

Proposed 132kV Grid Connection to the North Lowther Energy Initiative



Scoping Report

Environmental Impact Assessment_Scoping Report
Proposed 132kV Grid Connection to the North Lowther Energy Initiative
April 2020



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Preface

This Scoping Report has been prepared on behalf of SP Energy Networks (SPEN). It relates to the proposed development of a new 132kV overhead line to connect from the proposed wind farm development, the North Lowther Energy Initiative (NLEI), to the existing substation at Elvanfoot, South Lanarkshire (“the NLEI 132kV Connection Project”).

This report accompanies SPEN’s request for a Scoping Opinion from Scottish Ministers in accordance with Regulation 12 of the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017 (“The EIA Regulations”).

The Scoping Report is available to download free of charge from:
www.spenergynetworks.co.uk/pages/community_consultation

If you would like any further information or discuss any aspect of the proposed development, please contact the SPEN Project Manager either:

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Summary

Scottish Power Energy Networks (SPEN), through its transmission licence holder Scottish Power Transmission plc (SPT) proposes to construct a new 132kV grid connection in Dumfries and Galloway, and South Lanarkshire. As the transmission licence holder, SPEN is obliged to provide this connection, which is needed to allow the proposed wind farm development, the North Lowther Energy Initiative (NLEI), to input to the electricity network.

The proposed overhead line (OHL) will be a 132kV single circuit connection supported on double "H" wood poles connecting the proposed NLEI substation to the existing substation at Elvanfoot. The overhead line design has been determined following a detailed review of the engineering and technical requirements for the connection.

The wood poles will be approximately 12-16m in height to ensure adherence with minimum safety clearances. The average span between the wooden poles will be approximately 90-110m. An Infrastructure Location Allowance (ILA) is proposed of 50m tolerance either side of the proposed OHL and temporary access routes, to allow micro siting and adjustments to be made at the construction stage. Technical constraints around the existing Elvanfoot Substation require the overhead line to be terminated prior to crossing the B7040. A short section of underground cable will be installed to allow the grid connection to enter the substation.

Consultation at the route selection stage in accordance with the SPEN approach to line routing and environmental impact assessment has been undertaken. The current Proposed Route selected for the NLEI grid connection has taken into account the views expressed during this initial consultation stage. From the outset, SPEN has focused on reducing the environmental impact of the proposed development, whilst remaining technically and economically viable.

The Proposed Route from the proposed North Lowther Energy Initiative substation passes north across Clackleith Burn and Wanlock Water, then north east following the route of the B740. To the south west of the village of Crawfordjohn, the route passes eastwards between Braid Hill and White Hill, and then north to cross Leadhills Road (B797). From this point the route will parallel the existing 400kV overhead line south eastwards to reach the existing substation at Elvanfoot. The total length of this new 132kV grid connection is approximately 19km.

The Proposed Route will be subject to a detailed Environmental Impact Assessment (EIA), the results of which will be provided in an EIA Report. The Report will support the Section 37 application under the Electricity Act 1989 to the Scottish Government for consent to construct and operate the grid connection.

This Scoping Report provides a review of the proposed development at this stage, the study area environment and anticipated significant environmental effects which will be assessed in detail in the Environmental Impact Assessment (EIA). For each topic, the provisional scope and proposed assessment methodology is outlined for review. Proposed matters, which are considered can be scoped out or not addressed in detail in the EIA, are also outlined.

The Scoping Report accompanies SPEN's request for a Scoping Opinion from Scottish Ministers in accordance with Regulation 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to confirm the proposed scope of information to be provided in the Environmental Impact Assessment Report.

Project Need

- 1.1 SPEN through its transmission licence holder Scottish Power Transmission plc (SPT) proposes to construct a new 132kV connection supported on double wood poles in Dumfries and Galloway, and South Lanarkshire. The proposed development is needed to allow the proposed wind farm development, the North Lowther Energy Initiative (NLEI) to connect to the electricity transmission network at the existing substation at Elvanfoot (hereafter referred to as “the NLEI 132kV Connection Project”). The location of the NLEI 132kV Connection Project is shown on Figure 1.1.
- 1.2 This Scoping Report has been prepared on behalf of Scottish Power Energy Networks (SPEN) and will be submitted to Scottish Ministers to seek an opinion under Regulation 12 of the Electricity Works (EIA)(Scotland) Regulations 2017 to confirm the proposed scope of information to be provided in the Environmental Impact Assessment (EIA) Report.
- 1.3 Scoping is an early stage in the Environmental Impact Assessment (EIA) process, the objective of which is to ensure the assessment focuses on the likely significant effects associated with a project. Scoping also provides an opportunity for consultees to comment on the proposed methodologies for the EIA, identify sources of baseline information and raise any specific issues requiring assessment.

The Applicant

- 1.2 SPEN operates and maintains the transmission and distribution networks in central and southern Scotland on behalf of the licence holders, SP Transmission plc (SPT) and SP Distribution plc (SPD). SPT as an electricity transmission licence holder has a statutory duty “to develop and maintain an efficient, co-ordinated and economical system of electricity transmission”¹. It is also subject to licence conditions requiring it to enter into an agreement with the system operator to carry out works and obtain consents necessary to facilitate connections for generators.
- 1.3 To comply with the licence obligations, SPT must provide the proposed North Lowther Energy Initiative with a connection to the transmission system.

Legislative Framework

- 1.4 The legal provisions applying to the development of overhead lines (OHL) in Scotland are principally the Electricity Act 1989 and the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017. All transmission licence holders are required under Section 9 of the Electricity Act to take account of the following factors in formulating proposals for the installation of overhead lines: -
 - a) “to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and,

¹ S9 of the Electricity Act 1989 (as amended by the Utilities Act 2000)

b) to do what he reasonably can to mitigate any effect the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.”

1.5 SPEN interprets the words “reasonably can” to mean that it should make every effort to mitigate the environmental effects, whilst bearing in mind the technical constraints imposed by overhead transmission line technology, and its duties under Section 9 of the Electricity Act. In summary, SPEN is required to identify electrical connections that meet the technical requirement of the electricity system, which are economically viable, and cause on balance, the least disturbance to both the environment and the people who live, work and enjoy recreation within it.

Routeing Objective and Approach

1.6 The SPEN routeing objective for this project is to:
 “identify a technically feasible and economically viable route for a 132kV single circuit wood pole overhead line connection from the proposed wind farm development, the North Lowther Energy Initiative to the existing substation at Elvanfoot that meets the requirements of the electricity network and causes, on balance, the least disturbance to the environment and people, who live, work and enjoy recreation within it.”

1.7 The adopted approach by SPEN² to routeing overhead transmission lines is summarised in Table 1 below and detailed in Appendix 1.0.

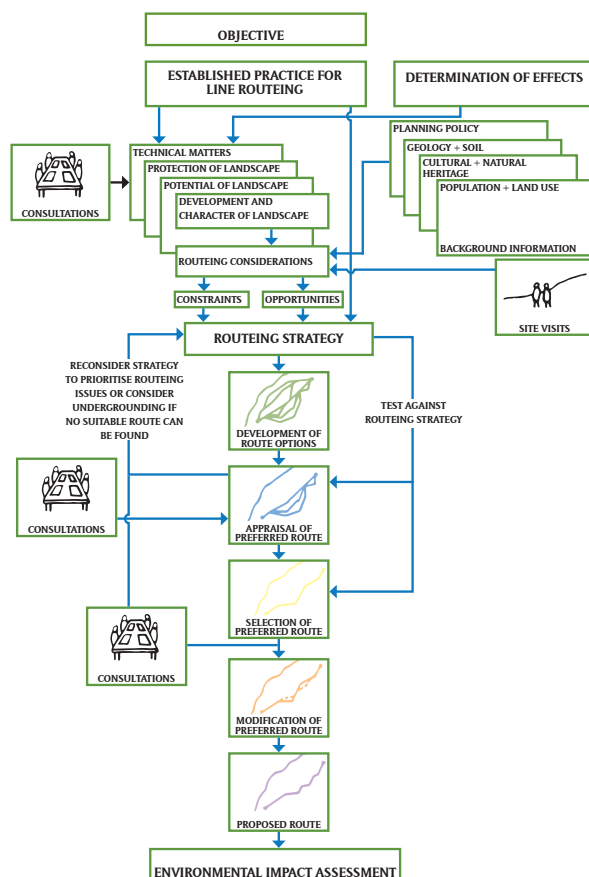


Table 1: Approach to Routeing and EIA of Overhead Transmission Lines

² LUC for ScottishPower (2015) Major Electrical Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment.

The Development and Consenting Process

- 1.8 The Project comprises three key phases:
- Phase One: Routeing and Consultation
 - Phase Two: Environmental Impact Assessment
 - Phase Three: Application for Consent

Phase One: Routeing and Consultation

- 1.9 Phase One comprises a review of environmental, technical and economic considerations and the application of established step by step routeing principles to identify and appraise potential route options to establish a “Preferred Route” for the OHL. The methodology and findings of the routeing process were presented in the Proposed 132kV Grid Connection to NLEI Routeing and Consultation Document (December 2019)
- 1.10 Following identification of a Preferred Route, initial consultation with the public, as well as with the local authority, statutory consultees, other appropriate agencies and landowners was carried out from the 13th January 2020 until 14th February 2020. A Consultation Leaflet was circulated to all providing information regarding the proposed grid connection, where to view the Routeing and Consultation Document and how to make any comments regarding the Preferred Route. A copy of the Routeing and Consultation Document has also been made available to view at the Council Offices, public libraries in Lesmahagow and Sanquhar, and the SPEN website. Exhibitions were also held at Sanquhar and Crawfordjohn on the 13-14th January 2020 from 14.00-20.00 hrs each day, with representatives of SPEN and Environmental Designworks present on both days.
- 1.11 The organisations consulted to date along with a summary of comments received during the consultation period and at the Exhibitions and proposed action by SPEN is provided in Appendix 2.0. No objections were raised from any statutory or non-statutory consultees.
- 1.12 Feedback received through the consultation process has been taken account of by SPEN through a review process, culminating in the confirmation of the “Proposed Route”, to be progressed to the next stage. The consultation process to date has helped to identify and collect useful environmental information for the Scoping Report, highlight areas of environmental concern, opportunities for mitigation and define the scope of environmental assessment. A summary of the route selection process to date has been placed in Appendix 3.0.

Phase Two: Environmental Impact Assessment

- 1.13 Phase Two comprises an Environmental impact Assessment (EIA) of the “Proposed Route”. This is required under The Electricity Works (EIA) (Scotland) Regulations 2017, given the nature and scale of the NLEI 132kV Connection Project. The EIA process will seek to avoid, reduce and where possible, offset likely significant impacts on the environment through an iterative routeing design process for the proposed OHL.
- 1.14 This will initially involve the scoping of the EIA through a request to Scottish Ministers and will culminate in the production of an Environmental Impact Assessment Report (EIA Report), which will report on the effects of the construction and operation of the NLEI 132kV Connection Project in its entirety.

Phase Three: Application for Consent

- 1.15 Following completion of the EIA Report, SPEN will apply to Scottish Ministers for consent under Section 37 of the Electricity Act 1989 (“the Electricity Act”), as amended, to install, and keep installed, the proposed OHL identified above. In conjunction with the Section 37 application, SPEN will apply for deemed planning permission for the OHL and any ancillary development under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, as amended. The EIA Report will accompany the application. For the proposed development this will be Dumfries and Galloway, and South Lanarkshire Councils.

Scoping Report

- 1.16 The Proposed Route is now being carried forward to Phase 2 with the preparation of a detailed Environmental Impact Assessment (EIA), the results of which will be reported in an EIA Report.
- 1.17 To ensure that the EIA Report covers all the relevant issues and that the concerns of external stakeholders are taken into account, this Scoping Report has been prepared to identify and review the potential likely significant effects of the proposed development on the environment. This provides a review of the proposed development to the extent known at this stage, the study area environment, key issues to be considered in the Environmental Impact Assessment and matters which are proposed can be scoped out or not addressed in detail in the EIA Report. For each topic the provisional scope and proposed assessment methodology is outlined for review.
- 1.18 A proposed list of Consultees, which should be approached by the Energy Consents Unit (ECU) as part of the scoping consultation process, and / or contacted by individual specialists from the NLEI 132kV Connection Project Team to inform the EIA, is provided in Appendix 4.0. Additional suggestions of stakeholders who may have an interest in the development, and who may wish to be consulted for information to inform the EIA are invited as part of the scoping consultation process.

Structure of the Scoping Report

- 1.19 This Report comprises of the following Chapters:
- Chapter 2:** Project Description
 - Chapter 3:** Study Area Environment
 - Chapter 4:** Scope of Environmental Impact Assessment
 - Chapter 5:** Scope of Topic Assessments
 - Chapter 6:** Proposed Structure of the EIA Report
- 1.20 In addition, the Appendices contain the following: -
- Appendix 1:** Approach to Overhead Line Routeing.
 - Appendix 2:** Summary of Consultee Responses.
 - Appendix 3:** Route Options Summary
 - Appendix 4:** List of Potential Consultees
 - Appendix 5:** Preliminary Draft Schedule of Mitigation Measures.
- 1.21 At the back of the Scoping Report are the References and a Glossary.

Project Team

- 1.22 This Report has been prepared for SPEN by Environmental Designworks, an environmental planning and landscape design practice, with specialist input from: SPEN on the proposed overhead line engineering design and technical issues; CFA Archaeology Ltd; BSG Ecology; Golder Associates and Scottish Woodlands Ltd.
- 1.23 This Scoping Report is available to view on the internet and download free of charge at: www.spenergynetworks.co.uk/pages/community_consultation.aspx
- 1.24 If you would like any further information or discuss any aspect of the proposed development, please contact the SPEN Project Manager either:
By email to: nleprojectmanager@spenedrgynetworks.co.uk

By post to North Lowther Energy Initiative Project Manager,
SPEN Environmental Planning,
55 Fullarton Drive,
Glasgow G32 8FA.

2.0 Project Description

Proposed Connection

- 2.1 The proposed NLEI 132kV Connection Project will be a 132kV connection supported on double “H” design wood poles (hereafter referred to as “double wood pole”), which will carry a single 3 phase circuit. The wood poles will be approximately 12-16m in height to ensure adherence with minimum safety clearances. The average span between the wooden poles will be approximately 90-110m. The approximate length of the Proposed Route alignment between the proposed NLEI and Elvanfoot Substation is 19km.
- 2.2 Technical constraints around the existing Elvanfoot Substation require the overhead line to be terminated prior to crossing the B7040. A short section of underground cable will be installed to allow the grid connection to enter the substation. The proposed underground 132kV grid connection will use oil free cables contained in a trench approximately 1.5-2.0 m wide and 1.3m depth. The total length of underground cable will be approximately 150m.
- 2.3 A diagram and photographs of an existing double wood pole overhead line and typical underground trench is provided in Figure 2.1.

Proposed Route

- 2.4 The Proposed Route as indicated in Figure 2.2, has been developed following the adopted routeing strategy and is considered at this project stage to have on balance the least likely adverse environmental effects, whilst being technically feasible and economically viable. At this project stage, the Proposed Route should be viewed as a “corridor” within which the detailed route alignment can be developed through localised deviations to avoid or reduce identified effects during the environmental assessment process.
- 2.5 The route identification and development reflects engineering technical design limitations such as slope gradients, rock outcrops, avoidance of areas of deep peat and proximity to other service infrastructure. Detailed technical, topographical and ground condition studies are currently being progressed to develop the Proposed Route design upon which the environmental assessments will be based.
- 2.6 It should be noted at this project stage that wherever practicable areas of peat will be avoided. If this is not possible site infrastructure will be located in areas of shallower peat or an appropriate engineering solution designed to avoid and/ or minimise excavation of peat by for example, piling solutions, floating roads/ working areas.
- 2.7 From the NLEI Substation, the Proposed Route at this project stage is aligned as follows:
- route descends hillside passing north eastwards through the edge of the coniferous plantation of Duntercleuch Rig, crossing Clackleith Burn and west of the farmhouse of Clackleith.
 - route passes to the east of an archaeological site on Clackleith hill and crosses the Wanlock Water. The Muirkirk to Wanlockhead long distance footpath is aligned along this valley.

