terminated at the puller end and tensioned by the tensioner. This process would be repeated until the complete section has been sagged and made off to specified design tensions.

*Phase 3 - Commissioning*

3.9.38 The OHL and support towers / poles would then be subject to an inspection and snagging process. This allows the Principal Contractor and SSEN Transmission to check that the works have been built to specification and are fit to energise. The Proposed Development would also go through a commissioning procedure for the switchgear, communications and protection controls through connecting substations. The circuits would then be energised from the substations.

## 3.10 132 kV Underground Cable Installation

3.10.1 Approximately 24 km of double circuit 132 kV underground cable would be installed as part of the Proposed Development. This includes approximately 15 km within Section 2, from the north of Sligachan to Luib (refer to **Figure V1-3.1m to V1-3.1q: The Proposed Development**), and approximately 9 km within Section 6, from within the vicinity of Loch Lundie to Fort Augustus Substation (refer to **Figure V1-3.1oo to V1-3.1qq: The Proposed Development**).

3.10.2 An underground cable solution for this project would comprise of a double circuit, with a cable rating required to match the corresponding OHL at 348 Mega Volt Amps (MVA).

3.10.3 The overall cable construction corridor would typically be approximately 37 m wide to accommodate excavation and cable installation equipment and store excavated materials during construction for reinstatement once the installation process is complete. A temporary haul road would be constructed along the length of the cable during the construction phase, with the circuits installed on either side. Similarly, access points and tracks from existing public roads to the proposed haul road would be required. The general working arrangements for installation of high-voltage underground cable via open cut trench is provided in **Appendix V1-3.2: Further Engineering Design Information**. A photograph showing an underground cable being laid as part of a double circuit installation is included in **Plate 3.7**.

**Plate 3.7: Photograph of Underground Cable Installation**

3.10.4 To facilitate a more efficient installation, cables would be installed via ducts in the open cut trenches (approximately 1.6 m depth[8] x 1.5 m width) which would be backfilled to avoid the need for open-cut trenches over long distances. These plastic ducts would be installed prior to the cable pull job to minimise open ground

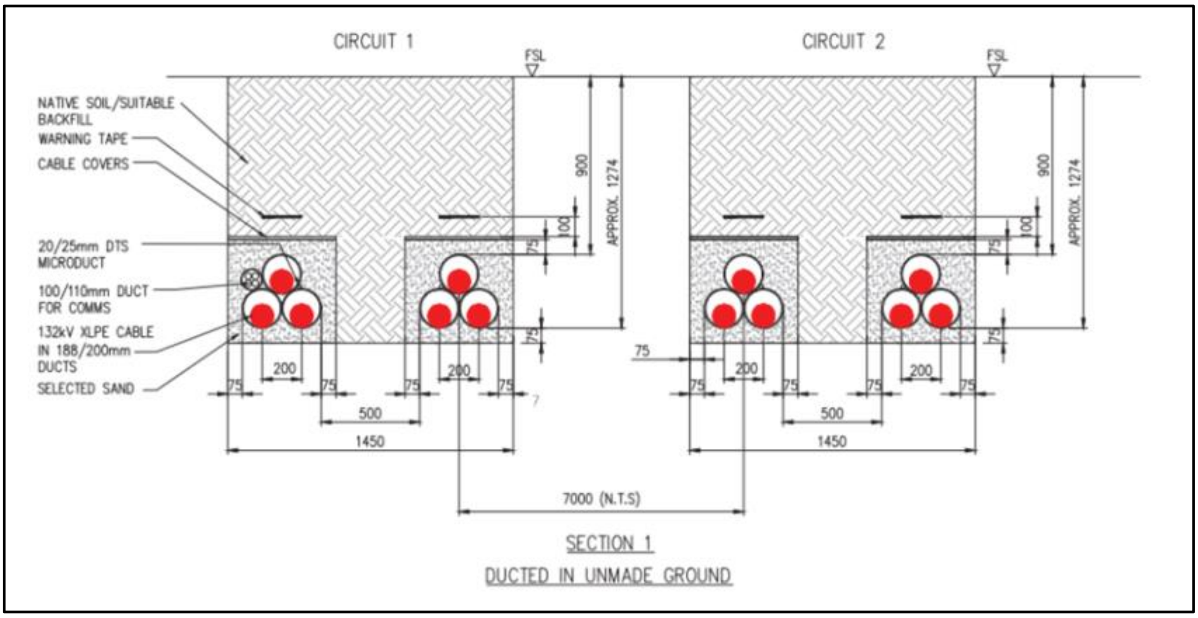
[8] Installation depth will vary depending on ground conditions and other factors.

