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Figures

3. THE PROPOSED DEVELOPMENT

3.1 Introduction

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

3.2 Description of the Proposed Development

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

- The installation and operation of approximately 24.3 km new 132 kV trident pole (H Pole) OHL between a new Cable Sealing End ("CSE") structure approximately 450 m to the southeast of Rothes III Wind Farm (Ordnance Survey (OS) grid reference 322434,847882) and a new CSE structure approximately 900 m north-west of Blackhillock substation (OS grid reference 342233,848695); and
- Ancillary works required to facilitate the construction and operation of the Proposed Development, including tree felling and vegetation clearance, temporary measures to protect road and water crossings, upgrades to existing access tracks and existing access points, new permanent and temporary access routes, permanent stone hardstanding areas related to the CSE structure, and associated working areas around infrastructure to facilitate construction.

3.2.2 The Proposed Development would also include the following works, which would fall under the Applicant's permitted development rights:[1]

- Approximately 450 m of UGC between the Rothes III Wind Farm on-site substation (OS grid reference 322049, 848063) and a new CSE structure to the southeast; and
- Approximately 1.1 km of UGC between the new CSE structure which would be situated approximately 900 m north-west of Blackhillock substation and Blackhillock substation itself (OS grid reference 343098,848409).

3.2.3 All elements of the Proposed Development are described further in this Chapter, and shown on **Figure 3.1:a-c**.

3.2.4 The environmental effects of the installation of the UGC sections are considered within **Appendix 1.1.** The construction methods for installation of UGC are detailed within this Chapter for completeness (see Section 3.4)

Limit of Deviation

3.2.5 A Limit of Deviation (LOD) defines the maximum extent within which a development can be built.

3.2.6 A 100 m LOD (i.e. 50 m either side of the centre line of the proposed OHL alignment) is sought to allow for micro-siting of the OHL during construction as shown on **Figure 3.1**. A 30 m LOD is sought for the construction of new access tracks (also shown on **Figure 3.1)**.

3.2.7 An operational corridor is required through areas of woodland and commercial forestry to ensure the safe operation of the OHL. It is anticipated that the width of the operational corridor would be 36 m either side of the OHL (i.e. 72 m in total). Also, for sections of new track built, a 20 m wide corridor is required (i.e.10 m either side of track centreline). Therefore, in areas of woodland or commercial forestry, should the OHL or access track alignments be microsited within the LoD the associated operational corridor width moves with the OHL or access track alignment. This can sometimes result in the operational corridor overlapping outside the LoD boundary.

[1] Town and Country Planning (General Permitted Development) (Scotland) Order 1992

3.3 Proposed Overhead Line

3.3.1 As displayed on **Figure 3.1a-c**, the proposed OHL would commence from a CSE structure approximately 450 m southeast of Rothes III Wind Farm on-site substation. From the CSE structure, the proposed OHL would continue to travel to the southeast before turning to travel generally northeast towards the town of Rothes. The proposed OHL would cross the A941 just north of a small picnic area then circle around the northern edge of the settlement of Auchinroaths before travelling southeast past Speyburn Distillery. The proposed OHL would then travel generally east, through forestry north of the B9015 passing to the north of the River Spey's prominent northern meander. It would cross the B9015 and travel north-eastward before turning southeast to cross the River Spey by Boat o' Brig. East of Auchroisk Distillery, the proposed OHL would curve north before turning to travel southeast. Towards the crossroads at the Mains of Mulben it would turn northeast, crossing the railway. After turning east around the Malcolmburn Bond Warehouses, it would curve in a south-easterly direction then cross the railway again and the A95 between the Glentauchers Distillery and Rosarie. Approximately 2 km from Keith, the proposed OHL would turn to the southeast towards Blackhillock substation crossing a minor road and the B9014. The proposed OHL would travel across agricultural land, transitioning into UGC approximately 900 m northwest of Blackhillock substation.

