



SP Energy Networks

Routeing Consultation Document

Kennoxhead Windfarm to Coalburn Substation 132kV
Overhead Line

Project no.661718

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RSK

RSK GENERAL NOTES

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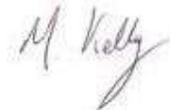
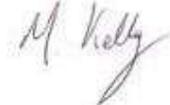
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Kennoxhead Windfarm to Coalburn Substation 132kV Overhead Line

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EXECUTIVE SUMMARY

Scottish Power Energy Networks (SPEN) proposes to construct a new 132 kilovolt (kV) overhead line (OHL) supported by wood poles to connect the Kennoxhead Windfarm to the existing Coalburn substation, approximately 2.5 km northeast of Coalburn, South Lanarkshire. The typical height of the wood poles above ground would range between 10m to 22m and have a typical height of 13m. As the majority of the route is above 200m above ordnance datum (AOD), the OHL will likely require construction using H poles, with a typical span between the poles of around 100m.

This document presents information on the approach taken in the identification of route options for the proposed connection, appraisal methodology, and the findings of the appraisals and assessments, concluding in the selection of the preferred option.

The approach to developing and assessing the route options follows SPEN's two stage approach to routeing¹, as follows:

- Stage 1: Development and appraisal of route options to select a preferred route including consultation with key stakeholders and local communities to establish a proposed route.
- Stage 2: Environmental Impact Assessment (EIA) of the proposed route and any associated infrastructure. Confirmation of the proposed route for assessment purposes.

Stage 1 has been completed and a preferred route has been selected which provides a technically feasible and economically viable continuous overhead line between Kennoxhead Windfarm and Coalburn substation whilst taking into consideration environmental, technical and economic constraints. This means that the proposed route would be the one that on balance, causes the least disturbance to the environment and the people who live, work and enjoy outdoor recreation within it. SPEN attach great importance to the effect the work could have on the environment and local communities and are keen to engage with key stakeholders so that views can be taken into account through the development of the project.

The proposed route will be taken forward for more detailed environmental assessments prior to submission of an application for consent under Section 37 of the Electricity Act 1989 (for the OHL).

¹ SP Energy Networks (May 2015) Major Electrical Infrastructure Project: Approach to Routeing and Environmental Impact Assessment, https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_FINAL_20150527.pdf

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GLOSSARY

132kV	132 Kilovolt capacity of a overhead electricity powerline
AA	Appropriate Assessment
AGOL	ArcGIS Online
AOD	Above Ordnance Datum
ASA	Archaeologically Sensitive Area
BDS	Background Desktop Study
BGS	British Geological Survey
Bing	A heap, especially of metallic ore or of waste from a mine.
BPM	Best Practicable Means
BTO	British Trust for Ornithology
CA	Conservation Area
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CTMP	Construction Traffic Management Plan
ECU	Energy Consents Unit (Scottish Government)
EHV	Extra high voltage transmission lines (e.g. 33kV)
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regulations	The Electricity Works (Environmental Impact Assessment (Scotland) Regulations 2017
Electricity Act	The Electricity Act 1989
EMF	Electromagnetic fields
EMP	Environmental Management Plan
FCS	Forestry Commission Scotland
GDL	Garden and Designated Landscape
GIS	Geographical Information Systems
GSP	Grid Supply Point
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectares
HER	Historic Environment Record
HES	Historic Environment Scotland
HHIA	Human Health Impact Assessment
Holford Rules	Guidelines developed in 1959 by Lord Holford which define the principles of route selection for overhead lines which continue to inform transmission line routeing in the UK.
HRA	Habitat Regulation Assessment

HSE	Health, Safety and Environment
HV	High voltage transmission lines (e.g, 11kV)
IBA	Important Bird Areas' includes sites designated or identified for designation as Special. Protection Areas under European Community Directive 79/409 on the Conservation of Wild Birds
IEMA	Institute of Environmental Management and Assessment
Initial Study Area	Broad search area subsequently refined to identify the Route Option Area
kV	Kilovolt capacity of an overhead line
LCT	Landscape Character Type
LCU	Landscape Character Unit
LDP	Local Development Plan
LOD	Limit of Deviation, an area which defines
LPA	Local Planning Authority
LV	Low voltage transmission lines (e.g. 230v)
LVIA	Landscape and Visual Impact Assessment
m	Metres
MLDP	Minerals Local Development Plan
MLRS	Medieval or Later Rural Settlement
NRHE	National Record of Historic Environment
NGR	National Grid Reference
NGT	National Grid Transmission
NTS	Non-Technical Summary
NRHE	National Record of the Historic Environment
NVC	National Vegetation Classification
OHL	Overhead line: an electricity powerline above ground level
OS	Ordnance Survey
PAWS	Plantation on Ancient Woodland Sites
PEA	Preliminary Ecological Appraisal
PIR	Project Inception Report
Planning Application	An application for planning permission under The Town and Country Planning (Scotland) Act 1997
PRA	Preliminary Risk Assessment
Preferred Route	The preferred route identified through the routeing study process, which hasn't been subject to non statutory consultation. Considered to represent the optimum balance between the various environmental and technical considerations
Proposed Route	The final route within which alternative OHL route alignments will delineated and appraised
PRoW	Public Rights of Way

PWS	Private Water Supply
Ramsar Site	A wetland site designated to be of international importance under the Ramsar Convention
Route	Linear area of search within study area, through which a new transmission line could be sited
Route Option Area	Area within which a number of potential route alignments can be identified prior to appraisal
RCD	Routeing Consultation Document
RSPB	Royal Society for the Protection of Birds
SAC	A Special Area of Conservation (SAC) protects one or more special habitats and/or species – terrestrial or marine – listed in the Habitats Directive.
SDP	Strategic Development Plan
Section 37 (s37) application	Application for development consent under section 37 of the Electricity Act 1989
SHETL	Scottish Hydro Electric Transmission Ltd
SM	Scheduled Monument
SEPA	Scottish Environment Protection Agency
SLA	Special Landscape Area
SNH	Scottish Natural Heritage
SPA	Special Protection Areas (SPAs) are selected to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, and regularly occurring migratory species.
SPEN	Scottish Power Energy Networks
SPG	Supplementary Planning Guidance
SPP	Scottish Planning Policy
SPR	Source-Pathway-Receptor
SPT	Scottish Power Transmission
SSSI	Site of Special Scientific Interest is a statutory designation made by Scottish Natural Heritage under the Nature Conservation (Scotland) Act 2004.
Study Area	The area of land which comprises the area within which route options will be identified and appraised
Trident wood pole	This construction type is nominally known as a “Trident” line due to the appearance of the poles once constructed.
VP	Vantage Point
WoSAS	The West of Scotland Archaeology Service
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

1 INTRODUCTION

1.1 Structure of the Document

1.1.1 This Routeing Consultation document is structured as follows:

- Section 1 provides an introduction to the project giving a project description and providing information on project background and need, legal and planning context and SPEN's approach to routeing;
- Section 2 sets out the methodology used throughout the routeing process;
- Section 3 outlines the environmental and technical considerations within a defined study area, which informed routeing;
- Section 4 of the document provides a summary of route options and analysis, including a description of the preferred route; and
- Section 5 summarises the consultation process that is proposed for the Kennoxhead OHL development and sets out the subsequent phases of routeing and environmental assessment processes.

1.1.2 Appendices to the document include:

- Appendix 1 Figures and Reports
- Appendix 2 Environmental Baseline Data Sources
- Appendix 3 Environmental & Technical Baseline Appraisal
- Appendix 4 Environmental Constraint Sensitivity Assessment
- Appendix 5 Detailed Environmental Analysis of Route Options
- Appendix 6 Holford Rules – Excerpt from SP Energy Networks 2015 – Major Electrical Infrastructure Projects – Approach to Routeing and Environmental Impact Assessment

1.2 Document Purpose

1.2.1 Scottish Power Energy Networks (SPEN) as agents for Scottish Power Transmission Ltd (SPT) propose to construct a 132kV continuous overhead line (OHL) between Kennoxhead Windfarm (Grid ref: 277165E 624386N) and Coalburn Substation ~14 km north-north-east (Grid ref: 282510E 637337N). Kennoxhead Windfarm is located on land south of the A70, near the village of Glespin on the Douglas Estate while Coalburn substation is located on land west of the M74 near Coalburn (Figure 1.1, Appendix 1).

1.2.2 This document presents information on the approach taken in the identification of route options, appraisal methodology, and the findings of the appraisals and assessments, concluding in the selection of the preferred option.

1.2.3 The purpose of this document is to inform consultees of the proposals and thus enable them to provide feedback and comment on the preferred option that has been identified. SPEN is committed to ensuring that the effect the development could have on the environment and the people who live, work and enjoy outdoor recreation within it is

minimised, so are keen to engage with key stakeholders, with views taken forward to the next stage in the process; Environmental Impact Assessment (EIA).

1.2.4 All technical figures referred to in this section are provided in Appendix 1.

1.3 Project Background and Need

1.3.1 SPEN are legally obliged under the Electricity Act 1989 to provide grid connections to new electricity generating developments and has been approached by the developer for Kennoxhead Windfarm to provide a grid connection to the wider electricity transmission network.

1.3.2 SPT is required under the Electricity Act 1989 and under the terms of its Electricity Supply Licence “to develop and maintain an efficient, co-ordinated and economical system of electricity transmission”. SPEN’s stated view is that wherever practical, an overhead line approach is taken when planning and designing new lines.

1.3.3 As a result, SPEN are proposing to construct a new 132kV overhead line between Kennoxhead Windfarm and Coalburn Substation.

1.3.4 SPEN take the view that the project falls within the scope of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 which implement the requirements of the European Parliament and Council Directive No 2014/52/EU.

1.4 Legal and Planning Context

1.4.1 There are a number of legal provisions which apply to the development of electricity transmission and distribution lines and associated infrastructure. The key provisions are as follows:

- The Electricity Act 1989 is the principal legislation which applies in the UK;
- The Town & Country Planning (Scotland) Act 1997 as amended by The Planning etc. (Scotland) Act 2006; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Scottish Power Transmissions Statutory License Duties

1.4.2 Scottish Power Transmission’s licensed businesses are authorised to transmit and distribute electricity within its network areas under the Electricity Act. As such, Scottish Power Transmission has a statutory obligation to carry out the duties outlined within the Electricity Act.

1.4.3 A statutory duty is imposed on SPEN by Schedule 9 of the Electricity Act 1989, to ensure that the following factors are accounted for when formulating proposals for the installation of OHLs: *“to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features or special interest of protected sites, buildings, objects of architectural, historical or archaeological interest; and to do what it reasonably can to mitigate any effects which the proposals would have on the natural beauty of the countryside or any such flora, fauna, features, sites, buildings or objects.”*

Consenting Requirements

- 1.4.4 Section 37 of the Electricity Act requires that, with the exception of certain specific examples, all electricity lines exceeding 20kV will require consent to be granted by the Scottish Ministers. This 'Section 37 consent' gives approval to install, and keep installed, an overhead electricity line. Section 57 of the Town & Country Planning (Scotland) Act 1997 as amended by The Planning etc. (Scotland) Act 2006 provides that "*Planning permission may also be deemed to be granted in the case of development with government authorisation*". In certain circumstances, deemed planning permission may include works that are 'ancillary' or necessary to the operation of the overhead line such as cable sealing end compounds.
- 1.4.5 In some instances, there may also be the need for separate planning permission where development does not form part of a Section 37 application. For example, separate planning permission may be required for 'ancillary development' such as a substation. Where consent for development is sought, an application must be made to the relevant planning authority, under the Town & Country Planning (Scotland) Act 1997 as amended, before such works are able to be carried out.
- 1.4.6 Finally, some forms of development, including underground cables, are typically classed as 'permitted development' under the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (as amended). Developments classified as permitted development may automatically be granted planning permission, by statutory order, and do not require submission of a planning application to the local planning authority.
- 1.4.7 At the same time as applying for Section 37 consent, SPEN will request deemed planning permission under Section 57 of the Town and Country Planning (Scotland) Act 1997 from South Lanarkshire Council as the planning authority for the overhead line and all ancillary elements.