works / excavations. Joint bays would be required every 900 m to 1,100 m (approximately) along the length of the cable. These would comprise an underground concrete lined structure approximately 9 m in length, 3.5 m wide and 2 m deep. In areas where there is a potential risk of localised flooding within underground joint bays, a cable link box may be required to be installed. This would be an above ground structure, approximately 1.3 m in height, 1.1 m wide and 0.4 m depth (see **Appendix V1-3.2** for photographs and plans of link box structures). Indicative locations for cable link boxes within Section 2 of the project are shown on **Figure V1-3.1m to V1-3.1q**. The requirement for cable link boxes within Section 6 of the project is subject to further assessment.

3.10.5 Once all trenching has been complete, the ducting installed and backfilled, and a joint bay constructed at either end of the cable section, the cable installation process can begin. The cable is coiled on to a cable drum to allow for transportation from the manufacturing plant to the site location. This drum is then loaded on to a cable installation trailer which allows the drum to rotate and the cable to be pulled from the drum. The drum is positioned at a joint bay at one end of the cable section and a winch is positioned at the joint bay at the opposite end of the cable section. A steel wire bond attached to the winch is drawn through the duct until it has reached the joint bay at which the cable drum is positioned. Following pre-installation checks, the cable can be drawn through the duct.

3.10.6 It is anticipated that the underground cable connection would comprise two banks of three 132 kV cables installed in a trefoil duct formation, as shown in **Plate 3.8.** These would be installed within a single trench. A fibre optic cable would also be installed within the trench for monitoring purposes.

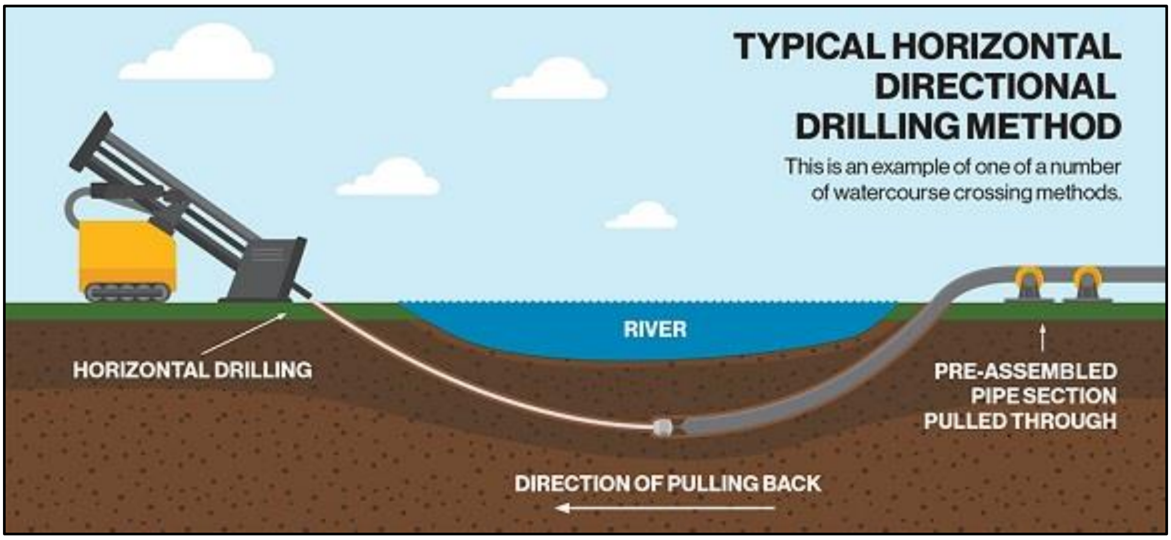
**Plate 3.8: Illustration of Trefoil Duct Formation**




3.10.7 Approximately 1.8 km of underground cable within Section 2 of the transmission connection would be installed under the A87, between Sligachan and Sconser. Whilst the precise method of installation would be determined by the successful Principal Contractor, it is anticipated that a trench would be cut in a single carriageway of the road for each of the two circuits, with the bundles of cable laid in each trench. This would require one circuit to be installed in a single side of the carriageway, with traffic management measures in place to maintain flows of traffic along the other side of the carriageway. It is anticipated that closed sections of carriageway can be kept to a minimum as works would happen sequentially and it should not be necessary to close the entire length of carriageway within which the circuit is being installed. Once one circuit is installed, the road would be reinstated and the same process repeated on the other carriageway for the second circuit. The duration of these works along the A87 is anticipated to be approximately 12 weeks.