Trident H Poles

3.3.2 The proposed H pole is based on a trident design requiring a matched pair of either wood or steel poles erected 2.5 m apart with supporting crossarm steelwork linking the poles at the top. Three conductors in horizontal formation and made from all aluminium alloy would be strung between each H pole. The proposed trident H poles would be generally between 12 m and 14 m in height, including insulators and support, but in some places could be up to approximately 16 m in height including insulators and support, dependent on ground conditions and topography. The OHL would comprise a combination of suspension poles, angle / tension poles and terminal poles, as described below:

- Suspension poles: these are used for straight sections of OHL where there is no need to terminate the conductor;
- Angle poles: these are used either in-line, where there is a need to terminate the conductors, and / or where there is a need to change the orientation of the OHL; and
- Terminal poles: these are used where there is a requirement to terminate the OHL on to an UGC at a CSE structure.

3.3.3 A photograph of a typical H pole is provided in **Plate 3.1**.

Plate 3.1: Typical H Pole

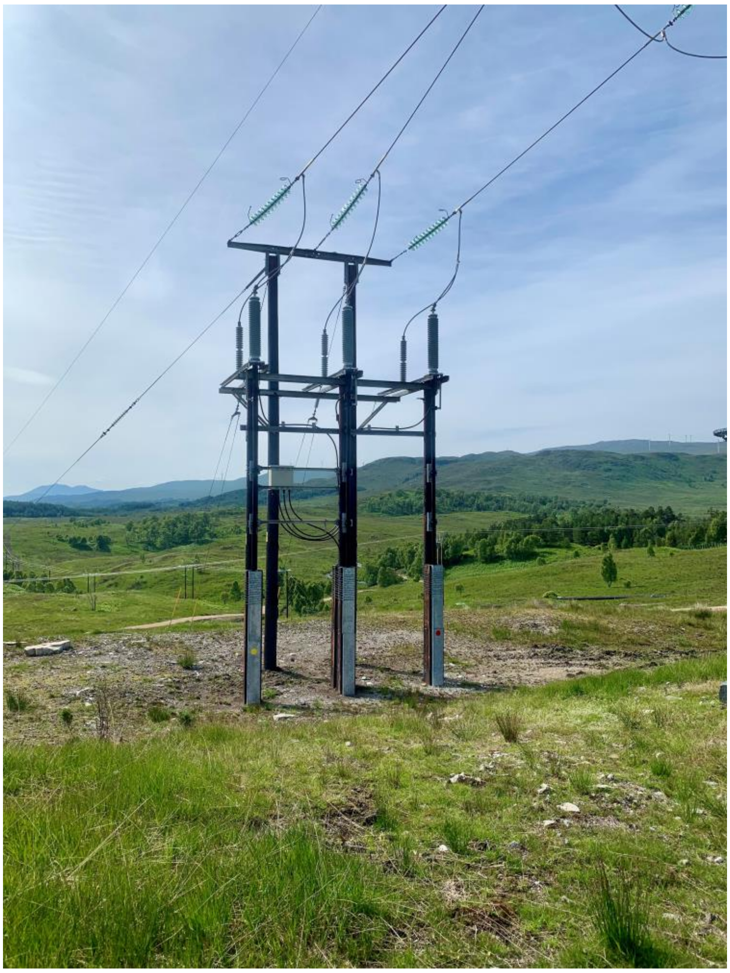
Conductors and Span Length

3.3.4 Three conductors in horizontal formation and made from all 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. 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.

Cable Sealing End (CSE) Structure

3.3.5 CSE structures would be required to facilitate the transitions from UGC to OHL and vice versa. As part of the Proposed Development two CSE structures are proposed (see **Figure 3.1a-c**). The CSE structures would accommodate the CSE equipment and downleads mounted on trident poles. Cables would emerge from below ground and would be affixed to the structure. The cables would be enclosed in protective boxing and anti-climb measures would be installed on the structure for safety reasons. The exact design of the CSE structure would be confirmed by the Principal Contractor. A typical CSE structure is shown on **Plate 3.2** below.

Plate 3.2: Typical Cable Sealing End Structure



3.4 Proposed Underground Cable

3.4.1 As stated above, the UGC works that fall under the Applicant's permitted development rights extend approximately 450 m to connect into the Rothes III Wind Farm on-site substation and approximately 1.1 km to connect into Blackhillock substation. The cable alignments are shown on **Figure 3.1a-c**, along with their LOD of 100 m. Cables would be installed through open cut trench techniques. Given the length of the cable section into Blackhillock substation, one joint bay (a location at which cable lengths are jointed) would likely be required. The location of this joint bay would be agreed during detailed design, and in discussion with the relevant landowner. The joint bay would comprise an underground concrete lined structure approximately 9 m in length, 3.5 m wide and 2 m deep. An above ground link pillar would also be required within 10 m of the joint bay, protected by a stock proof fence. **Plate 3.3** illustrates a typical above ground link pillar. Due to its shorter length, a joint bay would not be required for the cable section into the Rothes III Wind Farm on-site substation.