- route aligned along the lower slopes and valley floor parallel to the B740, and watercourse of Whitecleugh Lane which flows into Crawick Water. The route is located within the Leadhills and Lowther Special Landscape Area (SLA), and the road forms the eastern boundary of the Muirkirk and North Lowther Uplands Special Protection Area (SPA). In this area of rough open and improved grassland there are a few scattered farmhouses and residential properties.
- route passes along the edge of a large area of peatland forming Crawick Moss.
- Route aligned along the lower slopes and valley floor parallel to the B740 and Duneaton Water.
- route passes eastwards across fields with a few isolated farms and residential properties. The route is located within the Leadhills and Lowther SLA.
- route ascends White Hill through an area of young coniferous plantation forming part of Cleuch Forest. Broadleaved trees have been planted to the edge of the woodland and along Glentewing Burn.
- route crosses minor road and descends across open fields and Lettershaws Burn to Lettershaws farm and adjacent residential properties. A caravan site is located to the south of the B797 road.
- route passes through the southern edge of Cleuch Forest parallel to the B797. The route passes to the south of Lettershaws Scheduled Monument, and is then aligned south eastwards crossing the B797 and leaving the Leadhills and Lowther SLA. The route then passes along the small valley of Glencaple with a farmhouse and adjacent residential property to parallel the existing 400kV overhead line.
- route parallels the existing 400kV line to reach Elvanfoot Substation. The north west ethylene pipeline and national gas pipeline are aligned in a north- south direction through this area.
- the proposed underground cable route is then aligned from the Proposed OHL Route across an area of rough sloping grassland and crosses the B7040 to reach Elvanfoot Substation.

Micro- Siting & Infrastructure Location Allowance

2.8 The proposed NLEI 132kV Connection Project development footprint will continue to be developed and detailed through technical, engineering and environmental review as an integral part of the design and EIA process. Even post consent the final vertical and horizontal profile of conductors, pole positions and access track routes may require to be refined to reflect the following:

- Pre-construction confirmation of dynamic environmental conditions e.g. the location of protected species.
- Detailed technical survey information, particularly for unconfirmed ground conditions.
- Provide further scope for the effective mitigation of any likely environmental impacts.
- Minor alterations as requested by landowners.

- 2.9 To ensure that the final positions of the OHL poles and associated temporary and permanent infrastructure are not varied to such a degree as to cause an increase in the likely significant environmental impacts in the EIA Report, an Infrastructure Location Allowance (ILA) is proposed. This will permit the siting of a pole to be adjusted within 50m tolerance either side of the proposed OHL and temporary access routes. It is proposed that the Infrastructure Location Allowance forms part of the Section 37 application and any condition attached to consent.
- 2.10 Implementation of the ILA will be controlled through the proposed Construction Environmental Management Plan (CEMP). Should a request to vary a pole or access track position within the ILA be raised, the relevant environmental baseline surveys undertaken to inform the CEMP will be reviewed in the first instance as these surveys extend beyond the proposed 50m ILA tolerance. Should this review identify any potential issues, further environmental advice will then be sought from the appropriate specialists. A procedure for notifying relevant statutory consultees of proposed ILA movements will also be agreed with these bodies prior to construction commencing.

Overhead Line (OHL) Infrastructure

- 2.11 With an overhead electricity line, conductors (or wires) are suspended at a specified height above ground and supported by wooden poles or lattice steel towers, spaced at intervals. Conductors can be made of aluminium or steel strands. Most overhead lines at 132kV and above carry two 3 phase circuits, with one circuit strung on each side of a tower. An earth wire may be required to provide lightning protection.

Tower Type, Height and Span Length

- 2.12 The proposed overhead line will be supported on double wood poles due to the altitude and weather conditions, such as ice and wind loading, associated with the study area.
- 2.13 The heights of the wood poles reflect the statutory clearances required for the conductor, which is determined by the voltage of the overhead line (the higher the voltage, the greater the safety clearance that will be required) and the span length required between poles. Wood poles will have nominal lengths ranging from 8.5m to 24m. These will be installed at a minimum excavation depth of 2m. Taking this excavation depth into account, together with topography and span lengths, it is anticipated that the wood poles for the NLEI 132kV Connection Project will have a height between 12m and 16m above ground.
- 2.14 The section of overhead line between poles is known as the “span”. With the distance between them known as the “span length”. The maximum span length between double wood poles is 150m, although provision can be made for an increased distance of 200m. In typical use at low altitude, 120m is the usual span length. At higher altitude, where more extreme weather is prevalent, the span length is reduced to between 90m and 110m to take account of greater ice and wind loading factors.
- 2.15 Wood poles are fabricated from pressure impregnated softwood, treated with a preservative to prevent damage to structural integrity. New wood poles are dark brown in colour and weather over time to a light grey.

- 2.16 There may occasionally be a need to use lattice steel towers on wood pole OHLs. Towers are fabricated from high tensile steel, which is assembled using galvanised high tensile steel bolts with nuts and locking devices. Examples where towers may be used include crossing a watercourse with steep valley sides that would make the construction process for wood poles difficult. In this situation it may be necessary to construct a steel tower either side of the watercourse to achieve the span length required to cross the valley. Other examples requiring the use of steel towers would occur if slope gradients are too steep to be able to construct and ‘stay’ the wood poles into the ground.

Underground Cables

- 2.17 Where a section of underground cable is required, for example where the OHL terminates and connects into the substation, the conductors are encased in insulated material and buried in a trench of suitable depth and width, and then backfilled. Whilst the number of cables, and the depth and width of the trench depends on the circuit rating and voltage, the overall width of the trench can be further increased by other factors. The final width is dependent on, for example: the installation method; environmental issues; ground conditions; and access requirements during construction. Where connected to an overhead line, an underground cable may also involve the creation of a fenced compound for the siting of above ground terminal supports and sealing end compounds.

Maintenance

- 2.18 The majority of components of overhead lines are maintenance free. Working conditions in which a line operates and the effects of the environment on exposed elements do give rise to corrosion, wear, deterioration and fatigue after many years in service. Regular inspection identifies any unacceptable deterioration at an early stage, so action can be taken to maintain a high level of security and safety on all components in accordance with the Electricity Supply Regulations. Access arrangements for maintenance and fault repairs will be made with the relevant landowners and undertaken within the agreed wayleave.
- 2.19 There is also an ongoing requirement to ensure that any trees within the wayleave corridor are managed to maintain required safety clearances.

Operational Life

- 2.20 Depending on the severity of pollution and local weather conditions, experience indicates that the components of a new overhead line of this type would require refurbishment after approximately 40 years. At that time it is likely conductors, insulators and fittings would be replaced. In addition, as things stand, should the wind farm operation come to an end, the NLEI 132kV Connection would also be decommissioned accordingly.

Decommissioning

- 2.21 When a line is decommissioned, the poles are removed and all components reused where possible. Foundations are extracted to a minimum depth of one metre below ground level and the ground reinstated to the satisfaction of the landowner.

Construction Process

- 2.22 The construction of overhead lines and underground cables requires additional temporary infrastructure such as temporary access to the wood pole locations and construction

compounds to store materials. All have limited maintenance requirements and are subject to well-established procedures for dismantling/ decommissioning.

- 2.23 The construction of the proposed grid connection will be procured by SPEN. This contract will appoint specialised contractors for specific elements of work, such as civil engineering works and overhead line construction. Each specialist contractor will be required to comply with the requirements set out in the EIA Report and any conditions or other restrictions placed upon the Section 37 consent, through the Construction Environmental Management Plan (CEMP).

Construction Environmental Management Plan

- 2.24 A Construction Environmental Management Plan (CEMP) in conjunction with SPEN's Construction, Health, Safety and Welfare requirements will control all potential environmental effects of the construction works. The CEMP controls and guides working practices during construction such as: implementation timescales; detailed design measures to safeguard sensitive habitats and species; further surveys as required before commencing works etc. The document will also incorporate SNH, SEPA and other relevant guidelines by adopting current best practice in protecting the environment during the works.
- 2.25 Construction Method Statements will be used to describe the nature of proposed works and the protection measures being applied for specific activities in accordance with the CEMP. This will aim to ensure all activities are carried out to minimise the environmental effects.

Programme

- 2.26 Construction of a wood pole takes place in one single operation, i.e. the hole is dug and the pole erected within the same day.
- 2.27 The construction programme for the NLEI 132kV Connection Project will be confirmed at detailed design stage and project start following the granting of statutory consents and after all necessary land purchase/ wayleave arrangements have been concluded.

Pre-Construction Activities

- 2.28 SPEN and appointed Contractors will seek to liaise further with those directly affected by the proposed development prior to commencing with works on site to ensure all effects during construction are minimised.
- 2.29 Prior to commencing the construction of the OHL, a precision ground survey will be carried out to determine the ground profile along the centre of the proposed line route and for 25m on either side where the ground profile slopes across the line route. This is to ensure that the locations selected for the wood poles and the relationship with each other comply with the technical limits laid down for maximum span lengths, maximum sum of adjacent spans and safety clearances to live conductors in the final siting. Further consideration is also given to the detailed environmental effects as outlined in the CEMP and landowner requirements.
- 2.30 Where the route of the line passes over or is in close proximity to trees that could infringe safe clearance to 'live' conductors, the tree must be felled or pruned prior to the construction. Any trees felled as part of the proposed development wayleave will be undertaken in adherence to the mitigation measures as listed in the CEMP.

Construction Method for an OHL

2.31 Construction of overhead lines typically follows a standard sequence of events as outlined below:

(i) Tree Felling where required

Felling will be undertaken with tracked mechanical harvesters designed to cause least ground and soil structure damage. Manual chainsaw operators will support the harvester to fell any trees that are too large or heavily branched. Once felled, timber is stacked on the ground to await extraction to the roadside.

At this early project stage it is proposed that any mature commercial forestry (20-50 years) felled to accommodate the works shall be used for timber products. Young non-commercially viable trees (0-20 years) will be chipped and the mulch spread to an agreed depth for the specific location.

All commercial felling operations including access tracks and protection of watercourses will be undertaken in accordance with UKFS/UKWAS³ Guidelines. Timber will be harvested conventionally with the resulting lop and top left and used as brash mats to provide floatation for the extraction of the timber products as per standard forestry practices to minimise ground damage. At this project stage it is envisaged that areas felled beyond the required OHL wayleave to accommodate for example, for potential windthrow will be returned to the landowner and replanted in accordance with the Long Term Forestry Plan unless an alternative proposal is identified during the environmental assessment process.

Other individual trees depending on the species, location and future use shall be felled as close to the ground as possible and the stump either treated with a suitable herbicide or removed by a stump grinder.

(ii) Construction of Temporary Construction Compounds

Temporary construction compounds will be required for the provision of site offices, welfare facilities and the storage of construction materials. The temporary compounds will be located close to the existing road network, and where services and utilities can be easily accessed. The appointed contractor in agreement with SPEN will identify these sites prior to construction. Each temporary compound will be fully restored when the grid connection has been commissioned.

(iii) Preparation of Temporary Accesses

Wood pole construction generally involves the use of a tracked excavator and low ground pressure vehicles such as tractors, argocats or quad bikes to deliver, assemble and erect each of the wood pole structures. There may be some instances where an access track may need to be formed using imported stone or temporary matting.

Where new temporary access tracks are required, the type will be determined based on the ground conditions, landuse and environmental sensitivity of the location. The three main types of access are:

- Low pressure vehicle use.

³ UK Forest Standard/ UK Woodland Assurance Standard.

- Floating tracks.
- Wood/steel matting.

Where floating stone access tracks are used over peat, best practice guidance⁴ will be followed and the risk of compaction will be minimised by:

- Using suitably graded geotextiles and geofabrics to spread loading.
- Micro siting tracks to avoid any particularly wet areas of peat.
- Using appropriate drainage techniques to maintain the natural peat hydrology.

The least disturbance to current land use and land management practices will be sought, and the use of existing tracks will be maximised where possible with upgrading works undertaken where necessary. It may be necessary to construct temporary spurs from existing roads/tracks into each pole position. The temporary access roads will be identified by SPEN for inclusion in the EIA Report and application for consent. These will later be confirmed with the appointed contractor.

The CEMP will set out the detailed criteria for identifying the types of tracks required and the appropriate installation and removal techniques for each type.

Temporary bridges may also need to be installed to provide access over watercourses for construction. For narrow burns, a mat of timbers will be used supported by steel beams. Larger watercourses will require the installation of a steel plate deck which will have safety barriers at either side supported by main support beams and steel cross members.

All watercourse crossings will be designed to comply with the Controlled Activities (Scotland) Regulations. These will adhere to the general binding rules and may, in some instance require a Licence.

Where temporary crossing of watercourses are required, it is envisaged at this stage of the project that there will be two types:

- Narrow burns- a mat of timbers supported by steel beams.
- Larger watercourses- steel plate decking bridge supported on main beams and cross members.

(iv) Temporary Working Areas including Excavation and Construction of Foundations

The likely required temporary working areas around wood pole positions is 30m x 20m. A 5m tract under the route is also required for conductor stringing. These areas are reinstated and restored upon completion of the construction works.

Wood pole foundations involve an excavation to allow the pole brace block or steel foundation brace to be positioned in place. A typical pole excavation will be 3m x 3m and 2m deep. Excavated material is sorted and used for backfilling once the pole is erected.

(v) Assembly and Erection of Poles

For wood poles, the cross-braced steelwork, insulator fittings and wood poles will be assembled local to the pole site and lifted into position by the tracked excavator, which

⁴ SNH/FC (2010) Floating Roads on Peat

excavated the foundations. The foundation holes will then be backfilled with the excavated material and the pole stay wire supports attached in preparation for conductor stringing.

(vi) Stringing of Conductors and Commissioning of the Line

Stringing of the poles will only commence after a sufficient number of structures have been completely erected. Temporary pulling points will be established at angle poles. These may coincide with temporary pole working areas and will generally be 30m x 20m in area.

At each pulling area, a winch will be set up at one end of the stringing area. A “tensioner” will be set up at the other end of the section. Pilot wires will be placed in blocks fitted to the top of the insulator strings and connected to both the winch and the tensioner. Using the winch, the conductor will then be drawn through the section, with the tensioner providing a constant tension. This allows the conductor to be pulled above the ground minimising damage to the conductor and the ground below.

(vii) Reinstatement

Upon completion of construction activities, the temporary working areas and construction compounds will be fully reinstated and restored to their previous condition.

Services

- 2.32 The proposed transmission line may cross underground pipelines and services. In these locations all requirements of the appropriate authority will be adhered to, both at the detailed design stage, when locating individual poles and ensuring minimum safety clearances are achieved, and at the construction stage by complying with relevant Codes of Practice and adopting Safe Working Procedures and Operations.
- 2.33 Prior to stringing the conductors, any roads, which are to be crossed by the proposed overhead line, have to be protected by building a scaffold tunnel “sky cradle” through which vehicles can safely pass.

Completion

- 2.34 Wood pole construction is completed with the reinstatement of ground around the poles, access routes and construction compound, all in accordance with the CEMP and as agreed with the landowner. Any surplus material will be treated in accordance with the CEMP and Site Waste Management Plan.
- 2.35 The CEMP will outline the required clearance measures to be implemented at the outset of the construction work. This may require for example: the existing vegetation and materials holding the seedbank (i.e. 300mm of the top of the softer materials) to be stripped and carefully set aside for reuse; or whole turves set aside and stored vegetation side up for use in surface restoration. In all cases, topsoil and subsoil will be carefully excavated and stored separately in accordance with BS4428 for ground reinstatement on completion of the works.

Construction Method for Underground Cables

- 2.36 Open cut trenching is the most frequently used construction method for cable installation. However, in crossing under watercourses or motorways for example, a trenchless technique such as directional drilling may be used.

- 2.37 Works at each section commonly consist of the construction of a haul road, the excavation of the cable trench by mechanical excavators, cable laying, the backfilling of the trench with sand and backfill material, and surface reinstatement. A typical cable installation rate is up to 160m per week, depending on the terrain. A temporary construction compound is also required and again this is generally located close to the midpoint of the cable route.
- 2.38 Annual maintenance checks on foot are commonly required during operation. Except for low growing vegetation the cable route will also be kept clear. In the unlikely event that there is a fault along the cable, the area round the fault will be excavated and the fault repaired or a new section of cable inserted as a replacement. If lines are decommissioned, cables can either be left in situ, or carefully excavated and removed.