3.10.8 Watercourse crossing methods for underground cable installation would be tailored for each crossing dependent on the watercourse width and water volumes. Crossings would either be trenched within the watercourse channel and backfilled, or for watercourses over 2 m wide and where conditions allow, Horizontal Direct Drill (HDD) would be utilised which would involve directional drilling beneath the watercourse channel. HDD is a method of installing underground pipelines, cables and service conduit through trenchless methods. It involves the use of a directional drilling machine, and associated attachments, to accurately drill along the chosen bore path and back ream the required pipe. See **Plate 3.9** below.

**Plate 3.9 – Typical HDD Method**




3.10.9 At HDD locations (indicatively shown on **Figure V1-3.1m to V1-3.1q and Figure V1-3.1oo to Figure V1-3.1qq: The Proposed Development)**, temporary compounds would require to be established (up to approximately 50 m by 50 m) on each side of the watercourse to be crossed. An example of a HDD compound setup is shown in **Plate 3.10**.

3.10.10 Once the compounds are established, the HDD would be progressed in four phases:

- Phase 1: Drill a narrow pilot hole on a pre-determined path;
- Phase 2: Drill a larger hole following the alignment of the pilot hole;
- Phase 3: Install cable ducts in the newly established hole; and
- Phase 4: Install electrical cables within the ducts.

**Plate 3.10: Example HDD Compound**

3.10.11 A directional drill rig would be set up at one end of the HDD section, and then drill to the target location. At the end of the drilling process the drilled material and sediment accumulated in the drill recycling tanks would be removed and disposed of or used for agricultural purposes in an appropriate manner. The HDD launch and reception pits and associated temporary infrastructure would be fully situated within the temporary compounds.

3.10.12 The HDD process involves the use of a drilling fluid made up primarily of water and clay. The purpose of this fluid is to remove cuttings from the borehole, stabilise the borehole, and act as a coolant and lubricant. The main clay component in the fluid is bentonite.

3.10.13 The arrangement of HDD equipment and associated infrastructure within the compounds would vary according to local conditions and identified sensitive receptors.

3.10.14 Advice on the requirement for CAR consent would be discussed and agreed with SEPA prior to the start of works on site to ensure appropriate controls are put in place to prevent impairment of surface or groundwater by the HDD works.

3.10.15 Excavations would be kept free from water by use of mobile pumps, with water pumped to a suitable location as agreed on site by the Ecological Clerk of Works (ECoW) and in accordance with the Applicant's GEMPs (see Part 3.16 of this Chapter). Drainage design measures to ensure the discharge would not result in pollution to surface water will be set out in the Construction Environmental Management Plan (CEMP) (see **Appendix V1-3.9: Outline CEMP**). The temporary haul road would also require appropriately designed drainage and cut-off ditches to maintain natural drainage patterns.

3.10.16 All excavated material would be carefully stored a minimum of 10 m from, and downslope of, any adjacent watercourse, with particular care taken to prevent any risk of runoff or windborne dry sediment being discharged into the watercourses.

3.10.17 Engineered backfill would be placed around the cable ducts in appropriate layers to protect the cable from accidental damage, and to ensure the desired cable rating is achieved. A 75 mm minimum bedding layer of stabilised backfill would be laid in the trench to provide bedding for the ducts. Marker boards would then be placed on top of the engineered fill. Excavated material would then be placed on top of the marker board and compacted in place.

3.10.18 Reinstatement of the surface layers would be completed by returning the remaining excavated material to the trench in layers, in reverse order with the existing vegetation placed on the trench where possible. The reinstatement process is discussed in paragraphs 3.16.7 to 3.16.14 below (see also **V1-Appendix 3.7: Site Reinstatement and Restoration Plan**).