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

- 1.4.8 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 require that, before consent is granted for certain developments, an Environmental Impact Assessment (EIA) must be undertaken. The EIA Regulations set out the types of development that are always subject to an EIA (Schedule 1 developments) and other developments which may require an EIA if they exceed certain thresholds and are likely to give rise to significant environmental effects (Schedule 2 developments). The Proposed Development currently falls under two Schedule 2 definitions:
- 1.4.9 "(2) an electric line installed above ground -
- 1.4.10 (a) with a voltage of 132 kilovolts or more
- 1.4.11 (c) the purpose of which installation is to connect the electric line to a generating station the construction or operation of which requires consent under section 36 of the Electricity Act 1989
- 1.4.12 As such, SPEN propose to undertake an Environmental Impact Assessment of this project to support the application for Section 37 Consent and Deemed Planning Permission.

1.5 Project Description

Scope

- 1.5.1 The scope of this study is limited to the routing of a connection between the Kennoxhead Windfarm Substation and the existing Coalburn Substation, and specifically identifying a preferred route based on a balance of technical, economic and environmental considerations.

The Development

- 1.5.2 The connection is proposed as a new 132kV wood pole overhead line between Kennoxhead Windfarm point of connection and the existing Coalburn Substation on the following basis.

Overhead Line design

- 1.5.3 SPEN's policy is to seek a continuous overhead line solution for all transmission connections and only where there are exceptional constraints are underground cables considered an acceptable design option. Such constraints can be found in urban areas and in rural areas of the highest scenic and amenity value. Whilst underground cables have visual benefits, there are associated technical and environmental and economic disadvantages including:

- the physical extent of land required;
- the fault repair time;
- difficulties associated with general maintenance;
- increased cost;
- greater ground disturbance from excavating trenches;
- the restriction of development and planting within the underground transmission cable corridor;
- requirements for cable sealing end compounds or platforms at each end of each section of underground cable; and the fact that underground cabling is a less efficient means of transporting electricity.

- 1.5.4 On this basis, the key design assumption is that this will be a continuous OHL connection throughout. Should the appraisal identify any areas where a proposed OHL is likely to give rise to unacceptable effects, alternative options (such as underground cables and alternative routes) will be considered.

If, in certain circumstances, it is determined that an underground cable is required instead of an overhead line, the approach is to minimise the length of underground cable necessary to overcome the constraint to overhead line routing, consistent with a balance between technical and economic viability, deliverability and environmental considerations. It is not uncommon for a length of cable to be required to enter or exit a substation.

Wood Poles

- 1.5.5 The size of poles and span lengths will vary depending on several factors, in line with industry standard ENA Specification 43-50 ISSUE 2. The OHL route is above 200m

AOD and will therefore be likely to require construction using H poles (rather than single poles), with a span length of around 70m - 100m and pole heights ranging from 10m – 22m with a typical height of 13m. This has been used as the basis for identification of the preferred route, however, the precise pole configuration, height and the spans will be determined after a detailed line design following confirmation of the proposed route.

The wood pole will support three conductors (wires) in a horizontal flat formation. Typical trident woodpole specifications are shown in Figure 1.2 a -d, Appendix 1.

Subject to confirmation of the proposed route for the new OHL, detailed survey work will be carried out to inform the proposed positions and heights of each individual wood pole.

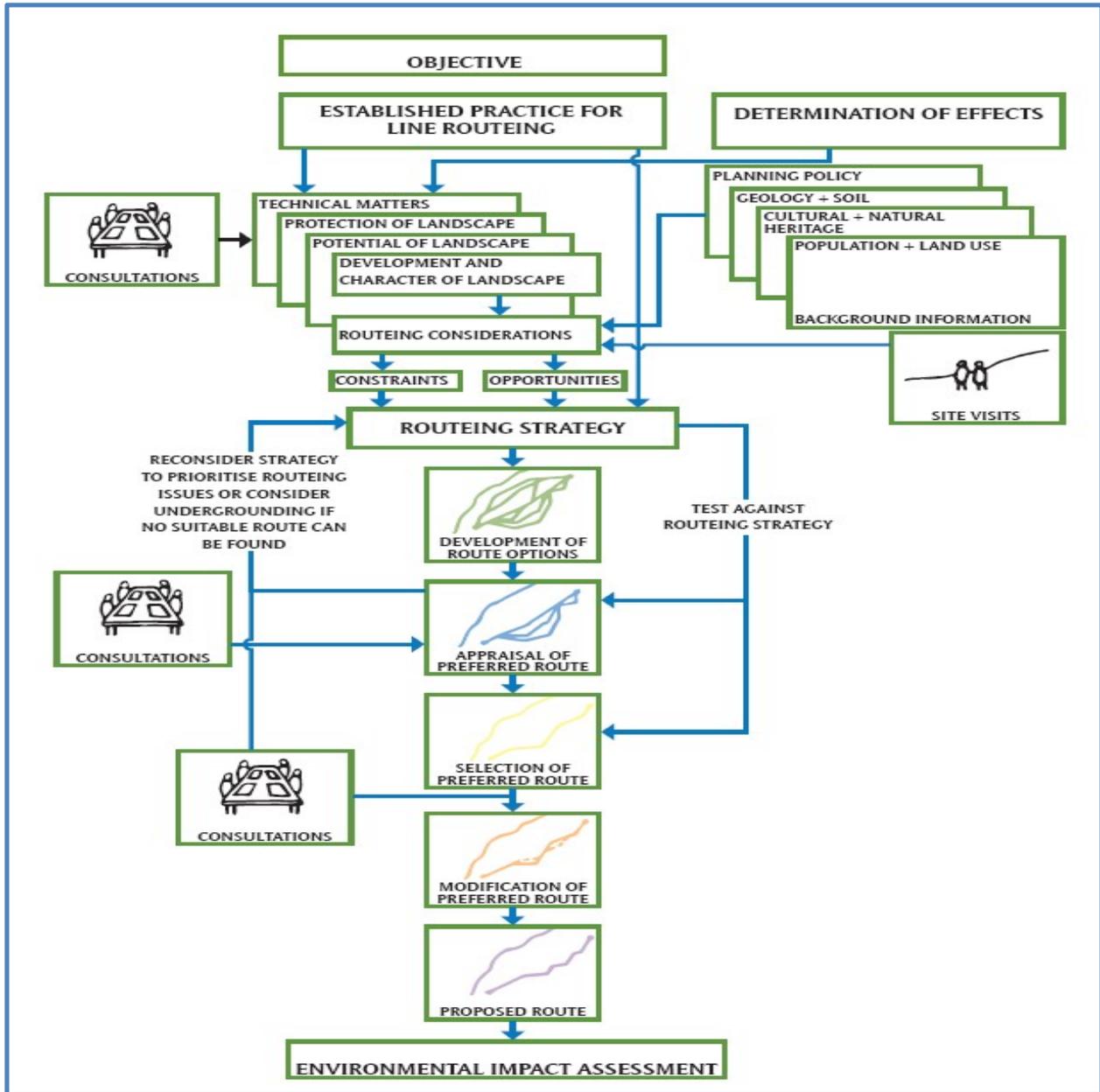
Overhead Line Construction and Maintenance

- 1.5.6 OHL construction typically follows a standard sequence of events as follows:
- prepare access to the pole locations using existing access tracks (farms, windfarms, etc.,) as appropriate;
 - erect wood poles;
 - string conductors; and
 - reinstate pole sites and remove temporary accesses.
- 1.5.7 Temporary accesses will be constructed, as necessary, and laydown /storage areas established to facilitate development depending on ground conditions, it may be possible to access work locations by tracked/low ground pressure vehicles, however trackway panels or temporary stone roads may be required in some circumstances. Following commissioning of the overhead line, all equipment and temporary access of construction areas will be removed with the land being reinstated to the satisfaction of the landowner.
- 1.5.8 For wood pole line construction, the ‘poles’ are typically erected using normal agricultural machinery such as an excavator with a lifting arm. A tracked excavator and low ground-pressure vehicles, (e.g. tractor, ATV, quad bikes) are used to deliver, assemble and erect each wood pole structure at each location. The erection of the wood poles requires a typical excavation of 3m² x 2m deep. The excavated material is segregated into appropriate layers and used for backfilling. It is relatively rare for concrete or other backfill to be used in the foundations of wood poles. This would normally only be used where ground conditions are particularly unstable (identified by site investigations). An excavator is typically used to hoist the assembled structure into position and once the structure has been braced in position the trench is backfilled.
- 1.5.9 Stringing of conductors. The conductors would be winched to/pulled from section poles; these poles therefore require access for heavy vehicles to transport the conductor drums and large winches. Where the overhead line crosses a road a scaffold tunnel would be used to protect the vehicles from the works. Existing distribution lines would be either switched off, deviated or protected using ‘live line’ scaffolds. Reinstatement of pole sites and removal and reinstatement of temporary infrastructure sites.
- 1.5.10 In all cases, every effort is made to cause the least disturbance to landowners and local residents during construction. Following completion all ground disturbance resulting from the construction of the new line is reinstated.

1.6 SPEN Approach to Routeing

- 1.6.1 SPEN's approach to routeing an overhead line is based on the premise that the major effect of an overhead line is visual and that the degree of visual intrusion can be reduced by careful routeing. A reduction in visual intrusion 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. In addition, a well-routed line takes into account other environmental and technical considerations and would avoid, wherever possible, the most sensitive and valued natural and man-made features.
- 1.6.2 Figure 1.1 illustrates the process flow which SPEN adopts for OHL routeing and which has been applied to this project. The following sections describe the key stages in this process.

Figure 1.1: SPEN Approach to Routeing



2 ROUTEING STRATEGY METHODOLOGY

2.1 Overview

2.1.1 The route development and assessment methodology adhered to within this report is consistent with SPEN's approach to routeing². SPEN's guidance broadly recommends that projects should adhere to the following process:

- Routeing Objective;
- Established practice for OHL routeing;
- Consideration of potential effects, technical & environmental routeing considerations;
- Develop project specific Routeing Strategy;
- Development of route options;
- Appraisal of route options and selection of preferred route;
- Consultation on the preferred route
- Modification of the preferred route;
- Selection of the proposed route and environmental impact assessment

2.1.2 The proposed route selection is then taken forward to an EIA process and is used as a basis for an application for consent.

2.1.3 The way in which the routeing assessment has been undertaken is described in the sections below.

2.2 Routeing Objective

2.2.1 The objective of the route selection process is to identify a technically feasible and economically viable OHL route between the Kennoxhead Windfarm and Coalburn Substation, which causes least disturbance to people and the environment.