Waste

- 2.39 As part of the CEMP a Site Waste Management Plan (SWP) will be prepared for the proposed development, which will detail the requirements for management of any waste in accordance with statutory and licencing requirements, accepted good practice and to ensure that wherever possible materials are reduced, reused or recycled in preference to disposal. Any waste emanating from the construction works will be collected in predetermined areas on site and transferred to a licenced site by a registered waste carrier in accordance with the SWP.
- 2.40 At this project stage likely waste streams are considered to be as follows:
- Toilet facilities.
 - Municipal type wastes.
 - Subsoil/ Stone from wood pole excavations.

Draft Mitigation Measures

- 2.42 All mitigation measures and any consent conditions will be detailed and implemented by the Construction Environment Management Plan (CEMP) prepared specifically for the proposed grid connection to the NLEI. The CEMP will be read in conjunction with other Plans including: Construction Programme, Traffic Management Plan and Site Waste Management Plan.
- 2.43 A preliminary draft of actions that SPEN will implement to reduce, offset, prevent or compensate for potential adverse effects identified at this early project stage has been prepared and placed in Appendix 5.0. Mitigation measures will be developed further during the EIA process and inform the finalised CEMP.
- 2.44 A Draft Structure and Contents list for the CEMP, Preliminary Schedule of Information to accompany the application for consent and references is also outlined in Appendix 5.0.

3.0 Study Area Environment

The Project Routeing Strategy

- 3.1 The routeing strategy, which informed the identification and appraisal of the route options was: “Route options will recognise the elevated topography and ridgelines of hills making use of appropriate crossing points and the containing landform to avoid areas of highest amenity value and sensitivity as far as possible. Proximity to settlement and other forms of development within the Study Area will also require consideration”.

Study Area

- 3.2 The first step in the routeing process involved identification of the Study Area, to establish and define an area of search for route options and the gathering of environmental baseline data. In identifying the Study Area, it was important to ensure this was large enough to accommodate all likely route options reflecting the Routeing Objective and Routeing Strategy.
- 3.3 In this area the topography largely defines broad corridors within which it would be feasible to route an overhead line between the proposed NLEI substation and the existing substation at Elvanfoot. A preliminary check was also carried out to identify the presence of International, European or Nationally Designated areas within or immediately adjacent to, the study area, to ensure that potential effects on these areas could be considered from the outset.
- 3.4 Taking account of the above, and also informed by topography, a wider area encompassing the potential route options was then identified extending approximately 5km to either side to form the boundary of the Study Area.

Environmental Baseline

- 3.5 Information regarding the environmental features and sensitivities of the proposed Study Area at this stage of the Project is presented below and in the accompanying Figures 3.1- 3.8 (placed at the end of this Chapter).
- 3.6 The information for these Figures and provided in this Chapter was collected from published documents, site visits and initial contact with a number of consultees. In detail, the following has been undertaken: -
- Desk study of aerial photographs and historic maps.
 - Desk review of current environmental and planning data, designations, Local Development Plans and Policies.
 - Site appraisal of environmental resources and potential receptors within the Study Area
 - Reference to the Dumfries and Galloway, Borders, Glasgow and Clyde Valley Landscape Assessments by Scottish Natural Heritage.
 - Information available from: Local Development Plans covering the Study Area, Historic Environment Scotland website, SNH Website and SEPA website.
- 3.7 Information has also been obtained from the EIA Reports and supporting documents for the North Lowther Energy Initiative and the Harryburn Wind Farm, both of which have Study Areas that overlap the grid connection study area. A risk assessment of past mine workings in the Study Area has also been undertaken (Golder, 2019).

Planning Policy Context

- 3.8 The following Local Development Plans (LDPs) cover the Study Area: -
- Dumfries and Galloway LDP 2019
 - South Lanarkshire LDP 2015⁵
 - Glasgow and Clyde Valley Strategic Development Plan 2017

Key Landscape Features of the Study Area

Landform

- 3.9 An elevated range of undulating rounded hills defines a series of narrow valleys. Collectively named the Lowther Hills, these form part of the Southern Uplands, with the interlocking hill tops at around 500m AOD. Notable high points are Green Lowther at 732m AOD located to the east of the village of Wanlockhead and East Mount Lowther at 631m AOD to the south.
- 3.10 This range of hills divides the watersheds of the River Clyde and River Nith. To the west of Wanlockhead, the Wanlock Water joins the Crawick Water and the River Nith, which flows southwards to Dumfries. The Duneaton Water, Glengonnar Water and Elvan Water flow north eastwards to join the River Clyde, which flows north to Glasgow.

Landcover

- 3.11 The landcover of the upland area is mainly rough grassland and moorland encompassing the valley sides and hilltops. The extensive coniferous plantation of Duntercleugh Rig extends around the hill of Wedder Dod to the west of Wanlockhead, and Cleugh Forest to the south of Crawfordjohn encompasses White Hill and Braid Hill.
- 3.12 Along the valley bottoms are fields of improved and semi improved pasture, bounded by stone walls, and post and wire fences. Along the Duneaton Water valley there are strips of shelterbelt woodland to the north and south of Crawfordjohn. The woodland along the Glengonnar Water has been recently felled. The few areas of deciduous or mixed woodland are limited and restricted to the settlements and the grounds of farmhouses and isolated residential properties.
- 3.13 Around the settlements of Wanlockhead and Leadhills are relics of the past intensive mining of the area with spoil heaps, ore processing facilities, engineering structures and dismantled railway lines. The areas of former mineral workings and associated tipping are clearly identifiable by the lack of vegetation.

Landuse

- 3.14 The landuse of the Study Area is largely determined by the topography and elevation. The valley slopes and higher ground are primarily upland farmland and commercial forestry plantations. The heather moorland is managed for grouse shooting.
- 3.15 The valley floors are primarily agricultural land used for sheep grazing. The settlements of Crawfordjohn and Elvanfoot, and scattered farmsteads are located in this lower area. The villages of Wanlockhead and Leadhills are located in elevated and more exposed locations having developed as part of the past mining of the area.

⁵ Replacement LDP2 should be adopted 2020.

3.16 Aligned along the Glengonnar valley in a north-south direction is the B797, which passes through Wanlockhead and Leadhills and links Sanquhar to Abington. The B7040 follows the alignment of the Elvan Water and links Leadhills to Elvanfoot. Further north the B740 passes north eastwards linking Sanquhar to Crawfordjohn.

Landscape Designations (Figure 3.1)

3.17 The following regional landscape designations are located within or adjacent to the Study Area as indicated in Figure 3.1

- Thornhill Uplands Regional Scenic Area (RSA)
- Leadhills and Lowther Hills Special Landscape Area (SLA)

3.18 The noted landscape qualities of these areas are summarised as follows:

Thornhill Uplands RSA

- Area centred around the Middle and Upper Dales of the River Nith and the series of upland glens formed by its tributaries;
- Varied and contrasting upland and valley scenery ranging from exposed remote summits of the Lowther hills to the wooded gorge of the Nith above Drumlanrig to the pastoral character of the wide enclosed upper valleys;
- Accessible main valleys, relatively high population and managed landscape. Popular area for informal recreation; and
- Forestry and windfarm pressures.

Leadhills and Lowther SLA

- An extensive area of high, smooth, rolling hills and varied upland glens with a sense of emptiness engendered by a lack of extensive forestry or wind farm development;
- Cultural features include the mining heritage surrounding Leadhills and remains of settlements on the sides of glens;
- Extensive areas of rough grassland and heather moorland vegetation;
- The Southern Upland Way and other walking routes accessible via the M74/A74 (M) and main roads passing through the west; visitor attractions at Leadhills and fishing on the Daer reservoir.

Landscape Character Assessment (Figure 3.2)

3.19 Scottish Natural Heritage (SNH) has undertaken a series of Regional Landscape Character Assessments covering the whole of Scotland. Following established guidance⁶, the Landscape Character Assessment divides the landscape into a number of Landscape Character Types and Areas, and provides guidance and advice as to how development could be accommodated in the landscape. The different landscape character types in the Study Area are listed below and illustrated in Figure 3.2.

3.20 The majority of the Study Area encompasses the Southern Uplands Landscape Character Type (LCT) in Dumfries and Galloway and South Lanarkshire.

Key Visual Qualities of the Study Area

3.21 In summary the main visual spaces are either restricted and confined along the valley corridors, or panoramic views of the surrounding area afforded from hill tops. In addition to

⁶ Landuse Consultants (1991) Landscape Assessment Principles and Practice & Countryside Commission (1993) Landscape Assessment Guidance (CCP423).

stationary vantage points, transient views are also afforded of the Study Area: from roads, the B740, B797, B7040, A702 and M74; and network of footpaths which includes the long distance routes of the Southern Upland Way and Muirkirk to Wanlockhead Drove Road.

3.22 The main visual receptors located in the Study Area are: residential encompassing the settlements of Crawfordjohn, Wanlockhead, Leadhills, Elvanfoot, Abington and Crawford, and scattered farmhouses and residential properties; recreational e.g. visitors primarily to the villages and users of the public footpaths, attractions in the area such as Leadhills Mining Museum, Crawfordjohn Museum and Leadhills golf course; grouse shooting; fishing; and travellers using the roads through the Study Area.

Protected Areas and Features (Figures 3.3- 3.8)

Nature Conservation (Figure 3.3)

3.23 The following international and national designated areas are located within the Study Area:

- North Lowther Uplands Site of Special Scientific Interest (SSSI) located adjacent to the Proposed Route (biological interest);
- Muirkirk and North Lowther Uplands Special Protection Area (SPA) located adjacent to the Proposed Route (biological interest);
- Leadhills – Wanlockhead SSSI which comprises three discrete units located close to Wanlockhead and Leadhills (geological interest);
- Craighead Hill Quarry SSSI located to the north-east of Crawfordjohn (geological interest);
- Raven Gill SSSI located to the east of Ravengill Dod and west of Crawford (geological interest);
- Red Moss SSSI / SAC located to the north of Crawfordjohn (biological interest).

3.24 There are no national nature reserves, local nature reserves or country parks located within the Study Area. Information on local wildlife sites has yet to be obtained.

3.25 Key natural heritage interests identified in the Study Area include:

- Notable habitats including blanket bog, wet and dry heath, marshy grassland, acid flush, base rich flush, and unimproved grassland.
- Potential Ground Water Dependant Terrestrial Ecosystems (GWDTEs).
- Various watercourses that are likely to be used by fish including salmonids and lampreys, as well as riparian mammals, in particular otter and potentially water vole (although it is noted that no water voles have been found during surveys carried out for the proposed North Lowther Energy Initiative and proposed Harryburn Wind Farm).
- Breeding, foraging and passage birds in the area.
- Badgers, which may use habitats along the overhead line route corridor.

- Red squirrel, which may use woodland habitat along the overhead line route corridor.

Cultural Heritage (Figure 3.4)

- 3.26 Digital baseline information on known cultural heritage assets recorded within a rectangular Assessment Study Search Area of 238 km² (NGRs NS 80 11/NS 80 25 to NS 97 11/NS 97 25) was obtained in August 2019 from datasets curated by Historic Environment Scotland, West of Scotland Archaeology Service (WoSAS), on behalf of South Lanarkshire Council (SLC), and Dumfries and Galloway Council (DGC).
- 3.27 Within the search area, designated cultural heritage features consist of:
- 42 Scheduled Monuments (SM), of national importance and with statutory protection; one of which (Wanlockhead Lead Mines (SM5597)) is a Property in Care (PiC).
 - 24 Listed Buildings (LB), with statutory protection (3 Category A; 11 Category B; 10 Category C).
 - Two Conservation Areas (CA), of regional importance and with statutory protection: Wanlockhead and Leadhills (within which most (17) of the Listed Buildings are located).
 - One Inventory Garden and Designed Landscape (GDL) of national importance: Scot's Mining Company House, Leadhills.
 - One Archaeologically Sensitive Area (ASA): Wanlockhead Lead Mines (locally designated, by Dumfries and Galloway Council, and classified as being of regional importance).
- 3.28 In addition to these assets, local authorities Historic Environment Records (HERs) contain details of more than 600 non-designated assets of archaeological and cultural heritage interest within the Assessment Study Search Area. Of these, more than 100 are classified, in the HER entries, as potentially being of national importance (non-statutory register (NSR) sites).
- 3.29 The assets are diverse in both their date and their character and reflect human occupation and exploitation of the landscape since early prehistory. They include prehistoric burial and ritual sites, and settlements; Roman military forts, camps and roads; medieval and later rural farming settlements; medieval-post-medieval industrial (mining) remains; and historic buildings and designed landscapes.

Geology and Hydrology (Figures 3.5 & 3.6)

- 3.30 This section presents the baseline geological and hydrological information that has been collated to date for the Study Area.

Soils and Peat

- 3.31 The soils mapped in the Study Area predominantly comprise peaty podzols and brown earths (Scotland's Soils, 2019). There are localised areas of peat and peaty gley soils (Scotland's Soils, 2019).

Geology

- 3.32 Most of the Study Area is mapped by the British Geological Survey, as not having any superficial deposits at the surface (i.e. soils directly overlie bedrock, or exposed bedrock would be encountered at the surface). Superficial deposits are mapped in the river valleys. Alluvium and/or glacial till deposits are mapped along the Wanlock Water river valley and along the Elvan Water river valley towards Elvanfoot, along Crawick Water, Duneaton Water, River Clyde, Snar Water and Glengonnar Water (BGS, 2019).

3.33 The British Geological Survey (BGS, 2019) maps bedrock in the western and northern parts of the Study Area (including around the proposed North Lowther Energy Initiative) as comprising the Kirkcolm Formation, which is a wacke with mudstones. The central and eastern sections of the Study Area are mapped as being underlain by the Portpatrick Formation, which is a wacke and siltstone turbidite succession similar in origin to the Kirkcolm Formation. There are localised felsite dykes and conglomerates mapped within this formation. A band of the Crawford Group and Moffat Shale Group (undifferentiated) is mapped through the Kirkcolm Formation. This geology comprises mudstone, chert and smectite claystone. A small area of Glendouran Breccia Formation, which comprises sandstone and conglomerate, is mapped in the northern part of the Study Area.

Mining

3.34 A desk study mining risk assessment for the Study Area (Golder, 2019) highlighted the mining history in and around the villages of Leadhills and Wanlockhead that has resulted in the presence of historical mining features such as spoil tips, ore processing facilities and underground workings. The highest risks associated with mining hazards (in order of aggregate risk) were identified in the areas around Wanlockhead and Leadhills. In contrast, limited mining hazards were identified in the wider Study Area encompassing the Proposed Route.

Hydrology

3.35 There are numerous burns mapped in the Study Area that originate from springs located towards the tops of the hills, or from disused mine workings. These springs may not flow all year round and their flow is likely to be dependent on precipitation in the preceding time period (i.e. the burns are likely to be ephemeral).

3.36 These burns feed into either Snar Water or Glengonnar Water in the centre of the Study Area, Crawick Water to the northwest, Duneaton Water to the north, Mennock Water to the southwest, or Elvan Water to the east.

3.37 The Study Area straddles the watershed between the River Nith and River Clyde catchment areas. The watercourses in the west and southwest of the Study Area that feed into Wanlock Water, Crawick Water and Mennock Water, ultimately flow into the River Nith. The watercourses in the northeast, east and south of the Study Area that flow into the Duneaton Water and Shortcleuch Water/Elvan Water, ultimately flow into the River Clyde. Both the River Nith and the River Clyde were classified by SEPA as salmonid waters under the Fresh Water Fish Directive. The Directive has been revoked, but SEPA continues to have water quality objectives in relation to freshwater fish as part of its River Basin Management Plans.

3.38 River water bodies in the Study Area that have been classified under the Water Framework Directive (2000/60/EC) have mainly been classified as having 'good' or 'moderate' overall classification status (Scotland's Environment, 2019). There are no surface waters in the Study Area that are classified as a Drinking Water Protected Area under The Water Framework Directive and The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2007 (Scottish Government, 2019).

3.39 Flood risk mapping published by SEPA (2019) shows fluvial (river) flood risk is limited to the area immediately adjacent to the main watercourses. Lower reaches of some of the smaller burns that flow into these watercourses are also mapped as presenting a fluvial flood risk. There are localised small areas of mapped risk of surface water flooding adjacent to most watercourses within the Study Area.