Plate 3.3: Typical Link Pillar

3.4.2 Once all trenching has been complete, and the ducting installed and backfilled, the cable installation process would be able to begin. The cable would be coiled onto a cable drum to allow for transportation from the manufacturing plant to the site location. This drum would then be then loaded onto a cable installation trailer which would allow the drum to rotate and the cable to be pulled from the drum. A steel wire bond would be attached to a winch and drawn through the duct until it would reach the joint bay or location at which the cable drum is positioned. Following pre-installation checks, the cable would be able to be drawn through the duct.

3.5 Construction Programme

3.5.1 It is anticipated that construction of the Proposed Development would take place over a 22 month period, following the granting of consents.

3.5.2 Key tasks during construction of the Proposed Development would relate to:

- Establishment of a temporary construction compound;[2]
- Establishment of suitable laydown areas for materials and installation of temporary track solutions, as necessary;
- Upgrades to existing tracks (if required) and installation of new stone tracks;
- Felling of trees and tree stump removal along the alignment of the OHL;
- Delivery of structures and materials to site;
- Assembly and erection of trident pole structures and stays; and
- Stringing of conductors using hauling ropes and winches.

[2] The location and design of temporary site compounds would be confirmed by the Principal Contractor and separate planning permissions would be sought as required.

3.5.3 Installation of the trident poles would involve the following tasks:

- Excavation of a suitable area for the trident poles, and backfilling after installation of the pole (backfilling would generally be carried out the same day as excavation so that no open excavations are left overnight). The exact area would depend on the ground conditions at each pole;
- In some pole locations, it may be necessary to add imported hardcore backfill around the pole foundations to provide additional stability in areas where the natural sub soils have poor compaction qualities;
- Conductors would be installed on the trident poles using full tension stringing to prevent the conductor coming into contact with the ground; and
- Remedial works would be carried out to reinstate the immediate vicinity of the structures, and any ground disturbed, to pre-existing use. This would be undertaken using excavated material.

3.5.4 Installation of the UGC sections would involve the following tasks:

- Establishment of a working corridor approximately 30 m wide, centred on the cabling centreline;
- Excavation of a trench up to 2 m in depth and 1.3 m wide, widening through benching and battering where stability and safety concerns arise, and allowing additional space for cable joint bays, where required;
- Clearing out all materials likely to damage cable ducts, e.g. clods, rocks, stones and organic debris, and employ pumps to remove any water;
- Installing ducts within the trench, surrounded by a stabilised backfill material and covered with native backfill;
- Construction of cable joint bays, where required;
- Installation of cable through the ducted sectioning of the cable ends within the joint bay; and
- Reinstatement of excavated surface layers in reverse order and placement of marker boards / posts above the cable line / joint bays at appropriate locations.

3.6 Construction Environmental Management

3.6.1 All works will be carried out in accordance with the following:

GEMPs

3.6.2 General Environmental Management Plans (GEMPs) have been developed by the Applicant. The GEMPs considered relevant for this project are identified in **Appendix 3.1**.

SPPs

3.6.3 Species Protection Plans (SPPs) have been developed by the Applicant and have been agreed with NatureScot. These can be found in **Appendix 3.2**.

CEMP

3.6.4 A contractual requirement of the Principal Contractor would be the development and implementation of a Construction Environmental Management Plan (CEMP). It is anticipated that the implementation of a CEMP would be a condition to any grant of consent. This document would detail how the Principal Contractor would manage the site in accordance with all commitments and mitigation detailed in the EA Report, statutory consents and authorisations, and industry best practice and guidance. **Chapter 10** of this EA Report provides a summary of all mitigation measures identified within this EA, and this will be updated as required following further consultation and consent conditions.

3.6.5 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 Environmental Clerk of Works (ECoW), with support from other environmental professionals as required. SSEN Transmission would undertake monthly inspections and quarterly audits to ensure compliance with the CEMP.