2.3 Established Practice for Overhead Line Routeing

The Holford Rules Guidelines for Routeing of new high voltage overhead transmission lines

2.3.1 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 were reviewed circa 1992 by the National Grid Company (NGC) Plc (now National Grid Transmission (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Holford

² SP Energy Networks. 2015. *Major Electrical Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment*. Available at: https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_FINAL_20150527.pdf <Accessed 13/05/2019>

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 Scottish circumstances. A summary of the Holford Rules are summarised in Box 2.1.

Design Techniques for Forest Management Planning (2014)

- 2.3.2 Guidelines have been produced by the Forestry Commission (now Scottish Forestry) for the design of woodlands. These include a section on the design of open spaces in the forest, which discusses how OHL wayleaves can be integrated in the forest design.
- 2.3.3 The SPEN guidance requires standard application of the Holford Rules, as well as Forestry Commission guidelines if and when the new OHL may pass through forestry. The Forestry Commission guidelines state that, where possible, OHL should follow open space and run alongside woodland, instead of through it.
- 2.3.4 SPEN's approach to routeing OHL is primarily based on the idea that any major effect of an overhead line will be visual, and that the degree of visual intrusion can be reduced by carefully routeing the development. Techniques to reduce visual intrusion of OHLs include using the topography and trees to provide screening and background, as well as ensuring the that OHL is routed at a distance away from settlements and roads where possible. Particularly sensitive and valued natural and man-made features should also be avoided, with a well-routed OHL also taking into account any other technical and environmental considerations.

Routeing Considerations

- 2.3.5 Overhead lines are linear elements in the landscape. They are likely to affect, to varying degrees, visual and other environmental aspects of the area through which they run. This part of the process predominantly comprises information gathering and consideration of the potential for effects.
- 2.3.6 The initial stage is to determine a study area and gather baseline information within this area through desk-based studies, site visits, and consultations in order to identify potential constraints and opportunities to routeing.
- 2.3.7 To define a route that meets the requirements of the Electricity Act, a balance must be struck between three sets of considerations:
 - Economic
 - Technical
 - Environmental

Economic Considerations

- 2.3.8 In compliance with Schedule 9 of the Electricity Act the routeing objective requires the proposed connection to be economical. It is understood that this is interpreted by SPEN as meaning that as far as possible, and all other things being equal, the connections should be as direct as possible and the route should avoid areas where technical difficulty or compensatory schemes would render the connection uneconomical.

Technical Considerations

- 2.3.9 Technical considerations potentially include existing infrastructure (in this case windfarms and overhead lines), altitude and slope angle, and physical constraints such as large water bodies.

- 2.3.10 These technical considerations are not considered as being absolute constraints but are a guide to routeing. The approach taken is to identify preferred environmental options informed by a staged review of technical issues.

Environmental Considerations

- 2.3.11 Statutory duties imposed by Schedule 9 of the Electricity Act require licence holders to seek to preserve features of natural and cultural heritage interest and mitigate where possible, any adverse effects which a development may have. Experience across the electricity industry shows that an overhead transmission line is likely to affect to varying degrees the following:

- Landscape and visual amenity
- Ecology, ornithology and nature conservation
- Geology, hydrogeology and hydrology
- Cultural heritage
- Forestry and woodland

- 2.3.12 Other considerations which may affect routeing to a greater or lesser degree include:

- Planning allocations and major applications
- Noise
- Traffic (access for construction)
- Land Use (agriculture)
- Socio-Economics (tourism and recreation)

Box 2.1: – Holford Rules

<p>Rule 1</p>	<ul style="list-style-type: none"> • Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.
<p>Rule 2</p>	<ul style="list-style-type: none"> • 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.
<p>Rule 3</p>	<ul style="list-style-type: none"> • Other things being equal, choose the most direct line, with no sharp changes of direction and thus with few angle towers.
<p>Rule 4</p>	<ul style="list-style-type: none"> • 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.
<p>Rule 5</p>	<ul style="list-style-type: none"> • 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.
<p>Rule 6</p>	<ul style="list-style-type: none"> • 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 concentration or 'wirescape'.
<p>Rule 7</p>	<ul style="list-style-type: none"> • 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.

2.4 Consideration of potential effects, technical & environmental routing options

Study Area and Buffer Zone

2.4.1 A study area with a 2 km buffer zone (Figure 2.1) has been defined for this routing process – large enough to accommodate all likely route options. The purpose of defining the study area and buffer zone is as follows:

- The study area comprises the area within which various options for locating the proposed development are identified and assessed; and
- The buffer zone comprises a larger area within which potential impacts of the proposed development on the environment may occur. Potential impacts are identified and evaluated, in order to define the overall preferred route option.

Collection of Background Information

2.4.2 Following the establishment of the Study Area, an initial evaluation of environmental and technical constraints was undertaken. Key constraints were initially mapped for the study area and buffer zone using Geographical Information Systems (GIS), and collated from sources in the public domain and via external consultation with stakeholders where required. This data was supplemented where required by field survey. Constraints and potential issues considered when collecting background information have been outlined within Table 2.1.

Table 2.1 – Key constraints

	Constraints/Issues
Environmental	Ecology
	Ornithology
	Landscape (designations and character)
	Visual Amenity
	Archaeology and cultural heritage
	Recreation and tourism
	Hydrology, hydrogeology and geology (including peat)
	Residential dwellings and land use
	Other land uses (e.g., forestry, transmission lines, mineral operations, windfarms, agricultural, and roads)
Technical	Slope/gradient (topography)
	Existing infrastructure (or in the planning process)

	Constraints/Issues
	Altitude
	Ground Conditions
	Presence of large waterbodies
Economic	Ensure viability – as far as reasonably possible, the line should be direct and avoid areas where technical difficulty or compensatory requirements would render the scheme unviable on economic grounds.

3 TECHNICAL, PLANNING AND ENVIRONMENTAL ROUTEING CONSIDERATIONS

3.1 Study Area

- 3.1.1 The study area for the proposed development has been defined through:
- Identification of the start and end points for the connection, which represent the fixed geographical elements of the route. In this case, these comprise the Kennoxhead Windfarm Substation and the existing Coalburn Substation;
 - Identification of the technical and environmental drivers which exist in the area between these two points. These drivers include topography, landscape character and areas of environmental value and historical interest. This responds to the requirements of the Holford Rules 1 and 2, recognising that there is no requirement to take the most direct route between the start and end points and that routes must respond to the constraints identified.
- 3.1.2 A 2 km buffer distance has been applied to the study area on the basis of perceptibility of a wooden pole OHL within the landscape.³
- 3.1.3 The Study Area and Context with 2km buffer zone is shown on Figure 2.1.
- 3.1.4 The boundary of the Study Area is defined by several high-level constraints. These include:
- The northern boundary is defined by an existing 400kV OHL;
 - The eastern boundary is defined by the presence of Carlisle Road (B7078) and the M74 Motorway;
 - The southern boundary is defined by forested hill slopes; and
 - The western boundary is defined by plateaux moorlands and partial border with East Ayrshire.
- 3.1.5 Coalburn Moss SAC occupies the area to the south of Coalburn Substation. The study area boundary takes this into account to enable an approach to be considered at the routeing stage that will allow avoidance of the designated site. The study area also takes into account an area historically used for opencast mining at its southern extent to enable a route from this direction to be considered at the routeing stage.
- 3.1.6 The inclusion of the 2km buffer zone allows for consideration of the potential for the proposed development to indirectly impact upon important designated areas, landscapes and views.

³ D Horn, I McAulay and M Turnbull (May 2010) High Voltage Wood Pole Transmission and Distribution Main Interconnector Lines in Rural Landscapes: Perceptibility

3.2 Environmental and Technical Baseline

3.2.1 Baseline information that identifies key environmental constraints has been used as the basis of analysis and to inform the identification and appraisal of route options. The details of the environmental and technical baseline data sources and information is presented in Appendix 2 and 3, and the key issues are summarised as follows (see Figures 3.1 to 3.8):

- Coalburn Moss SAC/SSSI, which has been designated for its raised bog habitat. Present within the north of the study area, occupying approximately 235 ha;
- Presence of Coalburn, Douglas and Glespin settlements as well as individual dwellings;
- Muirkirk and North Lowther Uplands Special Protection Area/SSSI, occupying the south western portion of the study area (3% of study area) and covering. Kennoxhead Windfarm is located within this SSSI;
- Several areas of ancient woodland from the Ancient Woodland Inventory within the Study Area. These are located in the northwestern portion of the study area southwest of Rougham Wood at Stockbriggs and at Windrow Wood and an unnamed wood southwest of Douglas.
- Millers Wood (SSSI) and ancient woodland located to the southwest of Douglas;
- Recreational resources such as Hollandbush Golf Course and a number of core paths and rights of way;
- Listed Buildings (Category A to C) within Douglas;
- Presence of watercourses and waterbodies, including Poniel Water, Coal Burn, Longhill Burn, Kennox Water, Douglas Water, Alder Burn and Broadlea Burn;
- Scheduled Monuments (Douglas St Brides Chapel and Auchensaugh Hill);
- Presence of Douglas Valley Special Landscape Valley (SLA);
- Presence of Planning designations (Residential Masterplan Site, Development Framework, Strategic Economic Investment Location);
- Existing 400kV overhead Line to the north and consented windfarms and wind turbines;
- Consented planning applications for redevelopment e.g. Auchlochchan Bing and Bellfield Bing to the east of Coalburn;
- Presence of past, present and future areas of mineral extraction;
- Presence of adits and shafts associated with mineral extraction;
- Areas of peat;
- Potential areas for future minerals extraction e.g. small area of coal north of Coalburn Moss SAC and area of sand and gravel near Poniel.

3.2.2 The constraints analysis was undertaken using Geographical Information Systems (GIS). A project specific WebGIS service based on ArcGIS Online (AGOL) was developed specifically for the Kennoxhead project. This allowed spatial data, such as environmental constraints and protected sites to be overlaid with basemapping and project-specific data

to provide the project team with a web-accessible and updatable means of interrogating environmental and project details in a single place.

3.3 Routeing Strategy

3.3.1 In accordance with SPEN's approach to routeing, the routeing strategy for the Kennoxhead project is:

- To identify a technically feasible and economically viable route between Kennoxhead Windfarm and Coalburn Substation whilst taking into consideration environmental, technical and economic constraints. The route should, on balance, cause the least disturbance to the environment and the people who live, work and enjoy outdoor recreation within it.
- To help minimise landscape and visual effects, in accordance with the Holford Rules and SPEN's routeing methodology, the proposed overhead line has also sought to avoid high ground and ridgelines, responding to the grain of the landscape, subject to avoiding areas of highest amenity and environmental values far as practicable (as above). To help assess temporary and permanent cumulative effects, careful consideration has also been given to the relationship of the proposed OHL with other electricity infrastructure within the study area.

3.3.2 Whilst not the only influence on route alignment, the key considerations that have informed the routeing strategy have been the need to minimise impacts to: the settlements of Coalburn, Douglas, Auchlochan Garden Village; Coalburn Special Area for Conservation (SAC); and consented developments (including windfarms, commercial development, and mineral extraction).

3.3.3 In line with the Routeing Strategy the following sequential stages were adhered to, in accordance with SPEN's approach to routeing guidance.

Stage 1: Development of Route Options

3.3.4 Considerations identified in the routeing strategy were applied to the study area to establish a number of possible 'route options'. This process involved designing routes in accordance with the Holford Rules, that best fit the landscape and minimise effects on visual amenity, whilst avoiding wherever possible areas of high environmental value. These areas generally include areas of natural and cultural heritage value designated at a national, European or international level as these are afforded the highest levels of policy protection.