Hydrogeology

3.40 The Study Area is predominantly located on the Silurian-Ordovician aquifer, which is described as a fracture flow, low productivity bedrock aquifer (BGS, 2015), so the likelihood of there being significant groundwater abstractions for supply is considered to be low. Groundwater is unlikely to be encountered in the bedrock except at shallow depths (BGS, 1988).

3.41 The presence of mine adits, levels and shafts could also provide pathways for groundwater flow. There is also reportedly a legacy of heavy metals (lead, zinc, cadmium and copper) contaminating groundwater and the Wanlock Water valley downstream of Wanlockhead as a result of mine-water discharges and from runoff passing through/over mine waste (Golder, 2019; Land Use Consultants, 2017).

3.42 The majority of the area is classified as being of Vulnerability Class 5 (vulnerable to most pollutants, with rapid impact in many scenarios) or Class 4 (vulnerable to those pollutants not readily adsorbed or transformed). This is likely to be due to the limited superficial and soil cover over most of the Study Area.

3.43 The western part of the Study Area is located within the Upper Nithsdale groundwater body area, which is within the Solway Sub-Basin District (Scotland's Environment, 2019). The eastern part of the Study Area is located within the Leadhills groundwater body area, which is within the Clyde Sub-Basin District (Scotland's Environment, 2019).

3.44 Information presented in the Environmental Statement for the Proposed North Lowther Energy Initiative (LUC, 2017) indicates that there are unlikely to be any public water supply sources in the Study Area. Private water supplies have been identified in the western part of the Study in the Environmental Statement for the proposed NLEI.

3.45 The Environmental Statement for the Harryburn Wind Farm includes information about SEPA licences and private water supplies located in the eastern part of the Study Area (SLR, 2017). It is stated in the report that no SEPA licensed abstractions or Scottish Water drinking water abstractions sources were located in the area studied, but private domestic water supplies (mainly sourced from springs) were present.

3.46 The Scottish Wetland Inventory (Scottish Wetland Inventory, 2019) indicates that there are very few wetlands recorded within the Study Area (Figure 3.6). Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) were identified in the western part of the Study Area as part of the North Lowther Energy Initiative baseline work (LUC, 2017) and in the eastern part of the Study Area (SLR, 2017). These potential GWDTE were considered in the wind farm assessments as being rainfall and surface water dominated and, therefore, not groundwater dependent.

Designated Sites

- 3.47 There are a series of internationally and national designated sites located in the Study Area. The majority of these are designated for their biological interest, but some are designated for their geological interest. These include: Leadhills Wanlockhead SSSI (geological); Raven Gill SSSI (geological); Craighead Hill Quarry SSSI (geological); Red Moss SSSI / SAC; North Lowther Uplands SSSI (biological); and the Muirkirk and North Lowther Uplands SPA (biological).
- 3.48 There are a series of Geological Conservation Review (GCR) sites located within the Study Area and concentrated around Wanlockhead and Leadhills, called Leadhills-Wanlockhead. The majority of these GCR sites are also part of the Leadhills-Wanlockhead SSSI. There is also a GCR site at Raven Gill SSSI, located approximately 3 km northwest of Elvanfoot and at the North Lowther Uplands SSSI.
- 3.49 In summary the baseline geological and hydrological information indicates that the key geological and hydrological aspects of interest (i.e. likely receptors), located within the Study Area are:
- Nationally designated geological sites (including geological sites);
 - Hydrological/hydrogeological regimes supporting areas of peat;
 - Hydrological/hydrogeological regimes supporting areas of potential GWDTE;
 - The quality and flow of water in the surface watercourses (particularly those that are tributaries of salmonid waters);
 - Surface water and groundwater that provide sources of private water supply (quality and quantity);
 - Areas that are at risk of flooding.

Commercial Forestry (Figure 3.7)

- 3.50 Within the Study Area there are two large areas of commercial forestry, Duntercleugh Rig and Cleugh Forest. The proposed North Lowther Energy Initiative encompasses Duntercleugh Rig, which was originally planted in the 1970s. This plantation benefits from a diverse age structure, following phased felling and replanting programmes under the Scottish Forestry approved Queensberry (North) Forest Plan dating back to the late 1990's. The forestry affected comprises primarily of Sitka Spruce in the age range 0-20 years.
- 3.51 The proposed NLEI requires the felling of 69.11 ha of conifer woodland of which 32.50ha will be replanted with commercial conifers and 36.61 Ha compensatory planting will be delivered within the development area. The felling and replanting proposals are outlined in the NLEI Environmental Statement and have been designed in consultation with Buccleuch Estates and Scottish Forestry.
- 3.52 Cleugh Forest is located to the south of Crawfordjohn and encompasses Braid Hill and White Hill. Broad leaved tree planting has been undertaken on the plantation edges and along the Glentewing Burn.

Recreation Features/ Routes (Figure 3.8)

3.53 In summary the main recreational features, attractions and routes located in the Study Area are as follows: -

- Crawfordjohn Museum.
- Wanlockhead Mining Museum and Café.
- Wanlockhead Beam Engine.
- Leadhills and Wanlockhead Railway.
- Leadhills 9 hole Golf Course.
- Lowther Hills Ski Club.
- Southern Upland Way.
- Numerous walks identified as Core Paths and other footpaths passing along the valleys and hills in the area e.g. Muirkirk to Wanlockhead Drove Road, Coffin Road.
- Lowther Hills Grouse Moors
- Viewpoint on East Mount Lowther.

Other

3.54 Lowther Hill radar station is located to the south east of Wanlockhead and is one of the systems used by National Air Traffic Services (NATs) to ensure air safety. The surrounding area is therefore a NATs Primary Radar Safeguarding Area.

3.55 A national gas pipeline and the north west ethylene pipeline pass to the east of Elvanfoot Substation as indicated in Figure 3.7.

Approach Background

- 4.1 The legislation⁷ states that the Environmental Impact Assessment (EIA) in Regulation 4: “must identify, describe and assess in an appropriate manner, in light of the circumstances relating to the proposed development (including, where the proposed development will have operational effects, such operational effects) on the factors specified in paragraph (3) and the iteration between those factors: -
- (3) The factors are: _
- a) population and human health;
 - b) biodiversity, and in particular species and habitats protected under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (s) and Directive 2009/147/EC (of the European parliament and of the Council on the conservation of wild birds (B);
 - c) land, soil, water, air and climate;
 - d) material assets, cultural heritage and the landscape.”
- 4.2 This scope is not prescriptive; it is for the applicant and the consenting authority to agree the scope of each EIA on a case-by-case basis. The process adopted for this proposed development has comprised of the following steps:
- an initial schedule of topics considered to be of potential relevance was compiled;
 - the likelihood of significant effects arising from each topic was assessed;
 - where possible, further review was carried out to clarify this assessment;
 - topics that are considered unlikely to give rise to significant effects have been scoped out; and
 - a final schedule of topics drawn up for review and discussion (Table 2.0).

Initial Schedule of Topics

- 4.3 The following topics were considered to be of potential relevance in this case:
- Agricultural Land;
 - Air Quality
 - Climate Change (primarily in relation to carbon emissions);
 - Cultural Heritage;
 - Ecology;
 - Electric and Magnetic Fields
 - Electronic Interference (primarily in relation to aircraft safeguarding);
 - Forestry;
 - Hydrology and Hydrogeology (primarily in relation to surface/ groundwater and GWTDE);
 - Landscape and Views;
 - Noise and Vibration;
 - Socio Economics;
 - Recreation and Tourism;

⁷ Electricity Works (EIA)(Scotland) Regulations 2017

- Traffic and Transport;
- Utilities and Infrastructure;
- Waste and Resource Use;
- Water Quality and Drainage.

- 4.4 The likelihood that these topics may give rise to significant effects in the absence of mitigation was assessed on the basis of available information and has been categorised as:
- (a) Unlikely
 (b) Possible
 (c) Probable
- 4.5 Five Category (c) topics were identified: Cultural Heritage; Ecology; Forestry; Hydrology and Hydrogeology; and Landscape and Views. Significant effects were considered to be probable for these topics because of the scale and extent of the development.
- 4.6 The remaining topics were considered to fall into Category (b), in that significant effects could not be ruled out, but neither could they be regarded as probable, partly because of the likelihood that these could be avoided through mitigation.
- 4.7 The Category (b) topics were then revisited to test whether any might be moved up or down a category. Following further work, review and discussion to confirm commitment by SPEN at this project stage to mitigation that would ensure that significant effects could be avoided (Appendix 5.0), a number of topics have been reassigned to Category (a) i.e. unlikely to give rise to significant effects

Final Schedule of Topics

- 4.8 The final schedule of proposed topics for detailed assessment are listed below for review and discussion at this project stage. This Scoping Report seeks to obtain a scoping opinion to confirm the proposed scope and content of the Environmental Impact Assessment to accompany the Application for Consent, and review the proposed methodology of assessment for these key topics.

Table 2.0 Proposed Final Schedule of Topics

Topic	Regulation 4 Reference	Justification
Cultural Heritage	Archaeological & Architectural Heritage	<p>Potential effect on character or setting of known (or potential) heritage assets of national, regional or local importance during construction and operation.</p> <p>The Study Area includes a number of cultural heritage assets and the development will involve ground disturbance, which in the absence of mitigation could damage such assets.</p> <p>At this project stage, potential effects are considered to include:</p> <ul style="list-style-type: none"> ▪ Potential direct impacts on known, designated and non-designated heritage assets; ▪ Potential direct impacts on hitherto unknown buried

		<p>archaeological remains; and,</p> <ul style="list-style-type: none"> ▪ Potential effects on the settings of designated heritage assets (most notably on Scheduled Monuments and Listed Buildings in close proximity to the OHL).
Ecology	Flora & Fauna	<p>The Study Area includes habitats of interest and is used by protected species.</p> <p>At this project stage potential effects during construction and operation are considered to include:</p> <ul style="list-style-type: none"> ▪ Loss or disturbance of habitats of local or national significance. ▪ Loss or disturbance of GWDTEs. ▪ Pollution of watercourses and tributaries that are likely to be used by salmonid fish, lampreys, otter and potentially water vole. ▪ Potential damage to places of rest used by otter and disturbance during the construction. ▪ Potential damage and disturbance to water vole habitat, should they be present within the OHL corridor. ▪ Potential damage or disturbance to badger setts, should they be present within the OHL route corridor. ▪ Potential loss of trees which may be used by roosting bats, nesting birds and breeding red squirrel. ▪ Disturbance of breeding, foraging and passage birds in the area, and potential for collisions with overhead lines. ▪ Potential indirect effect on the Muirkirk and North Lowther Uplands SPA.
Forestry	Material Assets	<p>Potential effect on existing commercial forestry plantations at Duntercleuch Rig and Cleugh Forests during construction and operation. The Long Term Plans (LTP) for both forests will need to be amended to accommodate for the proposed OHL and agreed compensatory planting.</p>
Hydrology & Hydrogeology	Water & Soil	<p>Potential effects to the geological or hydrological environment during construction and operation could result from the following:</p> <ul style="list-style-type: none"> ▪ The physical disturbance of nationally important geological sites. ▪ Changes in land quality as a result of disturbance of contaminated areas associated with historical mining. ▪ Changes in surface water or groundwater quality as a result of construction activities (e.g. disturbance of historically contaminated areas resulting in mobilisation of contaminants, release of sediment from stockpile storage, storage of weather sensitive materials at

		<p>laydown areas, construction and use of access tracks, mechanical digging of new or existing drainage and cable channels, vehicle access over watercourses, construction of watercourse crossings and digging of excavations, leaks/spills of fuel/oils, foul waste from welfare units, pH changes due to use of cement).</p> <ul style="list-style-type: none"> ▪ Changes in surface watercourse morphology and flow resulting from construction in watercourses or on banks. ▪ Changes in local surface water flows, drainage patterns and associated flood risk. ▪ Changes in infiltration rates and groundwater recharge due to increased hardstanding. ▪ Changes in groundwater flow direction (e.g. due to subsurface features). ▪ Changes in groundwater flows and levels due to excavation dewatering (if required). ▪ Disturbance of/changes to hydrological regime of peat/bog habitats and GWDTE. <p>It should also be noted that the proposed development has the potential to be affected by subsidence or contamination resulting from historical mining features, and from flooding.</p>
<p>Landscape & Visual</p>	<p>Landscape</p>	<p>Potential landscape and visual effects of proposed development during construction and operation. The development will represent a change in the landscape involving the potential loss of some features, and effect the character and views. At this Project stage this is considered to include:-</p> <ul style="list-style-type: none"> ▪ Residential receptors including the villages of Crawfordjohn, Abington, Crawford and Elvanfoot. ▪ Thornhill Uplands Regional Scenic Area and Leadhills and Lowther Special Landscape Area. ▪ Walking and Cycle Routes including the Southern Upland Way and Muirkirk to Wanlockhead Drove Road. ▪ Visitor Attractions and Viewpoints. ▪ Travellers along the B740, B797, M74, B7040, A702 and minor roads.

Proposed Topics to be Scoped Out

4.9 With SPEN’s commitment to mitigation from the outset, the following topics are proposed at this stage to be scoped out of the assessment or covered as part of other topic headings. These proposed scoped out topics are: Agricultural Land; Air Quality; Climate Change; EMF; Electronic Interference; Noise and Vibration; Socio Economics; Recreation and Tourism; Traffic and Transport; Utilities and Infrastructure; Waste and Resource Use; and Water Quality and

Drainage. An explanation to support the suggestion that particular environmental impacts are likely to be insignificant and therefore scoped out at this stage is provided below.

- 4.10 Draft mitigation measures adopted by SPEN for the proposed development and commitment to supply specific information to accompany the Application at this scoping stage has been placed in Appendix 5.0. It is proposed these are reviewed, and further developed and refined in liaison with the appropriate authority as the project progresses.

Agricultural Land

- 4.11 Agricultural land shall be returned to original use following construction. SPEN are committed from the outset to minimise effects by ensuring construction works including temporary track alignments and reinstatement works, are agreed in full with landowners prior to work starting on site and all implemented in accordance with the Construction Environmental Management Plan (CEMP).

Air Quality

- 4.12 SPEN are committed to minimise effects by ensuring construction works are implemented in accordance with the CEMP. Operatives shall either avoid actions likely to generate airborne dust, or alternatively ensure appropriate dust suppression measures are in place prior to commencing operations. The CEMP shall require the construction works to be undertaken in accordance with industry best practice standards and as such ensure that the generation of dust is minimised at all times.

- 4.13 Where possible, the final alignment of the proposed overhead line, including access tracks and compounds will be designed to avoid being located within 200m of residential properties.

Climate Change (i.e. assessment of carbon emissions);

- 4.14 SPEN are committed to minimise effects by engineering design avoiding for example, areas of peat as far as possible and ensuring construction works minimise the release of CO₂ into the atmosphere. The CEMP shall cover peat management measures to cover for example, the following works: the construction of access tracks; drainage channels; or storage and reuse of excavated peat.

- 4.15 Disturbed peat shall be carefully stored and successfully managed in accordance with best practice guidance for reuse on site for the reinstatement of construction access roads and tower bases. Depending on the volume of peat likely to be encountered further information or a Peat Management Plan as outlined in Appendix 5.0 will accompany the Application for Consent.

Electric and Magnetic Fields (EMF)

- 4.16 EMF's are found everywhere in the environment where electricity is used or transported. SPEN compliance with required offsets, health and safety presents a precautionary approach that is intended to minimise the risk of any such effects.

Electronic Interference (primarily in relation to aircraft safeguarding)

- 4.17 Development can in some circumstances interfere with electronic communications including navigational systems. SPEN are committed from the outset to follow requirements for aviation safeguarding to ensure the proposed grid connection is fully compliant.

Noise and Vibration

- 4.18 SPEN are committed to minimise effects by ensuring construction works are implemented in accordance with the CEMP. The CEMP shall require the construction works to be undertaken in accordance with industry best practice standards and as such ensure that noise and vibration is minimised at all times. The operational design shall ensure that noise and vibration is in accordance with industry best practice standards.
- 4.19 Where possible, the final alignment of the proposed overhead line, including access tracks and compounds will be designed to avoid being located within 200m of residential properties.