3.7 Construction Practices and Phasing

Phase 1 - Enabling works

Works to Existing Distribution Network

3.7.1 Works would be required to the existing LV, 11kV and 33 kV distribution network within some areas to facilitate safe working and operating conditions given the proximity of the distribution network to the Proposed Development. It is anticipated that these distribution assets would be realigned or undergrounded to make way for the Proposed Development.

Road Improvements and Access

3.7.2 Vehicle access would be required to each pole location for the creation of foundations and to facilitate pole installation, and along the length of the UGC trench during construction. **Figure 3.1a-c** shows the proposed access arrangements, which comprise existing accesses and a combination of new temporary and new permanent access tracks. A transport assessment relating to the Proposed Development is included in **Appendix 3.3**. Access arrangements typically comprise:

- Existing accesses from the public road and tracks would be used during construction wherever possible including forestry tracks and those that serve local properties. Some minor improvements would be anticipated to some of these access points and tracks, including vegetation clearance, localised small scale widening and running surface improvements.
- Where no existing tracks can be used, new access routes would be required. These are shown on Figure 3.1a-c and in **Appendix 3.3** and would be further refined by the Principal Contractor in conjunction with landowners, within the defined LOD. Where the existing ground provides the appropriate bearing capacities, the new accesses would be constructed on-formation. Where the existing ground does not provide the appropriate bearing capacities and / or where peat is located, the new accesses would likely be floated on top of the soft ground, circumnavigating the requirement for deep excavations and disturbance to the peat.
- Other access by low ground pressure vehicles ground may be required between poles. Such access would not require formal access tracks as access would either be via tracked vehicles or temporary trackway systems would be utilised in boggy / soft ground areas where required.

3.7.3 Where upgrades are identified as being required to existing access points from the local road network, further consultation will be undertaken with Moray Council's Roads Department. Access along key routes would be maintained throughout the construction period to ensure no restriction of regular traffic. **Figure 3.1a-c** and **Appendix 3.3** displays and details the locations of existing access tracks to be used or upgraded and indicative new temporary and permanent access routes. Access between poles would also be required, most likely by ATV and / or Trackway panels.

Forestry Removal

3.7.4 An operational corridor would be required to enable the safe operation and maintenance of the OHL. It is anticipated that the width of the operational corridor would be 36 m either side of the OHL (i.e. 72 m in total). While the Proposed Development has been designed to minimise woodland felling requirements where practicable, construction would require the removal of sections of woodland, which would be undertaken in consultation with Scottish Forestry and affected landowners. Where possible, pole locations would be micro-sited to further reduce woodland removal. In addition, the project would seek to adhere to Scottish Government's Control of Woodland Removal Policy.[3]

3.7.5 After felling, any timber removed that is commercially viable would likely be sold and the remaining forest material would be dealt with in a way that delivers the best practicable environmental outcome and is compliant with waste regulations. Compensatory planting will be undertaken for woodland removed as a direct result of the project.

3.7.6 Forestry considerations are discussed further in **Chapter 9: Forestry.**

[3] Forestry Commission Scotland (2009) Control of Woodland Removal Policy

3.7.7 Five Woodland Reports are provided within **Appendix 9.1** detailing tree clearance techniques, operational corridor extents, and a breakdown of areas and timber volumes.

Phase 2 – Construction works

Foundations

3.7.8 The foundations for trident H poles comprise an excavation of approximately 3 m long and 3 m wide for each pole. The total construction area may extend to 20 m by 10 m. Excavated turf and sub soils would be stacked separately according to type so that they can be replaced in reverse order, with the turf being replaced on top. Some backfilling may require the addition of hardcore to provide additional stability in areas where the natural sub soils have poor compaction qualities.

3.7.9 Where shallow rock is encountered along the route, this would require a pecker to break into the rock to a sufficient depth of around 2.5 m.

3.7.10 Stays, where required, would be installed at the same time as a pole is erected, involving the placement of a wooden sleeper block beneath the surface at a depth of approximately one metre.

3.7.11 Where very soft ground conditions are unavoidable, the use of "bog shoes"[4], comprising additional sleepers attached horizontally across the poles below ground, may be required. This would increase the excavated area between the poles.