3.3.5 In response to the identification of the key environmental and technical constraints and strategy, a sensitivity weighting (hard constraint, moderate constraint or soft constraint) is defined on an aspect-by-aspect basis, for each environmental feature identified. This is undertaken with reference to Holford Rules 1 and 2 and by using relevant guidance and professional judgement relating to designations and their sensitivities.

In terms of the Holford Rules there are constraints within the Study Area which would be classified as 'areas of highest amenity value' under the definition in **Holford Rule 1**; Site of Special Scientific Interest, Special Area of Conservation, Special protection Area, Listed Building, Scheduled Monument.

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

- 3.3.6 In addition, there are constraints which would be considered under Holford Rule 2, which are also included as strategic constraints.

Holford Rule 2: Avoid smaller areas of high amenity value, or scientific interests 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

- 3.3.7 To identify route options within the Study Area the strategic constraints were categorised in terms of their potential to impact on the process of route option identification as follows:

Hard Constraint: Feature to be avoided wherever possible.

Moderate Constraint: Feature normally avoided where other alternative routes/alignments are available. If no other alternatives available, feature can be passed through with mitigation.

Soft Constraint: Feature present that could be relatively easy to mitigate, either by design, micro-siting or construction practices.

- 3.3.8 Table 2.2 details how this categorisation applies to the strategic constraints identified for within the Study Area.

Table 2.2: Strategic constraint categorisation

Sensitivity	Justification	Examples	Route Identification Response
Hard	Holford Rule 1 features (international and national designations) or environmental features considered particularly sensitive to transmission infrastructure Technical constraints of key significance	European designated sites (e.g. Special Protection Areas); National Park; National Scenic Area	Avoid wherever possible and prioritise for mitigation
Moderate	Holford Rule 1 features considered less sensitive to transmission infrastructure; Holford Rule 2 features (regional and local designations)	Geological SSSIs; Category B and C Listed Buildings; Local Nature Reserve	Proceed with caution
Soft	Holford Rule 2 features	Geological	Some constraints of lesser sensitivity - no

Sensitivity	Justification	Examples	Route Identification Response
	considered not to be sensitive to transmission infrastructure	Conservation Review Sites	issue for route identification

3.3.9 A 'heat map' was generated which assigns colours (red, amber, green) to hard, moderate and soft constraints, respectively. The purpose of heat mapping is to provide a graphic indication of overall receptor sensitivity across the study area.

3.3.10 Holford Rules 1 and 2 were applied to these site-specific strategic constraints using the following hierarchy to identify and refine potential route options:

- Avoid SACs, Class 1 peat areas, residences, scheduled monuments, listed buildings and non-designated heritage assets of potentially national significance.
- Preferably avoid or limit the distance travelled within SSSI; RSPB Bird Sensitive Areas; SSSI, Native/Nearly-native woodland and 100m buffer to existing and committed residential properties.
- Cultural heritage assets should be considered from a setting perspective where they are of national importance, or where the setting is pertinent to its citation. When assessing the impact on setting, a buffer of 2 km from the cultural heritage asset has been used. Setting effects have been considered within the route option appraisal.
- Where it is possible to do so, avoid or limit the distance travelled within Planted Ancient Woodland Sites, Potential disturbance to Black Grouse lek sites and disturbance to wader nest sites near to ponds, forested areas and peat.

Stage 2: Appraisal of Route Options and Selection of Preferred Route

3.3.11 To allow identification of a Preferred Route, an appraisal of the route options was undertaken and is described in this report. The purpose of this is to identify the relative potential of each route option to accommodate an OHL, including a focus on potential landscape and visual impacts of the options as directed by Holford Rules 3 to 7.

3.3.12 The conclusion of this appraisal is the identification of a 'Preferred Route'. Whilst this route has been defined based upon the information available to date, further consultation may lead to technical matters emerging which require a review of the Preferred Route. Where this occurs, a review of the route options would be undertaken to confirm the proposed route.

The appraisal of route options is carried out by means of the following key steps:

Step 1: Field and Desk Based Assessments

3.3.13 In order to validate information gathered through desk based collation and constraints mapping, and to supplement the landscape and visual desk work, site walkovers were completed by the an environmental manager, GIS specialist and landscape specialist in March and June 2019.

- 3.3.14 An ecology desk based assessment was also undertaken which considered publicly accessible ecological data from windfarms, overhead lines and other developments collated between 2010 to 2017 as well as advice from SNH and data from a background data search (BDS).
- 3.3.15 An ornithological desk based assessment was undertaken which considered publicly accessible ornithological data from windfarms, overhead lines and other developments collated between 2007 to 2017 as well as advice from SNH.
- 3.3.16 A review of designated heritage assets was undertaken at an early stage of the project. This identified that there is a concentration of listed buildings within and around the conservation area of Douglas, and a small number of discrete listed buildings in the northern part of the study area. There are two scheduled monuments (St. Bride's Church, SM20265, and Auchensaugh Hill, cairn, SM4234). However, from an early stage of the project proposed route corridors did not pass close to these designated assets of national importance. Therefore, an archaeological site visit was not undertaken at this stage.

Step 2: Environmental Analysis

- 3.3.17 An environmental analysis of identified route options was undertaken by each technical discipline in order to identify a Preferred Route.
- 3.3.18 The environmental analysis comprised a qualitative appraisal of each route option, based upon the criteria defined in section 3.3.7 and professional judgement. The appraisal considered the potential interaction of the potential OHL with key environmental features and associated sensitivities for each route option (as presented in Appendix 5) in order that subsequent comparison between options could be made.

Step 3: Selection of the Preferred Route for Consultation

- 3.3.19 Following the appraisal of each route option a Preferred Route has been identified based on the comparative merits of each option. The route that offers the greatest best balance of technical, environmental and commercial impacts as far as possible, and offering the greatest potential for mitigation has been chosen. The Preferred Route is based on professional judgement, in consideration of aspects set out above in relation to the overall potential of each route to accommodate the OHL.
- 3.3.20 The requirements of Stages 1 and 2 above are essentially fulfilled by the contents of this report. Stages 3 to 5 below are those that will be completed subsequently and are outlined as follows.

Stage 3: Consultation on the Preferred Route

- 3.3.21 Having identified the preferred route option in this report, in order to ensure that views and opinions have been gathered from relevant stakeholders to inform the route option selection process, it is required to undertake public consultation. Consultation on the Preferred Route is an integral part of identifying the best route option and this Project Routeing Strategy Document facilitates consultation on the Preferred Route. Allied to circulation of this document, a public event also will be held/hosted by SPEN in order to facilitate public consultation.

Stage 4: Modification of the Preferred Route

- 3.3.22 Following consultation, all responses will be considered and their relevance to the selection of the route options/preferred option assessed/identified. Where relevant to the routing process, the options will be reviewed in light of such response and necessary adjustments made.

Stage 5: Selection of the Proposed Route and Environmental Impact Assessment

- 3.3.23 Following the consultation period and modification/confirmation of the Preferred Route, a Proposed Route will then be identified for the purposes of obtaining a Section 37 consent. The route will be the subject of EIA Scoping and further analysis during the EIA required to support the application for consent. The process of EIA will be iterative with the refinement of the design of the OHL.
- 3.3.24 The Environmental Impact Assessment Report (EIAR) will report assessment findings, identify and describe potential significant environmental impacts of the proposed OHL development during construction and operation. The EIAR will also identify mitigation measures as appropriate and will state whether any potentially significant environmental effects remain. The EIAR will be submitted as part of the Section 37 application for the proposed OHL route.

3.4 Planning Considerations

- 3.4.1 The proposed Kennoxhead OHL development contributes to energy infrastructure, without which new renewable energy generation projects are unable to contribute towards achieving these targets.
- 3.4.2 Sections 25 and 37 (2) of the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning etc. (Scotland) Act 2006) require that planning decisions are made in accordance with the development plan, unless material considerations indicate otherwise.
- 3.4.3 The South Lanarkshire Local Development Plan (2015) covers the study area between the Kennoxhead Windfarm and the existing Coalburn substation.
- 3.4.4 Policy within the following are also considered material considerations:
- The National Planning Framework 3 (NPF3) (2014);
 - Scottish Planning Policy (SPP) (2014);
 - The Climate Change Scotland Act (2009);
 - The Scottish Renewables Action Plan (2009) and 2020 Route Map for Renewables in Scotland;
 - Planning Advice Notes (PANs); and
 - Scottish Government Web-based renewable energy advice.
- 3.4.5 Under the Renewable Energy Directive 2009/28/EC, the UK is committed to meeting 15% of its energy demand from renewable sources by 2020. According to the Scottish Government's Electricity Generation Policy Statement (July 2013), Scotland's generation mix should deliver:

- A secure source of electricity supply;
- At an affordable cost to consumers;
- Which can be largely decarbonised by 2030;
- And which achieves the greatest possible economic benefit and competitive advantage for Scotland including opportunities for community ownership and community benefits.

4 ROUTE SELECTION

4.1 Introduction

4.1.1 This section follows the procedure as laid out in Section 3.3 – Routing Strategy for the selection of a preferred route option for the proposed Kennoxhead OHL focussing on Stages 1 to 3 of that procedure.

4.2 Stage 1: Identification of Route Options

4.2.1 The first stage of the procedure requires the identification of potential route options from which a preferred option can then be selected. Prior to the identification of potential route options for Kennoxhead OHL, further refinement of the Study Area was undertaken on the basis of removal of the most significant constraints to development.

4.2.2 Figure 4.1 shows the key environmental constraints and areas of infrastructure, as described in Section 3. Figure 4.2 presents the heat mapping used to show the relative sensitivities of these environmental constraints and infrastructure using the convention of 'hard' and 'moderate' constraints as defined in Section 2.5.9 to 2.5.11. An environmental constraint sensitivity table showing the key constraints identified across the whole Study Area and their relative classification is also provided in Appendix 4.

4.2.3 As a result of the analysis of the baseline data and heat mapping, the refined study area was consequently identified through the removal of hard (red) constraints within the study area (Figure 4.3). This refined study area accordingly provided the focus for the selection of route options.

Initial Appraisal

On initial consideration of the refined Study Area, taking account of the remaining constraints it was clear that it could be broken down into three broad geographical areas (see Table 4.1) within which it might be possible for an OHL route option to pass through.

Table 4.1: Potential route options and geographical groups

Refined Study Area Broad Geographical Area	Description
West	Route options connecting Kennoxhead Windfarm to Coalburn Substation passing west of Hagshaw Hill between Nutberry and Galawhistle operational windfarms.
Central	Route options connecting Kennoxhead Windfarm to Coalburn Substation passing to the east of Hagshaw Hill Windfarm.
East	Route options connecting Kennoxhead Windfarm to Coalburn Substation passing to the east of Glespin and west of Douglas.

4.2.4 With further scrutiny of the remaining constraints within the three broad geographical areas identified within the refined study area, three initial route options were then identified as shown on Figure 4.4 and described in Table 4.2 below. As can be seen below, a number of variant options were identified for each route option in order to facilitate robust scrutiny.