Socio Economics

- 4.20 Due to the short term and localized nature of the construction process, any temporary disturbance created during construction is likely to be minimal and concentrated in small areas at any one time as the contractors progress along the proposed grid connection route. Once the connection is in place, there will be no further works required unless maintenance is needed. As the construction process requires only a small work force and is short in duration, this means it is unlikely that the employment created will affect local employment levels or generate a significant source of income for the area.

Recreation and Tourism

- 4.21 SPEN are committed to minimise effects by ensuring construction works are programmed to minimise effects on tourism and recreation. The CEMP and Construction Traffic Management Plan shall be developed with the aim of minimising where practicable potential construction traffic effects on the surrounding network of public footpaths and cycle routes.
- 4.22 The CEMP shall include provision for ongoing safe access to all walking and cycling routes for the duration of the construction works. If any routes require to be temporarily closed, a safe alternative route will be clearly demarcated. Such requirements also form part of the Construction Phase Health and Safety Plan, which is prepared for all construction works.
- 4.23 Effects on key cycling and walking routes, and viewpoints shall be covered in detail in the Landscape and Visual Assessment.

Traffic and Transport

- 4.24 A Construction Traffic Management Plan will form part of the CEMP. This will detail agreed routes for all construction traffic prior to the start of works.
- 4.25 Tree felling and extraction operations shall be in accordance with Scottish Forestry Agreed Routes Plan for that particular commercial plantation. Timber products felled to accommodate the proposed grid connection shall be picked up and delivered by lorries following these existing agreed timber haulage arrangements.

Utilities and Infrastructure

- 4.26 SPEN are committed from the outset to minimise effects by ensuring construction works are all in accordance with the CEMP. This shall outline measures to ensure construction personnel are informed of infrastructure located within the area and appropriate measures adopted to avoid damage and deal safely with such apparatus in consultation with the appropriate utility company.

- 4.27 All works within the vicinity of the national gas pipeline and northwest ethylene pipeline shall be carried out in accordance with approved codes of practices and guidance as prepared by the specific utility company and Health and Safety Executive.

Waste and Resource Use

- 4.28 SPEN are committed to minimise effects by ensuring construction works are all in accordance with the CEMP. A Site Waste Management Plan shall be prepared which will detail the requirements for managing waste and resources in accordance with statutory and licencing requirements, accepted good practice and to ensure wherever possible waste materials are prevented, reduced, reused, recycled or recovered in preference to disposal.
- 4.29 From the outset, the proposed development has been designed to minimise as far as practicable the quantity of peat which will require to be excavated and this approach will continue through to detailed design by micro siting and/or foundation design. Wherever practicable, peat shall be carefully stored and reused on site.
- 4.30 All likely waste streams shall be identified as far as practicable in the proposed development description in the CEMP.

Water Quality and Drainage

- 4.31 SPEN are committed to minimise effects by ensuring all construction work is in accordance with the CEMP. A Pollution Prevention Plan informed by SEPA Pollution Prevention Guidelines or Guidance for Pollution Prevention shall form part of the CEMP to ensure construction phase mitigation measures are put in place and all activities are carried out in such a manner so as to minimise or prevent effects on water quality and drainage. This will be developed where necessary to cover detailed construction work including the preparation of a drainage plan and programme of surface water monitoring.
- 4.32 Where possible changes in water quality or drainage have the potential to effect ecology, water resources and public or private water supplies, or GWDTE, these will be addressed in the relevant sections of the Ecology or Hydrology & Hydrogeology sections of the EIA Report.

5.0 Scope of Topic Assessments

5.1 This Chapter sets out the proposed scope and methodology of assessment for each topic. At this project stage this scope of assessment is provisional, and will be refined and agreed as necessary with relevant parties during consultation.

Evaluation of Significance.

5.2 The EIA Report will provide a detailed description of the aspects of the environment likely to be significantly affected by the development. This will cover direct effects and any indirect, secondary or cumulative effects of the development.

5.3 In assessing whether an effect is significant, reference will be made, where appropriate, to criteria on which the evaluation is based. These may include legal standards, policy guidance or accepted practice, and will be identified as appropriate in the EIA Report. Consideration will also be given to the views expressed by statutory agencies and other organisations that have been consulted during the assessment.

5.4 For the purpose of the EIA, the relative significance of effects will be assessed using the following terms: -

Major - a fundamental change to the environment.

Moderate - a material but non-fundamental change to the environment.

Minor - a detectable but non-material change to the environment.

None - no detectable change to the environment.

5.5 Any effect of the proposed development assessed as “**major**” or “**moderate**” (in terms of the criteria above) would be considered to be “**significant**” within the terms of The Electricity Works (EIA)(Scotland) Regulations 2017. Any effect assessed as “**minor**” would not be considered as “**significant**” within the terms of these Regulations.

Cultural Heritage

5.6 The Cultural Heritage Assessment will consider the potential effects of the proposed development on cultural heritage assets. The following effects could arise as a result of the proposed development:

- Physical (direct) effects: from construction activities on recorded cultural heritage assets and on as yet undiscovered assets within the proposed development Infrastructure Location Allowance (ILA), including access routes.
- Setting (indirect) effects: on the experience, appreciation and understanding of an asset from the introduction of the proposed development within its setting.
- Cumulative effects: where the proposed development, in conjunction with other developments in the surrounding landscape, would affect the setting of heritage assets present in the vicinity.

Consultation

5.8 Historic Environment Scotland, the Dumfries and Galloway Council Archaeologist, and West of Scotland Archaeology Service (WoSAS) on behalf of South Lanarkshire Council, will be

consulted to agree the approach to assessment and the methodology to be employed in the assessment, to obtain professional opinion on the likely effects of the proposed development upon heritage assets within their jurisdiction, to agree the locations and types of any visualisations (photomontages, photo wirelines, wirelines) required to inform the assessment, and to discuss approaches to mitigation.

Baseline Study

- 5.7 A desk-based assessment and field survey will be conducted for an Inner Study Area comprising a 200m wide corridor centred on the Proposed Route, and a 100m wide corridor along proposed access tracks routes, to identify all known heritage assets, designated or otherwise, to identify potential direct effects on cultural heritage assets and to inform an assessment of the archaeological potential of the proposed development ILA.
- 5.8 To inform the scope of the assessment of potential effects on the setting of cultural heritage assets, a 2km study area, either side of the proposed route alignment, combined with the scheme ZTV, will be used as the Outer Study Area. The extent of the Study Area reflects the proposed height of the wood poles (12m to 16m) and the spacing between poles (90m to 110m).
- 5.9 Sources to be consulted for the collation of data will include:
- Dumfries and Galloway Council HER for data in GIS format;
 - West of Scotland Archaeology Service HER for data in GIS format;
 - Historic Environment Scotland's (HES) on-line Spatial Data Warehouse (<http://portal.historicenvironment.scot/spatialdownloads>);
 - National Record of the Historic Environment (Canmore) (<http://pastmap.org.uk/>);
 - Ordnance Survey maps (principally 1st and 2nd editions) and other published historic maps held in the Map Library of the National Library of Scotland;
 - Modern vertical aerial photographic imagery (GoogleEarth; Bing);
 - Published bibliographic sources, including historic descriptions of the area (Statistical Accounts etc) and reports of previous archaeological investigations undertaken in the area; and,
 - The Historic Land-Use Assessment Data (HLAMap) for Scotland (<http://hlamap.org.uk/>).
- 5.10 Details will also be obtained for cultural heritage assets with statutory and non-statutory designations (Scheduled Monuments; Listed Buildings; Gardens and Designed Landscapes; Conservation Areas; Historic Battlefields; Archaeologically Sensitive Areas, and Sites of 'National' Importance recorded in the Dumfries and Galloway Council / WoSAS HERs) within the Outer Study Area.
- 5.11 The results of the desk-based assessment will be augmented by a reconnaissance field survey of the Inner Study Area. The walkover survey will exclude any areas of dense commercial forestry plantation, apart from attempting to locate features identified during the desk-based assessment where access is possible.
- 5.12 Collation of baseline information will be carried out in accordance with the Chartered Institute for Archaeologists' Code of Conduct (2014; revised 2019) and Standard and Guidance for Historic Environment Desk-Based Assessment (2014; updated 2017).

Impacts Assessment

- 5.13 The archaeological and cultural heritage assessment will be conducted with reference to the relevant policy and guidance: SNH & HES (2018) 'Environmental Impact Assessment Handbook'; Scottish Planning Policy (2014); Historic Environment Policy for Scotland (HEPS) (2019); HES Designation Policy and Selection Guidance (2019); Planning Advice Note (PAN) 2/2011: Planning and Archaeology (2011).
- 5.14 Direct effects will be assessed for heritage assets within the Inner Study Area.
- 5.15 The potential for setting effects within the Outer Study Area will use zone of theoretical visibility (ZTV) maps. Heritage assets identified by the desk-based assessment and/or through consultation as potentially being subject to significant adverse impacts on their settings will be visited, where possible, to establish their current baseline setting and their sensitivity to such impacts from the proposed development.
- 5.16 Assessment of likely direct effects, effects on setting and cumulative effects on heritage assets will take into account the sensitivity of the receptor and its setting and the likely magnitude of impact, which will be combined to provide a likely significance of effect (beneficial/adverse; temporary/permanent; reversible/irreversible). Assessment of potential effects on the settings of heritage assets will use the guidance published by HES (HES, 2016)⁸ and will include consideration of potential effects on views to, from and across receptors.

Cumulative Assessment

- 5.17 The cumulative assessment will consider the effect of the addition of the proposed development with other relevant proposed developments on the settings of heritage assets with statutory and non-statutory designations within the Outer Study Area.

Mitigation

- 5.18 Mitigation measures designed to prevent, reduce or offset significant adverse effects will be set out. Residual effects will be assessed, taking into consideration the likely effectiveness of the mitigation proposed.

Ecology

- 5.19 The approach shall follow the Ecological Impact Assessment (EclA) process with reference to the best practice guidance produced by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019⁹).
- 5.20 A desk study will obtain existing ecological data from a number of sources, which will be used in combination with field surveys to establish the baseline conditions for the Study Area. Data will be sought from the South West Scotland Environmental Information Centre (SWSEIC) and the Glasgow Museums Biological Record Centre for an area extending 2 km from the Proposed Route. Information on statutorily protected sites within 5 km of the Proposed Route has been obtained from the Scottish Natural Heritage site link website (<http://gateway.snh.gov.uk/sitelink>).

⁸ HES (2016) Managing Change in the Historic Environment: Setting,

⁹ CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1, Chartered Institute of Ecology and Environmental Management, Winchester.

- 5.21 A Phase 1 Habitat Survey will be carried out for the Proposed Route. The survey will be extended to include an assessment of the habitats present to determine their suitability for supporting protected species.
- 5.22 Based on the findings of the Phase 1 Habitat Survey, the following additional survey work may be required:
- NVC survey of GWDTEs that may be affected by the proposals;
 - Breeding bird surveys (including raptor, black grouse and barn owl surveys);
 - Vantage point flight activity surveys (to be undertaken in line with SNH guidance);
 - Bat habitat assessment (including roost assessment of trees where necessary);
 - Badger survey of the route corridor;
 - Otter and water vole survey of watercourse crossings;
 - Red squirrel survey of woodlands.
- 5.23 The collated baseline information shall then be evaluated to identify which important ecological features (i.e. sites, habitats and species) may potentially be impacted by the proposed development. The potential impacts on the important ecological features will then be outlined and an assessment made of their ecological significance.
- 5.24 The assessment will be based upon the avoid-mitigate-compensate hierarchy. In the final stages, the potential for measures to mitigate significant adverse impacts shall be investigated and, where this is not possible, the need for compensatory measures identified. The likely post-mitigation / post-compensation residual impacts shall be discussed and the implications of these residual impacts examined with regard to relevant local and national planning policy.

Hydrology & Hydrogeology

Scope and Study Area

- 5.25 The study will address the potential effects to the surface water and groundwater environment from the proposed development during the pre-construction, construction and operation phases. It will also address the potential effects to land quality and designated geological features.
- 5.26 The assessment will be undertaken in conjunction with the Ecology Assessment, so that the potential effects to peat forming vegetation and any GWDTEs are addressed. Decommissioning effects will not be considered because future water conditions cannot be defined and the plans for decommissioning are not known at this stage.
- 5.27 The focus of the assessment (particularly for the consideration of potential GWDTE) will be on the Proposed Route of the grid connection and associated temporary construction compounds, incorporating a 250 m corridor on either side. The Study Area will be extended to 1 km from the corridor for consideration of the potential effect on water dependent designated sites and water supplies.

Baseline

- 5.28 A summary of baseline conditions of the proposed development shall be described. This will be informed by baseline data gathered using publicly available resources, data requested from SEPA and Local Authorities regarding water supplies and the water environment, and from

fieldwork. It will also be supported by baseline data collection and information on peat and potential GWDTE supplied by SPEN and Ecologist.

- 5.29 Information relating to peat and potential GWTDE shall be obtained from the NVC survey. The requirement and scope of a NVC survey will be determined by the Ecologist when carrying out the Phase 1 Habitat survey by applying the Functional Wetland Typology for Scotland (SNIFFER, 2009). The baseline will be used to develop a conceptual understanding of the hydrological and hydrogeological environment and to confirm the selection of appropriate receptors.
- 5.30 The fieldwork will involve a site walkover. The walkover will focus on areas where geological or water environment constraints, identified as part of the baseline, are located along the Proposed Route. It will be used to ground truth the location of watercourses, identify the requirement for water crossing locations, allow a visual assessment of stream morphology and surface geology to be made, and improve the conceptual understanding of the water environment setting of potential GWDTE and wetlands areas identified by the Ecologist.

Assessment Method

- 5.31 The assessment will qualitatively address the potential changes to the baseline hydrological and hydrogeological environments. The assessment will specifically address the potential hydrological changes to the groundwater, surface water, GWDTE and intact deep peat habitats. It will link to the ecological assessment in relation to the identification of potential GWDTE and peat forming vegetation. Where potential GWDTEs are located on site, a qualitative assessment will be undertaken to determine their likely dependence on groundwater and the potential change to these sensitive habitats. Consideration will also be given to changes at designated geological sites and to land quality.
- 5.32 Effects will be assessed based on the information available for the existing environment. Initially, the potential changes to each receptor as a result of the proposed activities will be identified. Based on the information collated so far, the potential sources of effect that are proposed for consideration are presented in Chapter 4.0 (Table 2.0). Beneficial changes will also be identified where appropriate.
- 5.33 The identification of the changes will be followed by determining the initial effects, the identification of appropriate design and mitigation measures (to avoid, prevent or reduce the magnitude of the change), and the assessment of the residual (post-mitigation) effects.
- 5.34 Levels of effect will be determined by:
- assigning a category of sensitivity to individual receptors (i.e. ranging from 'Low' for receptors of local importance or low quality or rarity, to 'Very High' for receptors of international importance); and
 - assigning a level of magnitude to any predicted change (i.e. 'negligible' for minor or no change, to 'Substantial' for the loss of an attribute).
- 5.35 A matrix of the sensitivity of the receptors together with the magnitude of the change will be used to determine the significance of effect.
- 5.36 The assessment of the construction phase will take account of mitigation measures, the proposed construction practices and control measures that would be adopted in the project

CEMP. The assessment of the operational phase will take account of the proposed operational practices and design mitigation measures.

Relevant Legislation and Guidance

- 5.37 The hydrology/hydrogeological assessment will be undertaken in accordance with current planning guidance, advice and legislation, including, but not limited to:
- The Water Framework Directive (2000/60/EC);
 - The Water Environment and Water Services (Scotland) Act 2003;
 - The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
 - The Flood Risk Management (Scotland) Act 2009;
 - Scottish Planning Policy;
 - Relevant Planning Advice Notes;
 - Land Use Planning System SEPA Guidance Note 4 Planning guidance on on-shore wind farm developments (2017) (Version 9);
 - Land Use Planning System SEPA Guidance Note 31 Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (2017) (Version 3); UK Technical Advisory Group on the Water Framework Directive: Technical report on groundwater dependent terrestrial ecosystem (GWDTE) threshold values; and
 - SEPA Pollution Prevention Guidelines or Guidance for Pollution Prevention documents.

Forestry

5.38 The forestry assessment will include all conifers and broadleaved trees, woodlands and forests potentially affected by the construction and operation of the Proposed Route.