## 3.11 Cable Sealing End Compounds

3.11.1 Cable Sealing End (CSE) compounds are required to facilitate the transitions from underground cable to OHL (and vice versa). As part of the Proposed Development, three CSE compounds are proposed at the following locations:

- North of Sligachan, at approximate grid reference 148068, 832110 (see **Figure V1-3.1m**);
- Luib, at approximate grid reference 156389, 827438 (see **Figure V1-3.1q**); and
- near Loch Lundie, at approximate grid reference 229695, 802602 (see **Figure V1-3.1oo**).

3.11.2 Due to the hazards associated with live electricity, the compound is secured by installing fencing and gates around the perimeter. The compounds are anticipated to be approximately 37 m x 44 m. A permanent access track would be required at each CSE compound.

3.11.3 The plant required to facilitate the transition between underground cable and OHL is shown in **Plate 3.11**, and a photo of a CSE compound is shown in **Plate 3.12**.

**Plate 3.11: Overhead Line to Cable Transition**

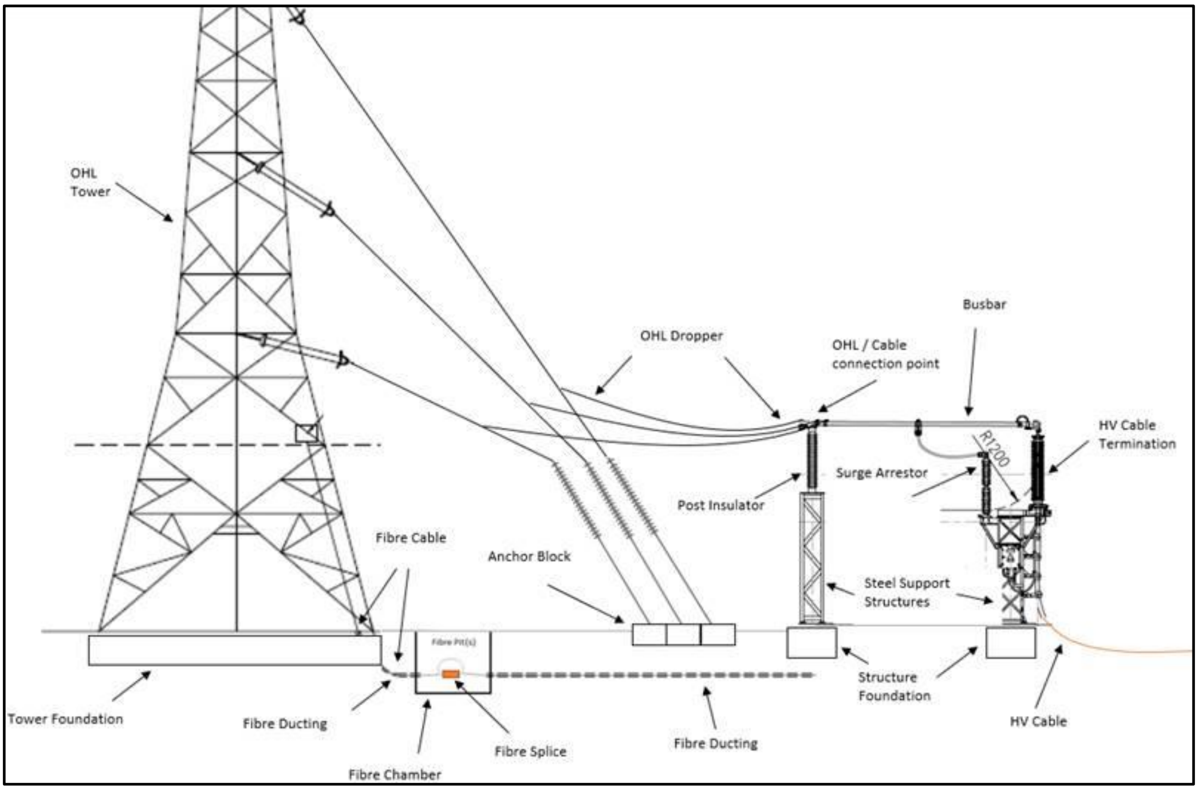



**Plate 3.12: Example of a Cable Sealing End Compound**

### 3.12 Land Use

3.12.1 **Table V1-3.3** summarises the indicative land take associated with the Proposed Development.