Table 4.2: Initial Route Options

Initial Route Options	Section Breakdown
Route Option 1 (West)	A2 - B1 - C1b A1 - B1 - C1b
Route Option 2 (Central)	A1 – B2 – B4 – B5 – C1a – C1b A2 – B3 – B4 – B5 – C1a – C1b A2 – B3 – B4 – B6 – C2a – C1a – C1b
Route Option 4 (East)	A3 – A5 – C2a – C1a – C1b A3 – A5 – C2a – C2b A3 – A4 – A5 - C2a – C1a – C1b 4.2.5 A3 – A4 – A5 - C2a – C2b

4.2.6 On identification of the three route options an initial technical review was then undertaken as part of the initial appraisal. This comprised a high level comparative assessment of route options and variations to identify whether any sections were significantly less acceptable than the others and could therefore be discounted prior to a more detailed appraisal being undertaken.

4.2.7 The initial technical review comprised a two-part process and is discussed in sections 4.2.7 to 4.2.15.

Part 1 – Initial Technical Review

4.2.8 An initial technical review of potential route options undertaken by SPEN Engineers in May 2019 assessed every route option and section variation on their own merit.

4.2.9 The initial technical review identified a severe steep slope after the crossing of the A70 (Option B2). After further analysis it was confirmed that this option was not technically achievable

4.2.10 Option C2b was discounted at the initial review stage because it would cross an existing 400kV OHL twice, cross the B7078 road (pinch point) at two locations and have a curve just before the substation that would make this a non-option in terms of technical feasibility.

- 4.2.11 Option A2 was discounted at the initial review stage due to the restricted availability of width for the OHL between the large pond and SSSI along the route. Areas above 300m and slope constraints alongside the Kennox Water and difficult accesses caused by the remoteness of the location also render this option technically unachievable.

Part 2 – Further Technical Review

- 4.2.12 A further technical review was undertaken by RSK in November 2019 which ruled out sections A4 and B6 for the reasons stated below.

The minerals assessment undertaken for the purposes of appraisal (Appendix 1) and identified a number of mine entries (shafts and adits) around the Douglas and Glespin area within proximity to Options A3 and A4. A larger number of shafts were identified in close proximity to Option A4 which present potential risks associated with settlement. Option 4 was therefore considered to be less appropriate than Option A3 due to potential risks associated with settlement.

- 4.2.13 Option B6 comprises a very short section that runs in close proximity to Douglas West Community Woodland. This option was discounted due to the potential impact on this community resource and the technical constraints of routeing through the dense woodland.
- 4.2.14 In appraising route options it is important to not only consider individual constraints to the potential development along each option but also areas where either one singular constraint and/or a number of constraints aggregate to create a Pinch Point. Such Pinch Points can consist of technical, engineering or environmental constraints (or combination thereof).
- 4.2.15 Where present, Pinch Points were accordingly identified on every variation of the routes.
- 4.2.16 The findings from the initial technical reviews discussed above and their variants (including identified pinch points identified and reviewed as part of the analysis) are summarised in Table 4.3 and 4.4.

Table 4.3 Route options with section variations
(sections discounted at the Stage 1 technical review stages shaded black)

Routes	Route section	Description
Routes 1 and 2	A1	Section A1 runs northeast from the Kennoxhead point of connection for ~2.3km along the edge of a conifer plantation and then for ~0.5km through the edge of the conifer plantation.
Routes 1 and 2	A2	Section A2 runs southwest to northeast from the Kennoxhead point of connection along a valley adjacent to the Kennox Water for ~3.8km then for ~0.3km towards the A90.
Route 1	B1	Section B1 is ~10.5km long and runs through fields categorised as improved grassland before going through the operational Galawhistle and Nutberry Windfarms and the consented Dalquhandy windfarm.
Routes 1 to 3	C1a	Section C1a is ~3.9km long and runs through a series of fields categorised as improved grassland before joining section C1b west of Coalburn.
Routes 1 to 3	C1b	Section C1b is ~3.3km long and runs through a series of fields categorised as improved grassland before joining Coalburn Substation to the north of Coalburn Moss.
Route 2	B3	Section B3 starts on the northern side of the A90 and runs 2.7km southwest to northeast through a series of fields categorised as improved grassland.
Route 2	B2	Section B2 starts to the south of the A70 and runs in a northeastern direction for ~2.5km across farmland to join B4.
Route 2	B4	Section B4 is 1.6km long and passes to the east of Hagshaw Hill and Extension Windfarm.
Route 2	B5	Section B5 is located to the east of Douglas West consented Windfarm and runs along the edge of a conifer plantation for 1.6km.
Route 2	B6	Section B6 is located to the east of Douglas West consented Windfarm and runs through an area of mixed woodland for 0.9km.
Route 2	C2a	Section 2a is located to the east of Douglas West consented Windfarm and runs through an area of mixed woodland for 1.9km.
Route 2	A3	Section A3 runs from Kennoxhead point connection for ~3.2km through a series of fields categorised as improved grassland towards the area of restored land at the former Glentaggart former open cast coal mine. The route then runs for ~2.7km through the western side of the restored area towards an area of young trees located to the southeast of Glespin.
Route 2	A4	Section A4 runs for ~2.7km through the eastern side of the area of restored land at Glentaggart former open cast coal mine towards an area of young trees located to the southeast of Glespin.
Route 2	A5	Section A5 is a continuation of A3 and A4 and runs from an area of young trees located to the southeast of Glespin for ~3.7km through a mixture of farmland, improved grassland and mixed woodland.
Route 3	C2b	Section C2b is a continuation of C2a and runs north towards Coalburn substation for ~6.5km through a mixture of farmland and mixed woodland. This section of the route is heavily constrained by the presence of residential properties, a wind turbine, the B7078, Coalburn Moss SAC, and a 400kV OHL.

Table 4.4 Pinch Points

(sections discounted at the Stage 1 technical review stages shaded black)

Pinch Point Reference	Route section	Description
PP1	A1	Hard constraint of elevation and gradient within this area. A large pond is located ~30m to the east of the proposed route section.
PP2	B1	Areas with potentially steep gradient would need to be negotiated on the run up to this Pinch Point. Higher altitude leads to shorter spans increasing the number of poles required. Buffering a property to the west (~100m) and a watercourse to the east (~50m) will only provide a width of ~100m at this point in the route option.
PP3	B1	Hard constraints of elevation, gradient and wind turbine topple distance are found within this area. If these can be avoided, only a narrow area of ~100 m would be available for OHL at this point. This section of the route would be within rotor diameter buffer which would mean potential for wake effects.
PP4	B1	Hard constraints of elevation, gradient and wind turbine topple distance are found within this area. If these can be avoided, an area of 50m (west) – not technically achievable and 85m (east) would be available for the OHL at this point. This section of the route would be within rotor diameter buffer which would mean potential for wake effects.
PP5	C1b	Potential visibility from residential properties to the west, avoidance of a golf course to west, a bing to the east and an area woodland are key considerations for this section of the route.
PP6	C1b	Proximity to Coalburn Moss SSSI/SAC (north) and Johnshill property (northwest) are key considerations for this section of the route. The primary view from Johnshill property is to the west. An appropriate buffer from a 400kV OHL will also need to be taken into consideration. Furthermore, an area of woodland is a key consideration for this section of the route.
PP7	A2	A pond to the west and the Kennox Water (SSSI) to the east present hard constraints in this area. Where A2 runs between the pond and SSSI ~100m would be available for the OHL at this point without any buffers being applied to the SSSI. If they are avoided (allowing for a 50mm buffer

Pinch Point Reference	Route section	Description
		around the pond) a width of 55m would be available for the OHL at this point.
PP8	B2	Key considerations at this section of the route are the proximity to properties, <u>extremely</u> steep gradients to the north and south of Douglas Water, and crossing the A70 road. Steep slopes could cause difficulties in the construction phase for safety reasons.
PP9	B3	Key considerations at this section of the route are the proximity to properties, steep gradients to the north and south of Douglas Water, and crossing the A70 road. Steep slopes could cause difficulties in the construction phase for safety reasons.
PP10	B5	<p>Constraints in this area of the route include Douglas West Community Woodland. This pinch point is beside a large area of woodland with very tall, established coniferous trees. Wind turbine topple distance also presents a potential hard constraint in this area.</p> <p>This section of the route leads on to variation C1a. A number of distribution OHL crossings increase issues in the construction stage. Mitigation option could be underground cable, however increasing the risk of failures in the network (operations/maintenance)</p>
PP11	Junction of A5/B6/C2a	<p>The constraints in this area include Douglas West Community Woodland to the east/south east and the presence of residential properties to the east and west.</p> <p>This section of the route leads on to variation C1a and C2b.</p>
PP12	C2a	Proximity to Coalburn Moss SSSI/SAC. The presence of a single turbine to the east of this pinch point also acts as a constraint, as well as the requirement to cross the B7078 road to the north.
PP13	C2b	This section of the route is constrained by the presence of residential properties, Coalburn Moss SAC to the west, and a 400kV OHL.
PP14	C2b	Constraints within this area of the route include the presence of 400kV OHL and Coalburn Moss, located to the south of the pinch point. The B7078 road is also located to the east which may also present a constraint.
PP15	C1a	Constraints within this area of the route include the presence of the settlement of Coalburn and several large steep sided ponds located to the southwest and northeast.

Part 3 Route Options for Consideration

4.2.17 As a result of the technical assessments undertaken as described above the route options initially identified were further refined to the option in table 4.5 below. These route options then formed the basis of further detailed environmental appraisal in order to select a preferred option.

Table 4.5: Route Options taken forward for further consideration

Route Option	Section Breakdown	Route Length
Route Option 1 (West)	A1 - B1 - C1b	17.5km
Route Option 2 (Central)	A1 – B3 – B4 – B5 – C1a – C1b	18km
Route Option 3 (East)	A3 – A5 – C2a – C1a – C1b	19km

4.3 Stage 2: Appraisal of Route Options and Selection of Preferred Route

Environmental Analysis

In order to provide a common basis for assessment across several disciplines a set of criteria have been developed upon which the consideration of route options is based. The criteria are hierarchical based upon the potential for each route option to accommodate a route whilst minimising impacts on the relevant constraints. Table 4.6 outlines the criteria.

Table 4.6 Appraisal Criteria

Option	Details
PREFERRED OPTION	Greatest potential to accommodate the infrastructure required within the context of the environmental and technical constraints identified.
SOME POTENTIAL	Some potential to accommodate the infrastructure required within the context of the environmental and technical constraints identified.
LEAST POTENTIAL	Least relative potential to accommodate the required infrastructure within the context of the environmental and technical constraints identified.

- 4.3.1 Note that these colour coding's represent relative weightings. A green colour code does not mean that no environmental issues have been identified, nor does a red colour indicate an insurmountable environmental constraint. The coding enables a qualitative analysis to be undertaken, applying professional judgement and experience on an aspect-by-aspect basis for each environmental feature.

Appraisal Methodology

- 4.3.2 The methodology for appraising the options for each environmental topic is detailed in the following sections.
- 4.3.3 A detailed analysis of route options is provided in Appendix 5 while a colour coded summary and assessment of the analysis undertaken by technical specialists based on the appraisal criteria detailed in Table 4.4 is presented in Table 4.4 and 4.5, Appendix 5.

Ecology, Ornithology and Peat

- 4.3.4 Existing baseline data collated from OHL and windfarm developments within the surrounding area were consulted to form the initial basis of the route appraisal. Furthermore, satellite imagery available for the area was reviewed to inform of habitats likely to be present as part of a high level study. Ecological designations are shown on Figure 3.1a.
- 4.3.5 The known presence of protected and priority species identified through existing data was used to inform the route appraisal. The presence of habitat suitable to support protected or otherwise notable species within route options was also considered.