5.39 Both desk and field surveys will be undertaken to obtain baseline data, assess local forest conditions, extent of tree clearance required and the effect on current forest management practices. Site assessment by the specialist woodland manager of the required wayleave, and potential windthrow effects shall determine the required felling. The aim shall be to keep felling to the minimum.

5.40 In summary, the consideration of potential forestry effects will take account of:

- Existing and planned, windfirm boundaries to minimise sterilization of commercial woodland areas and reduce the requirements for additional felling outside the required wayleave;
- Forest Design Plans through liaison with forestry owners/ managers to avoid, or reduce restrictions on forest management operations/ techniques e.g. maintaining access to woodland blocks for harvesting/ safety; and
- Identification of opportunities to retain and/ or undertake new compensatory planting

Landscape & Visual

5.41 The scope of the Landscape and Visual Assessment (LVIA) will cover a 5km study area encompassing the Proposed Route between the NLEI and Elvanfoot Substation. Review of the scale of the proposed development, initial site survey and professional judgement has determined that this Study Area is appropriate for the LVIA.

5.42 The technical scope is to assess the potential effects of the proposed development on landscape features, the landscape character, and visual amenity afforded from within the

geographical area of the assessment. This assessment will consider the construction phase of the proposed development and operational phase.

5.43 Good practice as described in the “Guidelines for Landscape and Visual Impact Assessment” (LI, IEMA, 2013) will be followed in undertaking the appraisal of the potential effects on landscape and visual amenity arising from the proposed development.

5.44 Desk and field studies shall comprise of the following tasks:

- desk survey review of baseline information covering key features of the physical environment including: geology, soils, drainage, landform, landcover and landuse.
- desktop review of relevant planning policy and landscape character assessments.
- fieldwork to determine key landscape features, identify receptors, characterise surrounding landscape (condition and value) and define visibility.
- fieldwork to identify of the approximate extent of visibility and key views. This will be informed by computer generated ZTV information.
- assessment of potential effects on landscape features, landscape character and visual amenity.
- computer generated photomontages will be prepared from agreed viewpoints to assess and illustrate the landscape and visual effect.

5.45 The adopted methodology and approach is summarised below: -

Baseline Survey and Analysis

- Site and Surroundings: Collation and review of baseline information covering key features of the physical environment, planning allocation, natural and cultural heritage of the site and surroundings.
- Landscape and Features: The character, condition and value of the landscape will be determined through a combination of desk and field study. Relevant designations will be identified from a review of planning policies and other designations relating to the area.
- Existing Visibility and Visual Amenity: Visibility, visual amenity and potential visual receptors will be identified, for example, residential properties, public footpaths, transport routes, key viewpoints, etc. The visual baseline including extent of visibility will be determined by using a combination of specialist computer mapping and site fieldwork.

Impact Assessment

- Landscape and Visual Effects: These will be reviewed and identified with reference to: the potential sources of effect of the proposed development; sensitivity of the landscape and visual resources (nature of receptors); and magnitude of change to the existing landscape and visual environment (nature of effects).
- Evaluation of Significance of Effects: Provides an assessment of the likely significance of effects reviewed with reference to landscape features, character, views and visual amenity. The different thresholds of significance of effect will be determined through professional judgement and evaluation of the environmental sensitivity of the location or receptor and the

nature or magnitude of effect, and will be described using the terms Major, Moderate, Minor or None.

Cumulative Assessment

- 5.10 Existing developments, such as wind farms and other vertical infrastructure (e.g. overhead lines and telecommunications masts) form part of the existing baseline environment and will be considered in the LVIA. The LVIA will consider the likelihood for significant cumulative landscape and/or visual effects with other similar types of development.

Proposed Viewpoints

- 5.11 Computer aided techniques will be used to assist the evaluation of the landscape and visual effects of the Proposed Route and photomontages will be prepared from agreed viewpoint locations.
- 5.12 The computer generated zone of theoretical visibility (ZTV)¹⁰ of the Proposed Route and preliminary proposed Viewpoint Photograph locations are shown in Figure 5.1. The viewpoints have been identified to represent a range of receptors, distances and viewing experiences. Feedback regarding the proposed viewpoint locations are invited at this Scoping Stage in order to ensure an agreed representative range are identified for the undertaking the LVIA.

Viewpoint	Description	Reason for Selection
1	Duntercleuch Rig	Represents sequential views for walkers along the Southern Upland Way/ Muirkirk to Wanlockhead Drove Road. Thornhill Uplands Regional Scenic Area.
2	Spango View	Represents sequential views for road users along B740 and views from adjacent residential properties. North Lowther/ Muirkirk SSSI/ SPA and Leadhills and Lowther Hills Special Landscape Area (SLA).
3	Netherhill	Represents sequential views for road users along minor road and views from adjacent residential properties. Leadhills and Lowther Hills SLA.
4	Eastertown	Represents sequential views for road users along B740 and views from adjacent residential properties. Leadhills and Lowther Hills SLA.
5	Glendouran	Represents sequential views for road users along minor road and views from adjacent residential properties. Leadhills and Lowther Hills SLA.
6	Crawfordjohn	Represents views from village of Crawfordjohn residential properties, Museum visitor attraction and Crawfordjohn Parish Church and Graveyard Listed Buildings. Leadhills and Lowther Hills SLA.

¹⁰ The ZTV prepared for the Proposed Route at this project stage assumes a wood pole height of 16m at a spacing of 100m (indicative locations only) with no landcover (i.e. no buildings, woodland) and 6km distance cut off.

7	Braid Hill	Represents sequential views for road users along minor road and views from adjacent residential properties. Leadhills and Lowther Hills Special Landscape Area.
8	Pyatshaw Brae	Represents sequential views for road users along minor road and views from Lettershaws residential properties and caravan site visitor attraction. Leadhills and Lowther Hills SLA.
9	Glencaple	Represents sequential views for road users along A797 road and views from adjacent residential properties. Lettershaws and Glencaple Scheduled Monuments(SM).
10	Abington Bridge	Represents sequential views for road users along A797, M74 and A702, cycle users along the A702 and views from village of Abington residential properties.
11	Crawford	Represents sequential views for road users along minor road and views from village of Crawford residential properties. Kirkton SM.
12	Elvanfoot	Represents sequential views for walkers along footpath and views from village of Elvanfoot residential properties. Glengeith SM.

6.0 Environmental Impact Assessment Report

- 6.1 Following receipt of the Scoping Opinion as to the proposed information to be provided in the Environmental Impact Assessment (EIA) Report, the Project Team will undertake the required specialist studies and detailed environmental impact assessment for the Proposed Route.
- 6.2 The EIA Report will identify and describe in detail the environmental effects of the proposed overhead line construction and operation, and will identify all appropriate mitigation measures. The completed EIA Report will accompany the Section 37 Application for the proposed grid connection and copies will be available for public comment.
- 6.3 The EIA Report will comprise of three tiers of documents:
- a Non-Technical Summary (NTS)
 - a Main Report; and
 - a series of Technical Appendices.
- 6.4 The NTS is a regulatory requirement and will comprise of a short document providing a description of the EIA process and its findings written in an easily understood style.
- 6.5 The Main Report is the core of the EIA Report and will comprise of Chapters on the following:
- Introduction;
 - Proposed Development;
 - Planning Policy Context
 - Assessment Topics; and
 - Summary of Effects.
- 6.5 The Topic Assessment Chapters for: Cultural Heritage; Ecology; Hydrology and Hydrogeology; Forestry; Landscape and Visual will cover:
- Introduction
 - Scope and Methodology
 - Policy Context
 - Baseline Conditions
 - Potential Effects of the Proposed Development
 - Residual and Cumulative Effects
- 6.6 The Technical Appendices will comprise of any detailed information required to support the Topic Assessment Chapters (e.g. surveys, calculations, mapping).
- 6.7 The proposed tiered structure of the EIA Report is intended to optimise the accessibility of the environmental assessment.

Reporting of Effects

- 6.8 The reporting of environmental effects of the proposed development will comply with the EIA requirements set out in the Regulations¹¹ and specifically will:

¹¹ The Electricity Works (EIA)(Scotland) Regulations 2017

- consider effects relating both to the construction phase and to the completed and operational development;
- evaluate the significance of the effects;
- categorise effects on the basis of their value (positive, negative etc), sequence (direct, indirect etc), duration (short/long term) and permanence;
- take account of mitigation, reporting on both the potential (pre-mitigation) and residual (post-mitigation) effects; and
- identify any combined and cumulative effects.

6.9 Where the potential for significant adverse effects is identified, mitigation will be considered. This typically takes the form of:

- measures already incorporated into the design (i.e. routeing strategy);
- additional measures identified through the assessment process (i.e. micro siting);
- routine measures required by regulation or standard practice (e.g. during construction); and
- specific measures likely to be applied by consent conditions (e.g. a Peat Management Plan).

6.10 The future baseline and assessment scenarios will take account of any committed or prospective developments that are of relevance. A schedule of relevant developments will be agreed as part of the Scoping Stage process.

SPEN's Overall Approach

The routeing of an overhead line is a complex process, requiring a balance to be struck between statutory obligations, engineering requirements, economic viability, landuse and the environment¹². The Government, Ofgem and the electricity industry, including SPEN, have reviewed their positions on grid connections and remain of the view that the need to balance economic, technical and environmental factors, as a result of statutory duties and licence obligations, continues to support an overhead line approach in most cases.

SPEN's view is therefore that, wherever practical, an overhead line approach is taken when planning and designing new grid connections. However, SPEN accepts that there are specific circumstances in which an undergrounding approach should be considered.

Approach to Routeing

In 2015, SPEN published a summary document outlining the approach taken to routeing transmission infrastructure (Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment, SPEN 2015). This document is available at www.spenergynetworks.co.uk/pages/communityconsultation.

SPEN's overall approach is based on the premise that the main effect of an OHL is visual. As a result of its scale relative to objects in the vicinity such as buildings and trees, and that as there is no technical way of reducing this other than choice of support (tower and poles), and only limited ways of achieving screening through planting, the most effective way of causing least visual disturbance is by careful routeing. In addition, a well routed OHL takes account of other environmental and technical considerations, even if the length is increased as a consequence.

The adopted approach for overhead line routeing is therefore based on the premise that the principal way of mitigating environmental effect is by the selection of the most appropriate route. Integral to this approach is the fact that the route selection process must be objective and comprehensive to the ultimate decision-making authority and those stakeholders whose interests are affected by the proposed development.

The approach is an iterative, systematic evaluation of route alternatives based on established practice and guidelines, with professional judgement used to establish explicitly the balance between environmental, technical and economic factors. Consultation and technical review is an integral part of the routeing strategy process. This enables assumptions to be confirmed and ensures confidence in the findings, prior to the commencement of subsequent steps.

Established Practice and Guidelines

The Holford Rules

It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing overhead lines, "The Holford Rules", should continue to be employed as the basis for routeing high voltage overhead lines. The Holford Rules

¹² SPEN (2015) Major Electrical Infrastructure Project: Approach to Routeing and Environmental Impact Assessment.

were reviewed around 1992 by the National Grid Company (NGC) PLC (now National Grid Transmission PLC (NGT)), as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by Scottish Hydro Electric Transmission Limited (SHETL) in 2003 to reflect circumstances in Scotland.

The guidelines for the routeing of new high voltage overhead transmission lines have been placed below and form the basis for routeing the NLEI 132kV Connection Project. Key principles of the Holford Rules include avoiding prominent ridges and skylines, following broad wooded valleys, avoiding settlements and residential properties, and maximising opportunities for “back clothing” infrastructure.

Rule 1: Avoid altogether, if possible, the major areas of highest amenity value¹³, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.

Rule 2: Avoid smaller areas of high amenity value, or scientific interest by deviation; provided that this can be done without using too many angle towers, i.e. the more massive structures which are used when lines change direction.

Rule 3: Other things being equal, choose the most direct line, with no sharp changes of direction and thus with few angle towers.

Rule 4: Choose tree and hill backgrounds in preference to sky backgrounds, wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.

Rule 5: Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.

Rule 6: In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concatenation or ‘wirescape’.

Rule 7: Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of undergrounding, for lines other than those of the highest voltage.

Forestry and Land Scotland Guidance

Guidelines have also been produced by Forestry and Land Scotland for the routeing of overhead lines through forest areas¹⁴. In summary, these guidelines state that overhead lines should be routed to follow open space and to run alongside, not through, woodland. Where there is no alternative route; an overhead line through a forested area should:

- avoid areas of landscape sensitivity;

¹³ Often interpreted now as “environmental” value to reflect wider intrinsic value.

¹⁴ Forestry Commission (1994) Forest Landscape Design Guidelines.

- avoid the line of sight of important views;
- be kept in valleys and depressions;
- not divide a hill into two similar parts where it crosses over a summit;
- cross skyline or ridges where they drop to a low point;
- follow alignments diagonal to the contour as far as possible;
- be inflected upwards in hollows and downwards on ridges.

With respect to the design of the overhead line corridor, within the forest, the overhead line should seem to pass through a series of irregular spaces. The forest should appear to meet across the open space in some places so that the corridor does not split the forest completely.

Overview of Routeing Process

Study Area

A Study Area is first defined, which is large enough to accommodate all likely route options, taking account of the technical requirements (i.e. connection points) and factors such as topography. Baseline mapping of the routeing considerations outlined below then enables routeing constraints and opportunities to be identified.

Environmental Considerations

As noted statutory duties imposed on SPEN by Schedule 9 of the Electricity Act 1989 state that Licence Holders:

“(a) shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archeological interest; and

(b) shall do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.”

As noted SPEN’s approach to route selection is based on the premise that the major effect of an overhead transmission line is visual and that the degree of visual intrusion can be reduced by careful routeing. This can be achieved by routeing the line to fit the topography, by using topography and trees to provide screening and/or background, and by routeing the line at a distance from settlements and roads.

Other potential environmental effects of such a development are likely to be interactions with visual amenity, the landscape character, landuse, nature conservation, cultural heritage, geology and soils, hydrology, recreation and tourism. In addition to permanent effects, the construction and operational effects also need to be considered.

Potential visual and physical effects relate primarily to the structure carrying the transmission lines. The structure and conductors may be visible from properties, roads, tourist attractions and other important locations, and may alter the character of the landscape. Physical effects relate primarily to the proposed structure such as the ground area occupied, underground disturbance of features to construct the required foundations

and possible requirement for temporary access tracks during construction. Transmission line conductors require specific safety clearances and may, for example, necessitate the removal of trees. The location and siting of the structure and conductors may also have an effect on bird movement.

Some effects can be avoided or limited through careful routeing. Other effects are best mitigated through local deviations of the route, the refining and micro siting of pole locations and/ or specific construction practices. These are reviewed as part of the EIA process.

Technical Considerations

- Technical considerations which can influence routeing include:
- Minimising the length of the OHL;
- The existing and proposed electricity transmission network;
- Access requirements/ opportunities;
- Avoidance of sharp angles of deviation.
- Minimising the position of the poles on steep slopes (avoidance of slopes >15° which can impact on the actual construction of the wood pole line).
- Avoidance of areas higher than 350m AOD. Experience of the difficulties of maintaining lines in exposed areas of Wales has led SPT to define two altitude¹⁵ limits for wood pole lines. This guidance indicates that routes for wood pole 132kV overhead lines should preferably be no higher than 350m AOD.
- Avoidance of unfavourable areas from a geotechnical point of view for example, areas of deep peat and contaminated ground should be avoided.
- Maintain required safety clearances and consideration of future maintenance requirements. For example waterbodies and watercourses used for fishing; wind turbine rotor blades; and national pipelines.

Economic Considerations

In compliance with Section 9 of the Electricity Act 1989, the Routeing Objective requires the proposed solution to be “economically viable”. This is interpreted by SPT as meaning that as far as is reasonably possible, and other things being equal, the line should be as direct as possible and the route should avoid areas where technical difficulty or compensatory requirements would render the scheme unviable on economic grounds.

Routeing Methodology

The routeing methodology for grid connections and EIA is made up of sequential steps, which inform the next step. Throughout the process, the methodology is informed by the preceding steps of the Routeing Objective and Routeing Principles with reference to: best practice; environmental; technical; and economic considerations.