**Table V1-3.3: Indicative Land Take for Construction and Operation of the Proposed Development**

| Activity | Construction | Operation |
|---|---|---|
| Access Track (Temporary) | 620,537 | N/A |
| Access Track (Permanent) | 422,047 | 137,036 |
| Temporary Construction Working Area at pole and towers | 1,112,720 | N/A |
| Cable Sealing End Compound | 4,884 | 4,884 |
| Underground Cable in Section 2 | 521,537 | N/A |
| Underground Cable in Section 6 | 347,599 | N/A |
| Permanent Land Take for 132 kV poles and towers | N/A | 707 |
| Area of Operational Corridor within Woodland | 118 ha | 118 ha |

### 3.13 Construction Programme

3.13.1 It is anticipated that construction of the project would take place over a 36 month period (approximately), following the granting of consents and discharge of pre-commencement conditions. A further seven months (approximately) would be required for dismantling works associated with the existing OHL.

### 3.14 Construction Employment and Hours of Work

3.14.1 SSEN Transmission takes community responsibilities seriously. The delivery of a major programme of capital investment provides the opportunity to maximise support of local communities.

3.14.2 Employment of construction staff would be the responsibility of the Principal Contractor but SSEN Transmission encourages the Principal Contractor to make use of suitable labour and resources from areas local to the location of the works.

3.14.3 It is envisaged that there would be a number of separate teams working at the same time at different locations along the Proposed Development route. The resource levels would be dependent on the final construction sequence and would be determined by the Principal Contractor.

3.14.4 Construction working is likely to be during daytime periods only. Working hours are anticipated 7 days a week between approximately 07.00 to 19.00 March to September and 07.30 to 17.00 (or within daylight hours) October to February. Working hours would be confirmed by the Principal Contractor and agreed with The Highland Council as local authority.

## 3.15 Construction Traffic and Site Compounds

3.15.1 Construction of the Proposed Development would give rise to regular numbers of staff transport movements, with work crews travelling to work site areas from a series of site compound areas located throughout the route. Indicative locations and a preliminary appraisal of these locations is included in **Appendix V1-3.2: Preliminary Appraisal of Borrow Pit, Quarry and Temporary Site Compound Areas**.

3.15.2 Smaller satellite material delivery and helicopter lift points (where helicopters are being utilised) would also be required.

3.15.3 Vehicle movements would be required to construct access tracks; deliver the foundation and relevant components and conductor materials to site; and deliver and collect materials and construction plant from the site compounds to work areas. Construction access routes are discussed within **Volume 2: Chapter 10 - Transport**.

3.15.4 A Traffic Management Plan would be prepared by the Principal Contractor, in consultation with SSEN Transmission, The Highland Council and Transport Scotland. The Traffic Management Plan would describe all mitigation and signage measures that are proposed on the public road network. An Outline Traffic Management Plan is provided in **Appendix V2-10.1: Transport Assessment**. Further detail on the anticipated traffic movements associated with construction of the Proposed Development, and an assessment of the likely effects and suggested mitigation measures, is provided in **Volume 2: Chapter 10 - Transport** and the Transport Assessment (**Appendix V2-10.1: Transport Assessment**).

3.15.5 Public road improvements would be required in some areas to facilitate construction traffic. These are largely expected to be undertaken under permitted development rights held by The Highland Council. Further detail on public road improvement works is included in **Appendix V1-3.4**.

## 3.16 Environmental Management during Construction

3.16.1 The assessment in this EIA Report has been carried out on the basis that all works would be carried out in accordance with industry best practice construction measures, guidance and legislation, together with the following documents and procedures:

*GEMPs*

3.16.2 General Environmental Management Plans (GEMPs) have been developed by the Applicant. The GEMPs considered relevant for this project are identified in **Appendix V1-3.5: General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs).**

*SPPs*

3.16.3 Species Protection Plans (SPPs) have been developed by the Applicant and have been agreed with NatureScot (formerly Scottish Natural Heritage (SNH)). These can also be found in **Appendix V1-3.5: General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs).**

*CEMP*

3.16.4 A contractual management requirement of the Principal Contractor would be the development and implementation of a Construction Environmental Management Plan (CEMP). This document would detail how the Principal Contractor would manage the site in accordance with all commitments and mitigation detailed in the EIA Report, statutory consents and authorisations, and industry best practise and guidance. **Appendix V1-3.6: Schedule of Mitigation Measures** provides a summary of all mitigation measures included in this EIA Report.

3.16.5 The CEMP would also reference the aforementioned GEMPs and SPPs. The implementation of the CEMP would be managed on site by a suitably qualified and experienced ECoW, with support from other environmental professionals as required.