- 4.3.6 With regards to birds, flight pattern data and known nest sites of target ornithological species were plotted against all route options. Route options were also assessed for their suitability to support bird activity, including black grouse leks and raptor nest sites, with consideration to known species within the wider area.
- 4.3.7 The potential presence of sensitive habitats, including bog and marshy grassland, and those likely to support GWDTEs was also factored into the route appraisal. A desk study to identify areas of conservation interest within the wider area was also undertaken, with locally and nationally designated sites reviewed up to 2 km from route options, and European designated sites reviewed up to 10 km from route options. Qualifying features of each designated site were noted and influenced the route appraisal where appropriate.
- 4.3.8 A relative comparison of each route option was then completed in order to qualify preference between each option. A high-level evaluation of each receptor present/potentially present was completed in order to inform the comparison, which included consideration of designated value (e.g. red squirrel priority woodland), rarity and susceptibility to impact from OHL development, amongst other factors.
- 4.3.9 Whilst the appraisal considers peatland habitat from the SNH maps and the BGS peat data, it is recorded at a coarse level. Peat therefore has not been used as a main factor to differentiate between route options, although it had been considered generally.

Peat deposits are shown on Figure 3.1b.

Archaeology and Cultural Heritage

- 4.3.10 At project inception stage, the key historic environment constraints were identified for the whole study area. These included designated heritage assets, the National Record of the Historic Environment (NRHE) from Historic Environment Scotland, and the Historic Environment Record (HER) from the archaeological advisors to South Lanarkshire Council, the West of Scotland Archaeology Service (WoSAS).
- 4.3.11 This information was captured spatially in GIS software. The location of designated and nationally important assets was identified and route options located to avoid these where practicable. At route appraisal stage, the proximity of the route options to designated cultural heritage assets (as identified on Figure 3.3) and non-designated assets was investigated.
- 4.3.12 For all assets, their proximity to each route option was assessed, and any potentially significant historic environment constraints were identified and summarised in the relevant appendix. Constraints to routeing were identified both through the potential for physical impacts arising from OHL construction, and from impacts on the setting of designated assets during OHL operation.
- 4.3.13 The potential for significant effects which may be avoidable are identified where the route cannot avoid a broad designation (such as a conservation area, which does not relate to a specific feature); or where there is the potential for setting effects upon an asset outwith the main route (i.e. within the 2km buffer); or a non-designated asset could not be entirely avoided but can be traversed. A higher risk of significant effects is likely where a route is in close proximity to an asset, increasing the likelihood of adverse setting effects.

Landscape

- 4.3.14 The landscape appraisal took into account the landscape character and sensitivity of the different landscape designations affected, the degree to which the route options and

potential alignments within the route option could be considered to have the least impact on landscape resource, and the degree to which the options conformed to the Holford Rules, particularly rules 4 and 5 (rules 1 to 3 were considered in the identification of route options). Consideration was given not only to the route itself but to the potential requirement for construction access tracks.

- 4.3.15 Because landscape was a significant factor in identifying the route options, the differences between them is relatively limited. The appraisal therefore takes a qualitative, expansive approach, drawing out the key differences between the options.

Visual Amenity

- 4.3.16 Consideration was given to the potential visibility of the OHL from the sensitive receptors as shown on Figure 3.7 - residential receptors, and particularly settlements; transport and recreational receptors.

- 4.3.17 As part of this, the degree to which an OHL would actually be perceptible was taken into account. Studies have been undertaken by a number of landscape practitioners⁴ in this regard and these suggest that wood poles may be perceived in most circumstances up to a distance of about 1.5 km, and that poles are not generally perceived beyond 6 km. The degree to which poles are perceived depends on whether they are seen against a backdrop or against the sky, the age of the line (new poles are dark and tend to blend in well, whilst older poles weather to a light silver-grey and can be more visible in the middle distances), and the design of the pole (H-poles tend to be more noticeable than single poles).

- 4.3.18 Taking this into account, and taking account of screening provided by woodland and built form in the form of windfarms and overhead lines the appraisal identified the receptors sufficiently close to the route to be considered to be at risk of significant adverse effects on visual amenity. This was undertaken through a combination of desk study and fieldwork.

Recreation and Tourism

- 4.3.19 The effects on recreation and tourism have been appraised within the visual amenity topic as the effects relate to the visual experience of the recreational user. No direct effects have been identified and temporary diversions during construction would be managed through the construction environmental management process.

Land Use

- 4.3.20 The land use topic covers a number of different features as follows:
- 4.3.21 As part of the development of route options dwellings and other occupied premises have been avoided, or are avoidable within the route option for all options; this includes an indicative 100m buffer as a trigger for consideration. Electric and magnetic fields do not form part of the appraisal.
- 4.3.22 A number of local and major planning applications have been identified in the study area which relate to:

- Advertisements

⁴ D Horn, I McAulay and M Turnbull (May 2010) High Voltage Wood Pole Transmission and Distribution Main Interconnector Lines in Rural Landscapes: Perceptibility

- Business and Industry
- Electricity Generation
- Hazardous Substances
- Householder
- Housing
- Minerals
- Telecommunications
- Windfarms

Land Use and Agriculture

4.3.23 The predominant land uses have been considered. The effects are considered to be greater on land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal.

Forestry

4.3.24 Where there are areas of woodland within the route which are avoidable, this is considered to have no likely significant effects. Where woodland loss cannot be avoided but the scale is relatively small, this has the potential for some significant effects. Where the route passes through woodland for a considerable distance, this is considered to have a higher likelihood of significant effects.

Flooding

4.3.25 Flooding has been considered in terms overhead line positioning where flood risk is extensive. Where there is some potential for significant effects (on the infrastructure) this has been noted.

Preferred Route

4.3.26 Table 4.8, Appendix 5 provides a colour coded detailed analysis of the preferred route assessment undertaken by technical specialists based on the appraisal criteria presented in Table 4.6.

4.3.27 In most instances assessment was undertaken on sections but where appropriate it has been undertaken by evaluation of the three route options. In all cases irrespective of the approach a code has been given to each section.

4.3.28 Table 4.7 provides a comparative summary of the detailed analysis undertaken by technical specialists of the route options taken forward for detailed analysis using the appraisal criteria presented in Table 4.6.

4.3.29 On balance Route Option 1 causes least disturbance to the environment in terms of compliance with the potential constraints. The main reasons for Route option 1 being preferred at this stage are as follows:

- Impact on settlements and private residencies would be limited, with only a few isolated properties within the route option;

- This route is furthest from the designated landscapes of Douglas Valley SLA and Douglas Conservation Area and is likely to result in lowest adverse effects on the landscape resource within the study area.
- The route option is a direct route, and the shortest of the three options.

4.3.30 Also, whilst it is acknowledged that Section A1 of this route option contains areas of forestry, there is the potential to microsite the OHL in this area to minimise forestry impacts.



Table 4.7 Summary of the detailed analysis undertaken by technical specialists

Category	Route Option 1	Route Option 2	Route Option 3
Ecology and Ornithology	Breeding Hen Harrier are known to be present in the vicinity of Kennoxhead point of connection; however any ornithological constraints present will likely be minor and manageable.	Any ecological or ornithological constraints present will likely be minor and manageable.	Breeding Hen Harrier are known to be present in the vicinity of Kennoxhead point of connection; however any ornithological constraints present will likely be minor and manageable.
Archaeology and Cultural Heritage	Of all the options available, Route 1 would be preferable, as it avoids the most sensitive sections (A3, B4 and C2a). No nationally designated assets within the route, nor setting issues within 2 km. Regional / local assets are avoidable.	No nationally designated assets within the route, nor setting issues within 2 km. Regional / local assets are avoidable.	No nationally designated assets within the route, nor setting issues within 2 km. Regional / local assets are avoidable.
Landscape and Visual Amenity	<p>Landscape Route Option 1 is preferred because it is considered the least sensitive of the two options. It is the most distant from the Douglas Valley SLA and likely to result in lower adverse effects on the landscape resource.</p> <p>Visual Amenity Route Option 1 is preferred because it is considered the least sensitive route, being more distant from the majority of visual receptors, including those at Coalburn, Douglas and Glespin.</p>	<p>Landscape Route Option 2 also has the potential to accommodate the required infrastructure, but would be liable to greater cumulative effects in combination with other grid infrastructure around Douglas Substation than Route Option 1.</p> <p>Visual Amenity Route Option 2 also has potential to accommodate the required infrastructure but the potential for cumulative effects on residential receptors is noticeably greater than those anticipated for Route Option 1.</p>	<p>Landscape Route Option 3 also has the potential to accommodate the required infrastructure, but would be liable to greater cumulative effects in combination with other grid infrastructure around Douglas Substation than Route Option 1.</p> <p>Visual Amenity Route Option 3 also has potential to accommodate the required infrastructure but the potential for cumulative effects on residential receptors is noticeably greater than those anticipated for Route Option 1 and 2.</p>



Category	Route Option 1	Route Option 2	Route Option 3
<p>Geology Hydrogeology and Hydrology</p>	<p>Section B1 passes through an area of blanket peat.</p> <p>Route Options 1, 2 and 3 all cross watercourses and drainage ditches at various points. However, it should be possible to span the watercourses with minimum requirement for encroachment within the watercourse buffer.</p> <p>No PWS are located within close proximity of Route Options 1, 2 and 3.</p>	<p>Section C1 passes through an area of blanket peat.</p> <p>Route Options 1, 2 and 3 all cross watercourses and drainage ditches at various points. However, it should be possible to span the watercourses with minimum requirement for encroachment within the watercourse buffer.</p> <p>No PWS are located within close proximity of Route Options 1, 2 and 3.</p>	<p>Route Option 3 is the preferred route as it avoids avoid potential impacts on blanket peat and hydrology.</p> <p>Route Options 1, 2 and 3 all cross watercourses and drainage ditches at various points. However, it should be possible to span the watercourses with minimum requirement for encroachment within the watercourse buffer.</p> <p>No PWS are located within close proximity of Route Options 1, 2 and 3.</p>
<p>Mining</p>	<p>Mineworking areas (opencast etc): 50% of the route is situated in Development high risk area/abandoned mines catalogue.</p> <p>Any mining constraints present will likely be minor and manageable.</p>	<p>Mineworking areas (opencast etc): 100% of the route is situated in Development high risk area/abandoned mines catalogue</p> <p>Any mining constraints present will likely be minor and manageable.</p>	<p>Mineworking areas (opencast etc): 100% of the route is situated in Development high risk area/abandoned mines catalogue</p> <p>Avoiding section A3 would restrict working over recently restored former open-cast mining areas and would help to minimise engineering complexity.</p>



Category	Route Option 1	Route Option 2	Route Option 3
Land Use and Infrastructure	Existing or committed development (WFs and OHLs) are present in close proximity to the route. Any constraints present will likely be minor and manageable. No clear preference between route options.	Existing or committed development (WFs and OHLs) are present in close proximity to the route. Any constraints present will likely be minor and manageable. No clear preference between route options.	Existing or committed development (WFs and OHLs) are present in close proximity to the route. Any constraints present will likely be minor and manageable. No clear preference between route options.
Forestry	Section A1 runs through an area of coniferous plantation and Sections B1 and C1 run through areas of woodland. Any forestry constraints present will likely be minor and manageable.	Section A1 runs through coniferous plantation and sections C1a and b run through areas of woodland. Any forestry constraints present will likely be minor and manageable.	Sections A5, C1a and b and C2a all run through woodland. Section C2a through an area of ancient woodland.
Recreation and Tourism	Route 1 requires the least amount of core path crossings. Both Route 2 and 3 require a similar number of core path crossings between sections C1a and C1b.	Both Route 2 and 3 require a similar number of core path crossings between sections C1a and C1b.	Both Route 2 and 3 require a similar number of core path crossings between sections C1a and C1b. Sections B3 and B4 of Route 2 are less preferable to other sections given proximity to core paths for longer sections.