In summary the steps in the routeing methodology consist of:

1. Identification of the Study Area and Routeing Constraints

The review of technical, environmental and economic considerations for the Study Area, together with established practice, route objectives and principles, guides the routeing strategy to identify the Study Area and routeing constraints. This approach establishes considerations that are used to identify broad corridors (routeing issues) and those which

¹⁵ Altitude being effectively an index of climate severity and exposure

are used to modify routes (deviation issues). Routeing issues are generally strategic and extensive in area, whilst deviation issues tend to be of local importance and smaller in scale.

2. Identification of Route Options

Based on the routeing strategy, a number of route options are then developed and the effect on the routeing considerations recorded.

3. Appraisal of Route Options

At the evaluation stage a route option may be rejected, modified or studied in more detail. The objective of this process being the identification of a Preferred Route, which has the least likely adverse environmental effects, whilst being technically feasible and economically viable.

4. Selection of a Preferred Route

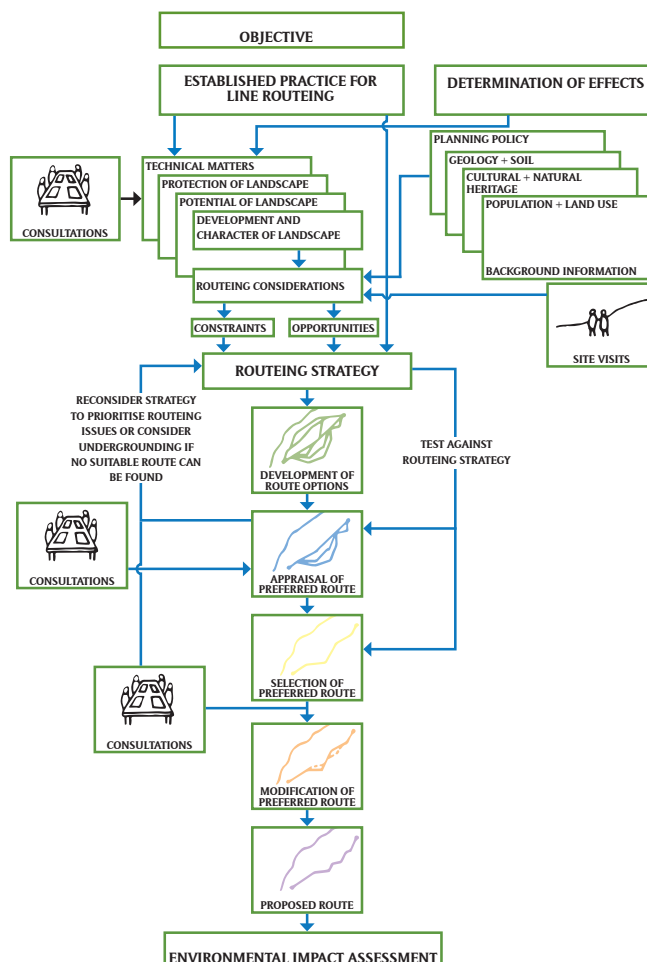
After the comparative evaluation of route options, a Preferred Route alignment is selected and a document for public consultation prepared. This Routeing and Consultation Document aims to provide an objective and transparent understanding of the routeing strategy process to date to identify the Preferred Route.

5. Consultation

Following consultation on this Preferred Route, any comments raised will be considered to inform the identification of a “Proposed Route”.

The approach to routeing overhead transmission lines is summarised in the below Appendix Table 1-1.

Appendix Table 1-1: Approach to the Routeing and EIA of an Overhead Transmission Line



Appendix 2: Summary of Consultee Responses

The Routeing and Consultation Leaflet prepared in December 2019 was circulated to statutory consultees, other appropriate agencies and all landowners to provide an understanding of the proposed development, access via the internet to the Routeing and Consultation Document and seek comment regarding the Preferred Route.

Hard copies of the Routeing and Consultation Document were also available to view at Dumfries and Galloway and South Lanarkshire Council offices and public libraries at Sanquhar and Lesmahagow. During this initial consultation stage public exhibitions were also held in Sanquhar and Crawfordjohn.

The full list of organisations consulted to date along with a summary of comments received and SPEN response is provided in Appendix Table 2-1 below.

The Table also summarises responses received during the public consultation events in January 2020 and subsequent consultation period, which ran from 13th January 2020 to the 14th February 2020.

Table 2-1 _ Summary of Consultee Responses

Consultee Name	Notification of Consultation Event	Response	Notes	SPEN Response
Statutory Consultees				
Dumfries and Galloway Council	Letter 19/12/19			
South Lanarkshire Council	Letter 19/12/19			
SEPA	Letter 19/12/19			
SNH	Letter 19/12/19			
Historic Environment Scotland	Letter 19/12/19	✓	Response 10/2/20. Consider Preferred Route is not likely to raise significant impacts for assets within remit. Note mitigation by design to ensure that the route does not have direct impacts on a SM and this should inc. 50m ILA. Also SM should be marked out to avoid any accidental damage during construction works. With ref to RCD, comments made re Appendix 1 assessment and requirement to include for mitigation in Appendix 4. References for undertaking the EIA also provided.	SPEN noted comments for EIA stage.
Forestry & Land Scotland	Letter 19/12/19			
Energy Consents Unit	Letter 19/12/19			
HSE	Letter 19/12/19			
MP/ Community Councils				
MSP	Letter 19/12/19			
D & G Community Councils				
Wanlockhead CC	Letter 19/12/19			
Wanlockhead Village Council	Letter 19/12/19		Email from Secretary 2/1/20	SPEN response noting Exhibition dates, information on internet and consultation period.
Royal Burgh of Sanquhar & District CC	Letter 19/12/19			
Kirkconnel & Kelloholm CC	Letter 19/12/19			
Durisddeer CC	Letter 19/12/19			
S Lanarkshire Community Councils				

Consultee Name	Notification of Consultation Event	Response	Notes	SPEN Response
Duneaton CC	Letter 20/12/19	✓	Noted at Exhibition that consultation letter not sent to correct CC Secretary.	SPEN issued follow up emails 16/1/20 & 29/1/20 to Gordon Wilson as incorrect Secretary contact provided by SLC. Apologised for mix up and proposed further meeting with CC.
Crawford & Elvanfoot CC	Letter 19/12/19			
Douglas CC	Letter 20/12/19			
Leadhills Community Council	Letter 20/12/19			
S Lanarkshire Councillors				
Councillor Eric Holford	Letter 21/12/19			
Councillor Alex Allison	Letter 21/12/19			
Councillor Ian McAllan	Letter 21/12/19			
D & G Councillors				
Councillor Jim Dempster	Letter 23/12/2019			
Councillor Mathew Ronnie	Letter 23/12/2019			
Councillor Andrew Wood	Letter 23/12/2019			
Non-Statutory Consultees				
Essar	Letter 19/12/19			
Scottish Gas Networks	Letter 19/12/19			
British Telecom	Letter 19/12/19			
Scottish Water	Letter 19/12/19			
Coal Authority	Letter 19/12/19	✓	Response 7/1/20. No issues.	SPEN noted.
Civil Aviation Authority	Letter 19/12/19			

Consultee Name	Notification of Consultation Event	Response	Notes	SPEN Response
NATS Safeguarding	Letter 19/12/19	✓	Email 13/2/20 notes proposed development has been examined from a technical safeguarding aspect and does not conflict with NATs safeguarding criteria. Accordingly NATs has no safeguarding objection to the proposal. Requested kept informed of proposed development as the route options via Wanlockhead pass close to NATs sites and their access roads (site access will be required 24 hours during any construction work).	SPEN to consult further at detailed design stage/ EIA.
Defence Infrastructure Organisation	Letter 19/12/19	✓	Letter 24/2/20 confirming MOD has no safeguarding objections to proposed development.	SPEN noted.
OFCOM	Letter 19/12/19	✓		
West of Scotland Archaeological Services	Letter 19/12/19			
Assoc for the Protection of Rural Scotland	Letter 19/12/19			
NFU	Letter 19/12/19			
Scottish Wildlife Trust	Letter 19/12/19			
RSPB (Scotland)	Letter 19/12/19			
RSPB Dumfries & Galloway Office	Letter 19/12/19	✓	Response 10/2/20. Welcome black grouse survey is carried out to inform exact location of route. Also agree with proposals to carry out both breeding raptor surveys and vantage point surveys. Note proximity to Muirkirk and N Lowther SPA and therefore the potential impact should be recognised in EIA. Note that all breeding and non breeding bird surveys should be carried out over a minimum of two seasons, considering the importance of this area to many red listed, schedule 1 or annex 1 species, inc. but not limited to black grouse, hen harrier, merlin and curlew.	SPEN noted comments for EIA stage review.
British Trust for Ornithology	Letter 19/12/19			
Scottish Ornithologists Club	Letter 19/12/19			
Biological Records Centre	Letter 19/12/19			
Dumfries & Galloway Environmental Records Centre (DGERC)	Letter 19/12/19			
The Woodlands Trust Scotland	Letter 19/12/19			

Consultee Name	Notification of Consultation Event	Response	Notes	SPEN Response
Red Squirrels in Scotland-South West Scotland	Letter 19/12/19			
Dumfries and Galloway Raptor Study Group	Letter 19/12/19			
Dumfries and Galloway Bat Group	Letter 19/12/19			
Scottish Badger Group	Letter 19/12/19			
Dumfries and Galloway Badger Network	Letter 19/12/19			
British Horse Society	Letter 19/12/19			
Game & Wildlife Conservation Trust	Letter 19/12/19			
Nith Salmon District Fishery Board	Letter 9/1/20	✓	Attended Exhibition and noted would appreciate involvement at pole position stage. JH noted proposed development also in River Clyde catchment and provided contact details for Clyde River Foundation.	SPEN will send detailed route when completed and arrange site visit to obtain feedback and agreement regarding pole positions at detailed design stage.
Fisheries Management Scotland	Letter 9/1/20			
Clyde River Foundation	Letter 15/1/20	✓	Response 27/1/20 requesting details of water crossings and method statements for any proposed in stream or riparian works. Noted Duneaton Water in particular supports an important trout fishery.	SPEN responded would send detailed route when completed and arrange site visit to obtain feedback and agreement regarding pole positions at detailed design stage.
Ramblers Association Scotland	Letter 19/12/19			
Scottish Outdoor Access Network (SOAN)	Letter 19/12/19			
Sustrans Scotland	Letter 19/12/19			
Paths for All Partnership	Letter 19/12/19			
Mountaineering Council of Scotland	Letter 19/12/19			

Consultee Name	Notification of Consultation Event	Response	Notes	SPEN Response
Southern Upland Partnership	Letter 19/12/19			
Scotways	Letter 19/12/19	✓	Email response 7/2/20 noting recorded rights of way in area and Council Core Path Plans should be checked. Noted formal response to information request can be made for charge.	SPEN noted comments.
Visit Scotland	Letter 19/12/19			
Dumfries and Galloway Tourist Board	Letter 19/12/19			
Northern Mine Research Society	Letter 19/12/19			
Dumfries and Galloway Reptile & Amphibian Group	Letter 19/12/19			
John Muir Trust	Letter 19/12/19			
Exhibition Attendance Crawfordjohn Village Hall & Nithsdale Hotel 13/1/20 -14/1/20				
Alan Wilson	Exhibition Attendee		Noted information as presented at Exhibition.	SPEN noted.
Nancy Kirkpatrick	Exhibition Attendee		Noted information as presented at Exhibition.	SPEN noted.
Ian Simm	Exhibition Attendee		Noted information as presented at Exhibition.	SPEN noted.
Jim Henderson	Exhibition Attendee		Requested further consultation/ input when pole positions are identified. Noted Clyde River Foundation should also be contacted as within river catchment.	SPEN noted.
David Barton	Exhibition Attendee		Questioned whether Community Councillor aware of Exhibition and general public.	SPEN sent follow up emails/info to CC.
Christine Barton	Exhibition Attendee		Questioned whether Community Councillor aware of Exhibition and general public.	SPEN sent follow up emails/info to CC.
Jon Summerlaw	Exhibition Attendee		Noted information as presented at Exhibition.	SPEN noted.
Other Contacts				
Wendy Johnston		✓	Email 14/1/20 Requested information as unaware of Exhibition.	SPEN sent follow up email with information.

Identification of Route Options

Given the nature of overhead transmission lines the primary environmental effects are likely to be landscape and visual effects. The best way to limit adverse effects on landscape and visual amenity is by careful line routing, led by landscape architects, based on professional judgement and informed by fieldwork.

Desk review of environmental baseline data for the Study Area and site visits, allowed the identification of a number of broad route options between the proposed wind farm development, the North Lowther Energy Initiative and existing substation at Elvanfoot. A number of route options have been identified, reviewed and rejected in the route selection process. This follows the approach to routing an overhead line as outlined in Appendix 1.

The appraisal of route options was undertaken qualitatively, employing specialist professional judgement drawing upon a detailed knowledge of the Study Area, the baseline environmental information collated to date and understanding of the potential environmental effects of overhead transmission lines. The objective of this process was to identify a technically feasible and economically viable Preferred Route, with the least disturbance to people and the environment.

The routing strategy approach is an iterative, systematic evaluation of route alternatives with professional judgement used to establish explicitly the balance between factors. Integral to the routing strategy approach is the fact that the route selection process must be objective and comprehensive to the ultimate decision-making authority and those stakeholders whose interests are affected by the proposed development.

Preliminary Environmental Review

The developed route options have been subjected to a preliminary environmental appraisal, which is detailed in Appendix 1 of the Routing and Consultation Document (2019). This appraisal was undertaken qualitatively, employing specialist professional judgement drawing upon: knowledge of the Study Area at this stage; the baseline environmental information collated to date; and understanding of the potential environmental effects of overhead transmission lines.

The key environmental considerations used for the comparison of route options have been: -

- Landscape: landform, landcover, landuse, designation, landscape character (SNH) and summary of effect.
- Visual: visibility, receptor type and summary of effect.
- Protected Areas & Features: nature conservation, heritage, geology, hydrology, commercial forestry, recreational attractions/ routes, national infrastructure and any other important features, which in this Study Area has included historic mining workings.

The relative significance of effects without mitigation of the different route options was assessed using the following terms:

Major - a fundamental change to the environment.

Moderate - a material but non-fundamental change to the environment.

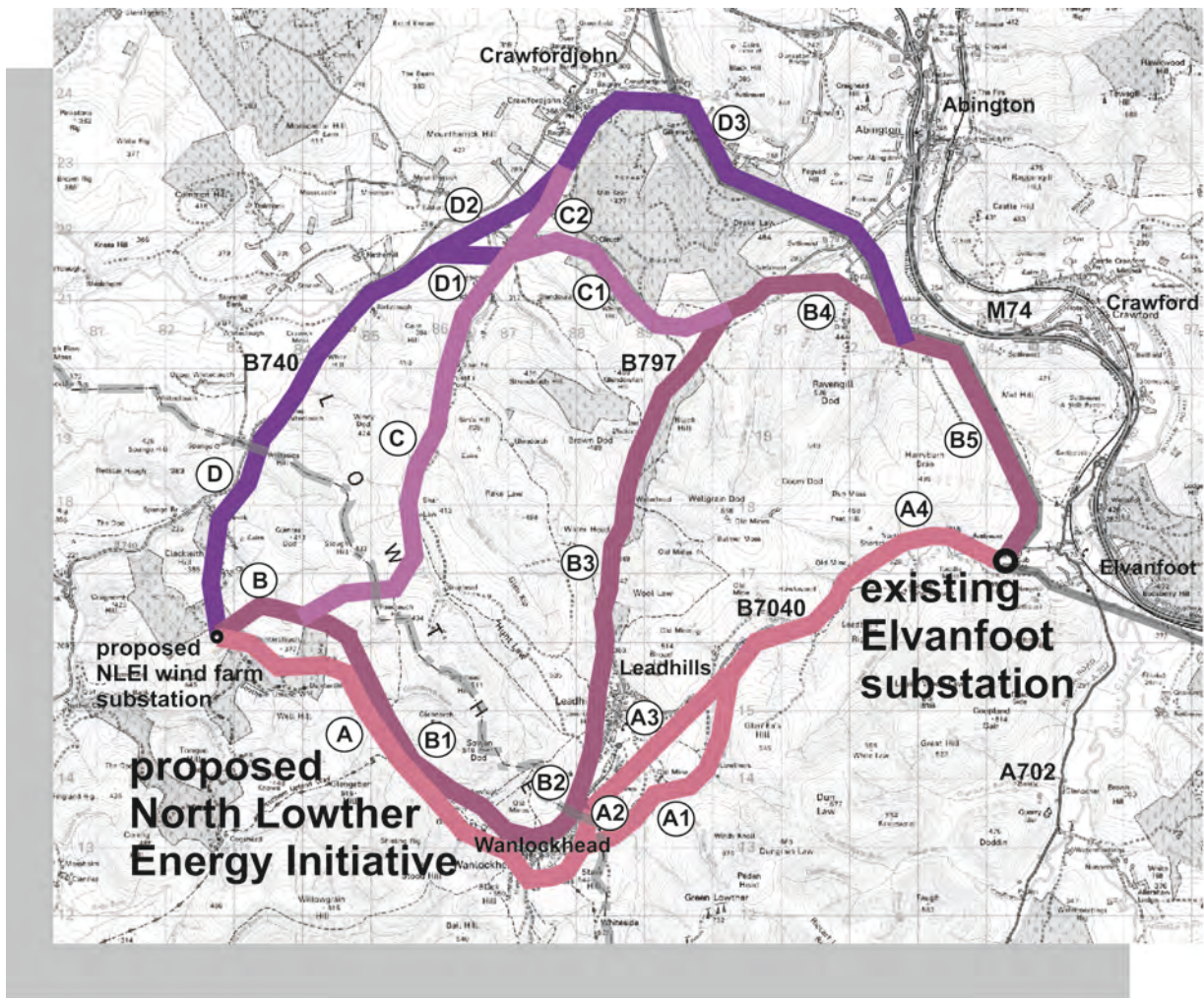
Minor - a detectable but non-material change to the environment.