3.16.6 An Outline CEMP is included in **Appendix V1-3.9**.

*Reinstatement*

3.16.7 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. Such works would involve the reinstatement of areas disturbed during the construction phase.

3.16.8 A site reinstatement and restoration plan has been prepared to describe the principles and best practice guidance and measures that would be followed in the reinstatement and restoration of disturbed ground. This is included in **Appendix V1-3.7: Outline Site Restoration Plan** and would be developed by the Applicant, the Principal Contractor and consenting authorities as required prior to construction commencing. In more sensitive areas, further site specific measures are required to ensure successful reinstatement, including site specific soil and peat management measures, and the employment of specialist advisers (i.e. ECoW and Landscape Clerk of Works (LCoW)). Such measures are set out in **Appendix V1-3.7: Outline Site Restoration Plan.**

3.16.9 The following paragraphs provide a summary of the working areas that would be reinstated, and typically how this would be achieved.

<u>Reinstatement of Access Tracks</u>

3.16.10 As shown in **Figure V1-3.1a to V1-3.1qq: The Proposed Development,** permanent and temporary tracks are required to facilitate construction and operation of the Proposed Development. Tracks to be retained would be partially reinstated on commissioning of the OHL to reduce their width to approximately 2.5 m for use by SSEN Transmission for maintenance access. Other tracks noted as temporary would be removed and the land reinstated.

3.16.11 Reinstatement would involve replacement of subsoil, then topsoil, grading and installation of drainage as required with turves replaced vegetation side up. Where there are insufficient turves the ground would be allowed to vegetate naturally, although some seeding may be required to stabilise sites and prevent erosion, or where landowner requirements dictate otherwise. Methods for the reinstatement of peat would be set out in the Peat Management Plan (see **Appendix V2-7.2: Peat Management Plan**).

<u>Reinstatement of Work Areas (Towers, Poles and Underground Cable)</u>

3.16.12 Soil would be stored within the working area for each element of the work during construction. Subsoils and topsoil removed to enable the construction of the foundations, or excavation of trenches would be temporarily stockpiled in separate bunds within the working area or corridor, with stripped turves stored on top of the bunds.

3.16.13 Reinstatement would involve replacement of subsoil, then topsoil with turves replaced vegetation side up. Where there are insufficient turves the ground would be allowed to vegetate naturally, although some seeding may be required to stabilise sites and prevent erosion, or where landowner requirements dictate otherwise.

<u>Reinstatement of Construction Compound(s)</u>

3.16.14 At the end of construction all materials, buildings, and temporary compounds would be removed. Where required the land would be regraded with subsoil put down first, then topsoil with turves replaced vegetation side up. Where there are insufficient turves the ground would be allowed to vegetate naturally, although some seeding may be required to stabilise sites and prevent erosion, or where landowner requirements dictate otherwise.

### 3.17 Operation and Maintenance

3.17.1 In general, OHLs and underground cables require very little maintenance. Regular inspections are undertaken to identify any unacceptable deterioration of components, so that they can be replaced. From time to time, inclement weather, storms or lightning can cause damage to either the insulators or the conductors on OHLs. If conductors are damaged, short sections may have to be replaced.

3.17.2 During the operation of the Proposed Development, it would be necessary to manage vegetation along the OC to maintain required safety clearance distances.

### 3.18 Dismantling of the Existing OHL

3.18.1 Following completion of the Proposed Development, the existing 132 kV OHL would be dismantled and removed. The dismantling works are ancillary works for which deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 is sought.

3.18.2 A dismantling plan has been prepared for these works and is included in **Appendix V1-3.8: Dismantling Plan**.

3.18.3 To dismantle the existing OHL, access to each pole or tower location would be required. In the majority of cases, this would require access by tracked vehicles to each pole or tower location. Existing access tracks would be utilised as far as practicable. It is not anticipated that any new access tracks would be required to facilitate dismantling. In areas of steep terrain or in areas where particular environmental sensitivities may favour alternative methods, removal by helicopter is proposed.

### 3.19 Decommissioning the Proposed Development

3.19.1 The Proposed Development would not have a fixed operational life. The effects associated with the construction phase can be considered to be representative of worst case decommissioning effects, and therefore no separate assessment on decommissioning has been undertaken as part of this EIA Report.