Category	Route Option 1	Route Option 2	Route Option 3
Route Length	17.75km	18km	19km
Summary of Environmental Constraints	<p>No major potentially significant environmental impacts are identified for Route Option 1.</p> <p>No major potentially significant environmental impacts are identified for Route Option 2.</p> <p>One potentially significant environmental impact has been identified for Route Option 3.</p> <p>Route Option 1 is 17.5km in length compared to Route Option 2 which covers 18km. All things being equal, Holford Rule 3 recommends choosing the most direct line with the least sharp changes of direction.</p> <p>Based on the comparative analysis identifying no clear preferences for several environmental topics and marginal preferences for others on balance Route Option 1 causes least disturbance to the environment</p>		

Final Technical Review

- 4.3.31 Following the environmental appraisal of options, and prior to the final selection of a preferred route option, a final technical review by SPEN Engineers in November 2019 was completed in relation to the system/network design requirements. This review was undertaken to ensure that, based on the level of detail available, the preferred route was within the technical parameters required to construct OHLs. This included consideration of matters such as altitude, topography, slope gradients, crossing of existing OHL infrastructure and crossing other existing and proposed infrastructure e.g. the A70, windfarms etc
- 4.3.32 The technical review highlighted technical challenges associated with Route Option 1 which are not present on Route Option 2. Approximately 50% of Route Option 1 crosses windfarms which creates the risk of wake effect from wind turbines to the OHL. This option also crosses through areas over 300 m AOD resulting in shorter spans and increased number of poles. There are also steep slopes over 15° that are concentrated between Pinch Points 2 and 4 at Galawhistle Windfarm and cannot be avoided by detailed routeing (micrositing). The remote location of Route Option 1 would also cause difficulties in access and construction.
- 4.3.33 Route Option 2 did not identify any significant technical challenges.
- 4.3.34 Route Option 3 is already identified as having a potentially significant environmental impact. The technical review highlights challenges associated with steep slopes which may cause difficulties in construction phase from a safety perspective. There are also multiple distribution OHL crossings identified on this Route Option which may require undergrounding to address.

Conclusion

- 4.3.35 On balance of technical and environmental considerations Route Option 2 is identified as the preferred route.

The preferred route is shown on Figure 4.5.

Additional considerations relating to the preferred route

- 4.3.36 Further to the identification of Route Option 2 as the preferred route the developer of Kennoxhead Windfarm has identified further potential wind turbine locations within the vicinity of Route Option 2 which need to be factored into the assessment. These would constitute a hard constraint on an OHL solution (see Figure 4.2). There therefore may be a requirement to underground a short section (less than 2 km) of OHL to avoid a proposed wind turbine. However this does not affect the conclusion of Route Option 2 being the preferred route on balance of technical and environmental considerations.,
- 4.3.37 Further considerations associated with this preferred Route are as follows and will require further consideration when determining the detailed alignment of the overhead line during subsequent refinement:
- The proximity to a small number of individual dwellings and farmsteads for example along Coalburn Road and between Coalburn and the River Nethan;

- Requirements for felling to ensure appropriate safety clearances from the OHL;
- Proximity to Hollandbush Golf Club and the need to make use of natural screening from existing vegetation;
- Proximity to Glespin and Douglas and the need to make use of natural screening from existing vegetation;
- Restricting working over former opencast mining areas as practicably possible;
- Reducing impact on woodland areas as practicably possible;
- Road crossings required of the A70, Station Road, Middlemuir Road, Shoulderigg Road, Coalburn Road and four unclassified Roads;
- Proximity to wind turbines (ensuring turbine height +10% topple height is adhered to);
- Proximity to waterbodies (ensuring buffer to ensure no infrastructure is located within 10m is adhered to).

4.3.38 Those issues above will require further assessment and consideration during subsequent stages of design.

5 CONSULTATION ON THE PROPOSALS AND NEXT STEPS

- 5.1.1 SPEN is inviting comments on the development proposals described in this document. You may comment in person, at the forthcoming public exhibition (detailed in the preface to this document), by post or by email.
- 5.1.2 When providing comments, SPEN would appreciate your consideration of the following questions:
- Do you have any comments regarding the rationale for the project, as set out within this route selection consultation document?
 - Do you have any comments regarding the approach to the selection of the preferred route as set out in this route selection consultation document?
 - Are there any factors you consider that may have been overlooked, or given either too much or insufficient consideration during the route selection process?
 - Do you have any other comments about the preferred route of the overhead line?
- 5.1.3 The public exhibition event will be held in the locations and the times detailed in the preface to this document.
- 5.1.4 The exhibition will be advertised in the local press and in the local community.
- 5.1.5 Comment forms will be available at the public exhibition. Comments can be posted or emailed to the SPEN Community Liaison Manager at the address below:

Kennoxhead Grid Connection Project
Land and Planning Team
SP Energy Networks
55 Fullerton Drive
Cambuslang
G32 8FA

Kennoxheadgc@spenenergynetworks.co.uk

Copies of this document can be found online at:

www.spenergynetworks.co.uk/pages/community_consultation

5.1.6 Public consultation events detailing the proposals outlined in this document will be held on the 5th and 6th of February 2020 at the following locations:

5th February 2020

1.00pm to 8.00pm

Coalburn Miners Welfare One Stop Shop

42 Coalburn Road

Coalburn

South Lanarkshire

ML11 0LH

6th February 2020

1pm to 8.00pm

Douglas St Brides Hall

Braehead

Douglas

Lanark

ML11 0QW

SPEN request that all consultation responses are received by 15th March 2020.

5.1.7 All comments received will inform further consideration of the preferred route alignment and the selection of a proposed route alignment, which will be taken forward for more detailed environmental assessment prior to submission of an application for consent. The applications will be developed for submission in 2021.

APPENDIX 1 FIGURES AND REPORTS

Figure Number	Figure Name
1.1	Study Area and Context
1.2a	Trident Woodpole – Structure Scale Drawing
1.2b	Trident Woodpole – Intermediate Structure
1.2c	Trident Woodpole – Section Structure
1.2d	Trident Woodpole – Terminal Structure
2.1	Study Area and Context with 2km buffer
3.1	Ecological Designations
3.2	Peat Deposits
3.3	Designated Heritage Assets within Study Area
3.4a	Landscape Designations
3.4b	South Lanarkshire Council Landscape Character Areas
3.4c	SNH Landscape Character Areas
3.5	Topography Plan – Elevation mAOD
3.6a	Private Water Supplies
3.6b	Surface Water Features
3.7a	Land Use and Infrastructure - Agricultural Land Use
3.7b	Land Use and Infrastructure - Windfarms and Wind Turbines
3.7c	Land Use and Infrastructure – Existing OHLs
3.7d	Land Use and Infrastructure - Mining - Mineral Extraction Zones
3.7e	Land Use and Infrastructure - Mining - Mine Entries
3.7f	Land Use and Infrastructure - Tourism and Recreation
3.8a	Forestry - FC National Forstry Inventory Woodland Plan
3.8b	Forestry - Ancient Woodland Inventory Scotland
3.8c	Forestry - Forestry Baseline
4.1	Developed Route Options - Combined Constraints
4.2	Developed Route Options - Comparative sensitivities
4.3	Developed Route Options - Refined Study Area
4.4	Developed Route Options - Refined Study Area and Route Options
4.5	Developed Route Options – Preferred Route Option
Report	
	Kennoxhead OHL Minerals Report (March 2019)

APPENDIX 2 ENVIRONMENTAL DATA SOURCES

Feature	Abb	Source
Ancient Woodland Inventory	AW	SNH
Conservation Areas	CA	Historic Environment Scotland
Core Paths	-	South Lanarkshire Council
Cycle Routes	-	SUSTRANS
Existing Transmission Infrastructure	-	SPEN
Flood Risk Zones	FRZ	SEPA online flood mapping
Historic Environment Record	HER	Canmore (canmore.org.uk)
Hydrogeology	-	Bgs (ONLINE)
Landscape Character Types (Landscape Character Assessment)	LCT (LCA)	SNH
Listed Buildings	LB	Historic Environment Scotland
National Tourist Routes	-	VisitScotland
National Scenic Areas	NSA	Scottish Government
Regional Scenic Areas	RSA	South Lanarkshire Council
OS Maps 1-250k	-	OS Open Data
OS Maps 1-50k	-	Emapsite
Ramsar sites	-	SNH
Residential Settlements and housing allocation areas	-	OS_Address_Layer (downloaded from emapsite)
RSPB Reserves	-	RSPB
Scheduled Monuments	SM	Historic Environment Scotland
SEPA Assessed Watercourses	-	SEPA online river basin management plan mapping
Sites of Special Scientific Interest	SSSI	SNH
Scenic Areas	-	South Lanarkshire Council
Special Area of Conservation	SAC	SNH
Special Protection Areas	SPA	SNH
Wild Land Areas 2014	WLA	SNH
Windfarms	-	SNH