H Pole Construction

3.7.12 Pole structures would be assembled completely within the laydown areas prior to transportation to the required locations. The assembled pole structures would be moved directly from the assembly areas and erected utilising one or two excavators, dependant on the complete H pole assembled weight. Stays would be installed at angle and terminal poles and potentially on cross slopes for stability.

3.7.13 Pole erection teams would likely consist of five to six operatives per team, each equipped with two tracked excavators, specialist tracked ATVs, rock breaking equipment and excavation formwork.

Conductor Stringing

3.7.14 The conductor would be delivered to site on wooden drums in pre-determined pulling section lengths. Prior to stringing the conductors, temporary protection measures (e.g. netted scaffolds or traffic management such as stop and go boards) would be required across public roads and existing access tracks. Conductor stringing equipment (i.e. winches, tensioners and ancillary equipment) would be set out at either end of pre-selected sections of the OHL.

[4] 'bog shoes' typically consist of large sections of timber, similar in size to railway sleepers, being bolted to pole foundations to increase their width by 2 to 3 m, see images below

3.7.15 A typical stringing team would consist of approximately 12 operatives. The route would be split into manageable sections, temporary backstays installed 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, prior to pulling. The tensioner would maintain the correct tension throughout the conductor pulling whilst the puller provides the 'pull'. Once the new conductor reaches the puller the conductor pulling would be stopped. 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.

3.7.16 In challenging sections, or to minimise the use of new temporary access panels, a helicopter can be utilised to assist with stringing conductors. It is anticipated that any necessary consents (e.g. planning consent or CAR authorisations) required for additional accesses or site establishment during construction would be acquired by the Principal Contractor.

UGC Installation

3.7.17 A working corridor of approximately 30 m would be required during the installation of the 132 kV underground cables. The proposed cabling would comprise one electrical circuit in a single trench comprising of three phases (cables) in a ducted trefoil (triangular) formation. There would also be one fibre duct installed within the trench. The trench would be approximately 1.3 m wide and 2 m in depth. In some instances, the trench could be made wider (through benching and battering) for stability and safety of the workforce. Alternative trench and duct arrangements may be employed for short lengths (<20 m) for specialist crossing locations such as crossing other cable circuits, crossing beneath palisade fencing, areas of peatland etc.

3.7.18 The trench bottom would be uniform with adequate clearance on each side of the ducts and be free from roots, organic debris, clods, rocks, stones, and other materials likely to cause damage to the cable duct.

3.7.19 Trench walls would be supported appropriately where necessary to ensure trench stability. 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 Environmental Clerk of Works (ECoW) and in accordance with SSEN Transmission's GEMPs. 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).

3.7.20 All excavated material would be carefully stored a minimum of 10 m 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.

3.7.21 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.

3.7.22 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.

3.7.23 Due to the length of the cable sections there would be requirements for inline joint installation on the approach to Blackhillock substation. Given the length of the cable section into Blackhillock Substation, one joint bay (where lengths of cable are joined) would be required, as determined by the particular cable type and ground conditions. The location of this would be agreed during detailed design, and in discussion with the relevant landowner. The joint bay would comprise an underground concrete lined structure approximately 9 m in length, 3.5 m wide and 2 m deep. An above ground link pillar would also be required within 10 m of the joint bay, protected by a stock proof fence.

Phase 3 – Commissioning

3.7.24 The OHL and support poles would then be subject to an inspection and snagging process. This would allow the 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 for the substations at the Rothes III Wind Farm and Blackhillock. The circuits would then be energised from the substations.

Phase 4 – Reinstatement

3.7.25 Following commissioning of the Proposed Development, it is anticipated that all areas disturbed during construction would be reinstated. Reinstatement will form part of the contract obligations for the Principal Contractor and will include the removal of all temporary access tracks, all work sites around the pole locations and the re-vegetation of laydown areas to recreate the former habitat as far as possible.

3.8 Construction Employment and Hours of Work

3.8.1 SSEN Transmission considers it important to act as a responsible developer with regards to the communities which host the construction works. The delivery of a major programme of capital investment provides the opportunity to maximise support of local communities. Employment of construction staff would be the responsibility of the Principal Contractor; however, the Applicant would encourage the Principal Contractor to make use of suitable labour and resources from areas local to the Proposed Development where possible.