None - no detectable change to the environment.

The findings of the Preliminary Environmental Review of the route options are summarised below as a simple matrix, which provides a preliminary ranking of the potential effect of each route option. This allowed a concise recording of the comparative assessment of route options undertaken at this project stage leading to the identification of the Preferred Route.

Table 3-1: Summary of Preliminary Environmental Review of Route Options

SUMMARY of PRELIMINARY ENVIRONMENTAL REVIEW	route options																	
	A	A1	A2	A3	A4	B	B1	B2	B3	B4	B5	C	C1	C2	D	D1	D2	D3
LANDSCAPE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
VISUAL	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
NATURAL HERITAGE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CULTURAL HERITAGE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
COMMERCIAL FORESTRY	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
GEOLOGY/HYDROLOGY	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
RECREATIONAL FEATURES	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
OTHER FEATURES E.G. MINING	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
APPROXIMATE LENGTH (KM)	7.2	3.6	0.6	3.1	4.9	1.4	5.6	0.3	7.9	2.8	4.8	6.8	3.8	1.5	6.9	1.1	2.3	6.9



- EFFECT**
- MAJOR
 - MODERATE
 - MINOR
 - NONE

Preferred Route Alignment

The Preferred Route as reviewed in the Proposed 132kV Grid Connection to NLEI Routeing and Consultation Document comprised of Route Options D, D1, C1, B4, B5 is 19km.

Route Alternatives

The Routeing and Consultation Document (2019) provided a review of the route selection process to identify the Preferred Route alignment and to invite comment.

Feedback received from the consultation process has been reviewed and considered in order to inform the route development process to identify the current "Proposed Route".

In summary, no objections were received regarding the Preferred Route. A number of comments were received which either noted the Preferred Route had no effect in their area of concern or provided information as to required survey work or potential mitigation measures for the environmental impact assessment. The two fishery management area officers for the Nith and Clyde have requested further consultation and a site visit at the detailed design stage to review the proposed wood pole locations adjacent watercourses.

At this project stage, the current Proposed Route should now be viewed as a **corridor** within which the detailed route alignment can be developed through localised deviations to avoid or reduce identified effects during the detailed environmental assessment.

Appendix 4: List of Potential Consultees

A list of potential consultees for the Scottish Government Energy Consents Unit to review and contact in relation to the scope of the EIA has been placed below.

Statutory Consultees

Dumfries and Galloway Council
South Lanarkshire Council
SEPA
SNH
Historic Environment Scotland
Forestry & Land Scotland/ Scottish Forestry
Scottish Government Energy Consents Unit
HSE
Scottish Water
Transport Scotland
Marine Scotland

Community Councils

D & G Community Councils

Wanlockhead Village Council
Royal Burgh of Sanquhar & District CC
Kirkconnel & Kelloholm CC

S Lanarkshire Community Councils

Duneaton CC
Crawford & Elvanfoot CC
Douglas CC
Leadhills Community Council

Non-Statutory Consultees

Essar
Scottish Gas Networks
British Telecom
Civil Aviation Authority
NATs Safeguarding
Defence Infrastructure Organisation
West of Scotland Archaeological Services
Assoc for the Protection of Rural Scotland
Scottish Wildlife Trust
RSPB (Scotland)
RSPB Dumfries & Galloway Office
British Horse Society
Game & Wildlife Conservation Trust
Nith Salmon District Fishery Board
Fisheries Management Scotland
Clyde River Foundation
Sustrans Scotland
Mountaineering Council of Scotland
Scotways
Visit Scotland
John Muir Trust
Joint Radio Company
The Crown Estate

Appendix 5: Draft Mitigation Measures

This Appendix identifies a preliminary draft of actions that SPEN shall implement to reduce, offset, prevent or compensate for identified potential adverse effects on the environment that may otherwise result as a consequence of proposed 132kV grid connection to the NLEI (Appendix Table 5-1).

The standard headings of the Construction Environmental Management Plan (CEMP) are outlined in Appendix Table 5-2.

Appendix Table 5-3 provides a Draft Schedule of Information to accompany the Application for Consent.

This CEMP shall be prepared with reference to construction best practice guidelines. A preliminary list of references at this stage of the project is indicated in Appendix Table 5-4.

Appendix Table 5-1 Draft Schedule of Mitigation Measures

No.	Draft Schedule of Mitigation Measures	
General		
1	Routeing	SPENs approach to Routeing aims to ensure that the process of selection of the Proposed Route minimises potential environmental effects.
2	CEMP, CSL & PPP	<p>All mitigation measures as outlined in the EIA Report and as required by any Consent Conditions will be detailed and implemented by a Construction Environmental Management Plan (CEMP) and Construction Site Licence (CSL). The CEMP shall include a Pollution Prevention Plan (PPP), Site Waste Management Plan (SWMP) and Traffic Management Plan (TMP) prepared specifically for the proposed 132kV grid connection to the NLEI.</p> <p>The SWMP shall detail the requirements for management of any waste in accordance with statutory and licensing requirements, accepted good practice and to ensure that wherever possible materials are reduced, reused or recycled in preference to disposal. This will include toilet facilities, soils/ stone/ peat from excavations, concrete from washout areas, municipal type wastes etc.</p> <p>These documents shall control and guide the working practices of the Contractor for the duration of the construction works and shall reflect current best practice and guidance in protecting the environment.</p>
Agricultural Land		
3	CEMP	On Site Construction Works. Reinstatement agreed with landowner and works undertaken in accordance with CEMP.
Air Quality		
4	CEMP	Control measures shall be put in place in accordance with the CEMP.
Climate Change		
5	CEMP	Control measures shall be put in place in accordance with the CEMP.
EMF		
6	Routeing/ Operation	Control measures shall be put in place as required to ensure proposed development is compliant.
Electronic Interference		
7	Routeing/ Operation	Control measures shall be put in place as required to ensure proposed development is compliant.

Noise and Vibration		
8	CEMP	Control measures shall be put in place in accordance with the CEMP.
Socio Economic & Community Effects		
9	CEMP	Control measures shall be put in place in accordance with the CEMP.
Recreation & Tourism		
10	Routeing/ Programme/ CEMP	Routeing and Programme. Control measures shall be put in place in accordance with the CEMP.
Traffic and Transport		
11	CEMP	The CEMP shall include a Construction Traffic Management Plan which shall be prepared as required by any Consent Conditions and indicate the agreed transport routes, management measures and programme for restoration etc.
Utilities & Infrastructure		
12	CEMP	Routeing. All guidance and best practice measures as required by the Gas and North West Ethylene major pipelines operators should be adhered to. Control measures shall be put in place in accordance with the CEMP.
Waste & Resource Use		
13	CEMP	Control measures shall be put in place in accordance with the CEMP.
Water Quality & Drainage		
14	CEMP	Control measures shall be put in place in accordance with the CEMP.

Appendix Table 5-2_Draft Structure and Contents of the CEMP

No.	Title	Description of Content
1	Introduction	Provides background information about the EIA Report with reference to objectives, content and mitigation measures.
2	The Project	Provides details of the development including a description of construction methods and facilities.
3	Roles and Responsibilities	Sets out the roles and responsibilities of the parties involved in the construction of the development.
4	Communications, Reporting and Training	Sets out the requirements for regular communications and reporting as well as staff training.
5	General Environmental Management Requirements	Sets out the general requirements with respect to environmental management during construction.
6	Subject Specific Requirements	Provides an overview of the subject specific requirements to be addressed.
7	Species Protection Plans– Mitigation and Management Plan	Sets out the general requirements with regard to protected species. Mitigation and management plans shall be prepared for each identified protected species e.g. otter, bats etc
8	Fish – Mitigation and Management Plan	Sets out the requirements with regard to protection of fish and watercourses.
9	Birds - Mitigation and Management Plan	Sets out the requirements with regard to protection of birds.
10	Habitat Management Plan	Sets out the requirements with regard to protection and reinstatement of habitats.
11	Pollution Prevention Plan	Sets out the requirements with regard to pollution prevention and protection of the water environment.

No.	Title	Description of Content
12	Drainage Management Plan	Sets out the requirements with regard to drainage and protection of the water environment.
13	Private Water Supply Protection Plan	Sets out the requirements with regard to drainage and protection of the water environment.
14	Watercourse Crossing Register	Sets out a watercourse crossing strategy and structure of a detailed crossing register.
15	Concrete Batching Management Plan	Sets out the requirements with regard to concrete batching and protection of the water environment.
16	Borrow Pit Scheme of Works	Sets out a framework to be followed in developing detailed method statements for borrow pits (if required).
17	Dust Control and Management Plan	Sets out the requirements with regard to the prevention and control of dust related impacts.
18	Archaeological Management Plan	Sets out the requirements with regard to protection and of archaeological interests.
19	Traffic Management Plan	Sets out the requirements with regard to the routeing and management of construction-related traffic.
20	Soil Storage and Management Plan	Sets out the requirements with regard to handling and storage of soil.
21	Peat Management Plan	Sets out the requirements with regard to handling and storage of peat and related peat-slide risks.
22	Felling and Tree Management Plan	Sets out the requirements with regard to tree felling and reinstatement.
23	Site Waste Management Plan	Sets out the requirements with regard to the management and disposal of waste.
24	Restoration and Reinstatement Plan	Sets out the requirements for restoration and reinstatement of sites post-construction.

Appendix Table 5-3_ Preliminary Schedule of Information to Accompany Application for Consent

No.	Schedule of Information to accompany Application	
1.	Draft CEMP & Programme	
SEPA		
2	Disturbance & Reuse of Peat	<p>The scale of development impact on peat is currently considered to be limited and shall be confirmed following the ground investigation survey findings and detailed design of the proposed development.</p> <p>The proposed development shall be designed to minimise as far as practicable the quantity of peat which will require to be excavated by micro siting or engineering design e.g. floating tracks/ piling.</p> <p>Depending on the volume of peat likely to be encountered the following shall be prepared: -</p> <p>a) A detailed map of peat depths to full depth with all built elements including peat storage area overlain shall be submitted to indicate clearly how the proposed development avoids areas of deep peat and other sensitive</p>

		<p>receptors such as GWDTE</p> <p>A table which details the quantities of acrotelmic, catotelmic and amorphous peat which will be excavated for each element and where it will be re-used during reinstatement. Details of the proposed widths and depths of any peat to be re-used and how it will be kept wet will be included.</p> <p>The following shall be submitted in accordance with Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste and our Regulatory Position Statement – Developments on Peat.</p> <p>b) Peat Management Plan</p>
2	Flood Risk Assessment	The proposed grid connection shall be supported by some form of Flood Risk Assessment, which demonstrates that the proposal including all temporary works will not result in additional flood risk.

Appendix Table 5-4-Construction Best Practice References to be updated during EIA

Forestry Commission	2011	Forests and Water- UK Forestry Standard Guidelines
SEPA	2010	Engineering in the Water Environment: A Good Practice Guide
SEPA	2012	Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste
SEPA		LUPS Guidance Note 31- Groundwater Abstraction & GWTDE
SEPA	2014	Landuse Planning System – SEPA Guidance Note 27- Use of Trees Cleared to Facilitate Development On Afforested Land
SEPA		Guidance for Pollution Prevention

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Relevant Planning Policy Background and Guidance

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PAN 1/ 2013: Environmental Impact Assessment (as updated in 2017)

PAN 1/2011 Planning and Noise and accompanying Technical

PAN 2/2011: Planning and Archaeology

PAN 3/2010: Community Engagement

PAN 60 Planning for Natural Heritage (amended 2008)

PAN 68 Design Statements

PAN 69 Planning and Building Standards Advice on Flooding

PAN 75 Planning for Transport

PAN 79 Water and Drainage

Guidance for Pollution Prevention

Relevant Legislation

The Electricity Act 1989 (as amended by the Utilities Act 2000)

Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017

Water Environment (Controlled Activities) (Scotland) Regulations 2011

Water Environment (Miscellaneous) (Scotland) Regulations 2017

Glossary

Term	Explanation
Energy Consents Unit	<i>Certain applications for energy infrastructure are made to Scottish Ministers for determination. Such applications include the installation of certain overhead electric lines and associated infrastructure. Such applications are administered by this Unit.</i>
Environmental Impact Assessment (EIA)	<i>A formal process used to identify, predict and assess the likely environmental effects of a proposed development.</i>
Environmental Impact Assessment Report	<i>The document which reports the findings of an EIA.</i>

Transmission Equipment

The following are general definitions of terms used in relation to transmission equipment.

Term	Explanation
Cable	<i>Generally refers to an underground "cable" suitably insulated, used for transmitting electricity.</i>
Conductor	<i>Wire strung between pylons, used for transmitting electricity.</i>
Earthwire	<i>Wire strung between the tops of pylons, used for lightning and system protection. May also be used to carry telecommunication signals</i>
Electricity lines	<i>Either an overhead line or an underground cable used to transmit electricity.</i>
Insulator	<i>Used to attach the conductors to the pylons preventing electrical discharge to the steelwork. Usually made from porcelain glass units, joined together to form an insulator ring.</i>
kV	<i>Kilovolt (one thousand volts)</i>
MW	<i>Megawatt (one million watts or one thousand kilowatts)</i>
Outage	<i>The withdrawal from service of any part of the transmission system for a period of time in connection with repair, maintenance, or construction of the transmission system as a result of breakdown or failure.</i>
Overhead Line	<i>An electric line installed above ground usually supported by lattice steel towers or wooden poles.</i>
SPEN	<i>Scottish Power Energy Networks. Develop and operate the transmission system on behalf of Scottish Power Transmission Ltd.</i>
SPT	<i>Scottish Power Transmission Ltd. Licence holder under the Electricity Act 1989, responsible for the transmission network from the English/ Scottish border to just north of Stirling.</i>
Sealing End Compound	<i>The compound area surrounding the terminal tower, where an overhead line converts to an underground cable.</i>
Substations	<i>Transforming or switching stations to control the voltage and direction of electricity. Transforming stations are used to increase the supply of electricity (to 275kV or 400kV) into the national grid system for transmission, and to reduce the voltage to lower levels (to 132kV) for distribution. Switching controls the direction of electricity and ensures fault protection.</i>
Switchgear	<i>Combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment.</i>
Transformer	<i>A static electrical device that transfers energy by inductive coupling between its winding circuits. They are used to vary the relative voltage of circuits and in some cases isolate them.</i>
Wayleave	<i>An agreement granted by the owner or occupier of land whereby transmission equipment is permitted to be installed on, over or under the land so owned or occupied in return for annual payments.</i>