3.8.2 Construction activities would in general be undertaken during daytime periods only. This would involve work between approximately 07:00 to 19:00 in the summer and 07:30 to 17:00 (or as daylight allows) in the winter, seven days a week.

3.8.3 Any variation in these working hours would be agreed in advance with Moray Council.

3.9 Construction Access

3.9.1 Construction of the Proposed Development would give rise to regular numbers of staff transport movements, with small work crews travelling to work site areas. It is anticipated that the Principal Contractor would identify a single main compound area, with a safe area for parking away from the public road. The obtaining of any necessary planning consent or other authorisations required for the site compound would be the responsibility of the Principal Contractor.

3.9.2 Construction access would utilise existing forestry or estate tracks where possible. Vehicle movements may be required to upgrade accesses and tracks; deliver the foundation and pole components and conductor materials to site; transportation of the workforce; and deliver and collect materials and construction plant from the main site compound and to individual pole locations.

3.9.3 The Principal Contractor would determine where access is required, and for which items of plant, and prepare a Construction Traffic Management Plan (CTMP) in consultation with SSEN Transmission and the local roads authority. To address potential impacts from construction traffic and describe all mitigation and signage measures that are proposed on public road accesses, a CTMP would be prepared pre-construction in consultation with Moray Council and Transport Scotland. Access along or crossing Core Paths, or any recreational routes would be managed via an Outdoor Access Plan, which would form part of the CTMP. The CTMP implemented for the works would be reviewed throughout the project and updated as necessary.

<u>Site Access Arrangements</u>

3.9.4 New permanent access tracks will be required to facilitate site access by construction vehicles for the OHL, as set out in **Appendix 3.3**. These new permanent tracks would be around Rothes III Wind Farm on-site substation, around Smallburn Farm, around Sourden Woods and towards Blackhillock substation. Low ground pressure bearing vehicles would be employed for transport of components to the OHL where feasible. Where required, Trackway panels would be utilised to provide a temporary surface for construction vehicles. Some temporary tracks would also be required to facilitate the construction of the UGC. It is anticipated the requirements for this would be determined at the detailed design stage.

Abnormal Loads

3.9.5 No abnormal loads are anticipated to be required for transport of components for the Proposed Development. All vehicles associated with construction would be below the criteria for abnormal loads, as defined by the UK Government.[5]

Potential Traffic Mitigation

3.9.6 In order to minimise potential traffic effects, the following good practice measures, forming embedded mitigation, would be put into place:

- Driver induction: all contractor drivers would take part in an induction briefing, covering the contents of the Construction Traffic Management Plan, and be updated as required or on a planned basis.
- Driver rotation: drivers and operators of construction vehicles would follow shift patterns allowing appropriate breaks and off days, reducing the risk of accidents.
- Travel times: journeys would be planned so as to avoid passing locations such as schools during opening and closing times or places of worship during services.
- Emergency access: access for emergency vehicles would be maintained at all times.
- Debris control: monitoring and measures would be put in place to ensure site debris is not transferred onto public roads by construction traffic.
- Inspection regime: inspection of construction vehicles and local roads would be carried out at regular periods to ensure safe operations.
- Travel arrangements: where practical, employees involved with construction of the Proposed Development should live locally to minimise the number of journeys required.
- Public access: where practicable, site operations will not restrict or obstruct public rights of way. Where this cannot be avoided, obstruction time would be minimised and an alternative route established.

3.10 Operation and Maintenance

3.10.1 In general, an OHL requires very little maintenance. Regular inspections are undertaken to identify any unacceptable deterioration of components, so that they can be replaced.

3.11 Decommissioning

3.11.1 The Rothes III Wind Farm has been consented with a life of 35 years. The operational life of the infrastructure proposed as part of the Proposed Development is 40 years. If the Proposed Development were to be decommissioned all components of the OHL, inclusive of trident poles, conductors and fittings, would be removed from site and either recycled or disposed of appropriately. A method statement would also be agreed with Moray Council setting out the detail of the decommissioning process. However, efforts would be made to repurpose the OHL for future connections prior to any decommissioning. Consent to be applied for is in perpetuity and therefore a financial guarantee is not appropriate.

[5] GOV.UK. (2019). *Transporting abnormal loads*. [online] Available at: https://www.gov.uk/esdal-and-abnormal-loads [accessed 15 February 2023].