APPENDIX 3 ENVIRONMENTAL & TECHNICAL BASELINE

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
Ecology ,Ornithology and Peat	<p>Protected Sites:</p> <p>Coalburn Moss Special Area of Conservation (SAC) lies in the north of the study area. This site is designated for having the following qualifying interests: active raised bogs and degraded raised bogs still capable of natural regeneration. This site is also designated as a site of special scientific interest (SSSI) based on the fact it is one of the best examples of lowland raised bog in the UK for its actively-growing Sphagnum-rich vegetation. The site is immediately adjacent to proposed route options.</p> <p>Muirkirk and North Lowther Uplands SPA occupies a considerable area of upland to the west and southwest of the study area. This SPA regularly supports breeding populations of European importance of the Annex 1 species: Hen Harrier (<i>Circus cyaneus</i>), Short-eared Owl (<i>Asio flammeus</i>),</p>	<p>The ecological/ornithological designated sites located within the 2km Buffer Zone are shown in Figure 3.1a. These are:</p> <ul style="list-style-type: none"> • Muirkirk Uplands SSSI • Muirkirk and North Lowther Uplands SPA • North Lowther Hills Important Bird Area • Airds Moss and Muirkirk Uplands Important Bird Areas <p>The Ancient Woodland Inventory shows Ancient Woodland to be scattered throughout the Buffer</p>	<p>Figure 3.1a - Ecological Designations</p> <p>Figure 3.1b - Peat Deposits</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Peregrine Falcon (<i>Falco peregrinus</i>), Merlin (<i>Falco columbarius</i>) and Golden Plover (<i>Pluvialis apricaria</i>). The boundaries of the SPA are coincident with those of North Lowther Uplands SSSI and Muirkirk Uplands SSSI. The former comprises wet heath and blanket peat and supports a diverse upland breeding bird community which is of national importance, including Hen Harrier and Short-eared Owl while the North Lowther Uplands SSSI supports an assemblage of moorland birds and raptors again including Hen Harrier and Short-eared Owl. The breeding population of Hen Harriers is of both national and European importance.</p> <p>North Lowther Hills Important Bird Area (IBA) also lies in the south of the study area. This site comprises moorland and areas of active blanket peat and supports a range of breeding upland species including Hen Harrier and Black Grouse. A second IBA in the south of the study area - Airds Moss and Muirkirk Uplands - includes the largest remaining continuous block of unforested moorland in South West Scotland. The main habitats include heather and grass moorland and blanket peat.</p>	<p>Zone, with several large blocks to the east of the M74:</p> <ul style="list-style-type: none"> Happendon Wood east of the M74 at Happendon Services. Roddenhill Wood, Coalburn wood and Newtonhead Wood east of the M74 at John Dewar & Sons warehouses 	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Miller's Wood SSSI - an excellent example of Betula sp. (Birch) woodland, a type which is rare in South Lanarkshire.</p> <p>There are no non-statutory sites within the study areas but there are 26 areas of ancient woodland within the study area.</p> <p>Habitats and Protected Species</p> <p>Based on RSK knowledge of the local area and a desktop review, the following habitat types are expected to be located within the study area:</p> <ul style="list-style-type: none"> • marsh/marshy grassland; • improved grassland; • broadleaved-semi-natural woodland; • semi-improved/Improved and unimproved grassland; • acid grassland; • mixed woodland semi-natural; and • coniferous woodland plantation. 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>The following protected species have been confirmed to be present within the study area during a background data search undertaken by RSK and a review of publicly accessible ecological data from nearby sites:</p> <ul style="list-style-type: none"> • Badger (<i>Meles meles</i>); • Brown Long-eared Bat (<i>Plecotus auritus</i>); • Common Pipistrelle (<i>Pipistrellus pipistrellus</i>); • Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>); • Daubenton's Bat (<i>Myotis daubentonii</i>); • Natterer's Bat (<i>Myotis nattereri</i>); • Leisler's (<i>Nyctalus leisleri</i>); • <i>Myotis</i> species; • <i>Nyctalus</i> species; • Common Frog (<i>Rana temporaria</i>); • Common Toad (<i>Bufo bufo</i>); • Common Lizard (<i>Zootoca vivipara</i>); • Common Toad (<i>Bufo bufo</i>); 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<ul style="list-style-type: none"> • Otter (<i>Lutra lutra</i>); and • Water Vole (<i>Arvicola amphibius</i>). <p>In addition, it is likely that Adder (<i>Vipera berus</i>) and Slow Worm (<i>Anguis fragilis</i>) are present. Red Squirrel were recorded in 2007 but have not been recorded recently and no Great Crested Newt have been recorded in the area.</p> <p>Ecological surveys to be undertaken in 2020 will provide further information on the habitats and species present along the preferred route.</p> <p>A review of publicly accessible ornithological data from windfarms, overhead lines and other developments collated between 2007 to 2017 as well as RSK’s ornithologist’s personal knowledge of the area indicates the presence of the following protected bird species which could be potentially impacted by the proposed development:</p> <p>Hen Harrier, Barn Owl (<i>Tyto Alba</i>), Short-eared Owl, Barnacle Goose (<i>Branta leucopsis</i>), Peregrine Falcon, Northern Lapwing (<i>Vanellus vanellus</i>); Osprey (<i>Pandion haliaetus</i>), Merlin, Greylag Goose</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>(<i>Anser anser</i>), Golden Plover, Greenshank (<i>Tringa nebularia</i>), Common Sandpiper (<i>Actitis hypoleucos</i>), Redshank (<i>Tringa totanus</i>), Sparrowhawk (<i>Accipiter nisus</i>), Snipe (<i>Gallinago gallinago</i>), Curlew (<i>Numenius arquata</i>), Dotterel (<i>Charadrius morinellus</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Kestrel (<i>Falco tinnunculus</i>), Tanwy Owl (<i>Strix aluco</i>), Pink-footed Goose (<i>Anser brachyrhynchus</i>), Red Grouse (<i>Lagopus lagopus scotica</i>), Buzzard (<i>Buteo buteo</i>), Whooper Swan (<i>Cygnus cygnus</i>), Ringed Plover (<i>Charadrius hiaticula</i>), Teal (<i>Anas crecca</i>), Black Grouse (<i>Tetrao tetrix</i>), Whimbrel (<i>Numenius phaeopus</i>), Common Crossbill (<i>Loxia curvirostra</i>), Goshawk (<i>Accipiter gentilis</i>), Canada Goose (<i>Branta canadensis</i>), Goldeneye (<i>Bucephala clangula</i>) and Tufted Duck (<i>Aythya fuligula</i>).</p> <p>The greatest sensitivities are predicted to be to Black Grouse lekking sites, wader nest sites (especially Curlew), goose flight lines through the northern section near ponds and raptor nest sites (especially Hen harrier and Goshawk).</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>The Scottish Raptor Study Group have been contacted and to date have given no response.</p> <p>RSPB were contacted and there are birds of importance noted out-with the site, but no data given for birds within it.</p> <p>Detailed ornithological surveys starting September 2019 will confirm species present along the preferred route.</p>		
Archaeology and Cultural Heritage	<p>Designated cultural heritage features within the Study Area are shown on Figure 3.3.</p> <p>World Heritage Sites There are no World Heritage Sites (WHS) within the Study Area.</p> <p>Conservation Areas There is one conservation area in the study area: Douglas (Site 1 on Figure 3.3).</p> <p>Scheduled Monuments There are two Scheduled Monuments within the Study Area. These are:</p> <ul style="list-style-type: none"> • St. Bride's Church, SM20265 (Site 2 on Figure 3.3); and 	<p>In defining the extent of the Study Area (shown in Figure 3.3), archaeological constraints in terms of the potential for impacts on the setting of designated assets were considered. No impacts – either physical impacts and/or impacts upon setting – are anticipated on heritage assets outwith the Study Area.</p>	<p>Figure 3.3 – Cultural Heritage Assets</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<ul style="list-style-type: none"> Auchensaugh Hill, cairn, SM4234 (Site 3 on Figure 3.3). <p>Listed Buildings There are 31 listed buildings located within the Study Area; the majority of which are within and/or adjacent to the conservation area of Douglas. Outwith Douglas, from south to north there are listed buildings at: New Mains (Category B, LB1496); Douglas Castle (Category C, LB1449); the Highlander statue at West Toun (Category B, LB13402); Birkhill House and stable block (Category B, LB7692); and Auchlochan Bridge (Category B; LB7688).</p> <p>Inventory status Gardens and Designed Landscapes There are no Gardens and Designed Landscapes within the Study Area.</p> <p>Inventory status Historic Battlefields There are no Historic Battlefields within the Study Area.</p> <p>Historic Environment Record (HER) and National Record of the Historic Environment (NRHE) There are 326 assets recorded in the HER as point features, the majority of which are duplicated in the</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>NRHE. There is a concentration of these near the banks of the Kennox Water and the River Nethan, with a considerable number of assets recorded prior to demolition in advance of opencast mining. The HER sites principally comprise features associated with medieval or later rural settlement with agricultural land use features and historic mining. The former includes: enclosures; rig and furrow; farmsteads; shieling huts; sheepfolds; and lime kilns. The latter includes: former mineral railway lines; magazines; quarries; shafts and mines such as Glespin Colliery, Andershaw Colliery, Braehead Colliery, Bankend Colliery and Westoun Colliery.</p> <p>Prehistoric activity within the Study Area is evident from findspots such as an axe head at Townhead Plantation and bronze spearhead at Douglas. There are numerous entries for cairns and possible cairns, with the records of several burial cairns having been uncovered in the mid-19th century at Poniel and Birkhill (Fauldhouse).</p> <p>Examination of modern aerial photographs and the Coal Authority data indicates that extensive late-20th century open cast mining works have been undertaken around Coalburn.</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
Landscape and Visual Amenity	<p>The study area is entirely within South Lanarkshire, with a short section of the western boundary of the study area on the county boundary with East Ayrshire.</p> <p>Landscape Designations and Classifications (Map 7)</p> <p>There are no designated landscapes of international or national importance within the Study Area.</p> <p><i>Douglas Valley Special Landscape Area (SLA)</i></p> <p>The Douglas Valley SLA covers a large section of the central and eastern area of the study area. Policy 15 of The South Lanarkshire Local Development Plan (Adopted June 2015) affords SLA a Category 3 (Local) level of protection, it states <i>'in Category 3 areas, development which would affect these areas following the implementation of any mitigation measures will only be permitted where there is no significant adverse impact on the protected resource'</i>. The 'key qualities' of specific SLA are set out in the Local Landscape Designations document</p>	<p>All of the extended buffer zone around the study area is within South Lanarkshire except for a small area to the west of the study area boundary, which is within East Ayrshire.</p> <p>Landscape Designations and Classifications (Map 7)</p> <p>The buffer zone contains no internationally or nationally important designated landscapes.</p> <p><i>Special Landscape Areas</i></p> <p>The north-east of the Douglas Valley SLA which extends outside the study area (and as described within the study area column) occupies the adjacent area of the buffer zone.</p> <p>There are no other designated landscapes within the buffer zone.</p>	<p>Figure 3.3 – Cultural Heritage</p> <p>Figure 3.4a – Landscape Designations</p> <p>Figure 3.4b – South Lanarkshire Council Landscape Character Areas</p> <p>Figure 3.4c – Scottish Natural Heritage Landscape Character Areas</p> <p>Figure 3.5 – Elevation, Metres Above Ordnance Datum (Topography) –)</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>(published by South Lanarkshire Council in November 2010).</p> <p>Almost all the SLA is located within the study area and the area is described in the designations document as, '<i>The Douglas Valley is a sheltered valley containing a well preserved designed landscape with significant mature woodland planting. It is centred around the historic village of Douglas and provides an accessible, contained and tranquil landscape in contrast to the open and expansive rolling moorland to both the south and north of the valley.</i>'</p> <p>The SLA is crossed by a 400kV steel lattice tower overhead power line and both Hagshaw windfarm and Douglas West windfarm are located within this SLA.</p> <p><i>Douglas Conservation Area</i></p> <p>Conservation areas are also afforded Category 3 (Local) level of protection by Policy 15 of the South Lanarkshire LDP. The Douglas Conservation Area is</p>		<p>Figure 3.7i - – Tourism and Recreation</p> <p>Figure 3.7h - Housing Allocations, Planning Designations and Settlement Distribution</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>focused on the north of the village of Douglas around Main Street.</p> <p>Both the Douglas Valley SLA and Douglas Conservation Area are considered to have a high value, but only a low susceptibility to a proposed overhead wood pole line and therefore would be considered to have a medium sensitivity to the proposed development.</p> <p>There are no other designated landscapes within the study area zone.</p> <p>Landscape Character (2019 SNH update)</p> <p>The Landscape Character of the area was classified in the Scottish Natural Heritage July 2019 mapping of landscape character types within Scotland. The landscape is classified in terms of broad character types and areas referred to as Landscape Character Types (LCT).</p> <p>The majority of the Study Area, particularly focused around the south and west of the Study Area, is within LCT 213 Plateau Moorlands – Glasgow and Clyde Valley. LCT 207 Upland River Valley – Glasgow and</p>	<p>Landscape Character (2019 SNH update)</p> <p>The LCT which cover the study area generally extend in to the surrounding buffer zone....</p> <p>Landscape Character (Map 8)</p> <p>The LCT which cover the study area generally extend in to the surrounding buffer zone, within only two further LCT present in the buffer zone to the east of the study area. These are the <i>Broad Valley Upland LCT</i>, which extends to the north east of the Douglas Water unit of the Upland River Valley LCT, where the Douglas Valley broadens at its confluence with Coal Burn. The valley is comparatively elevated and exposed, at about 200m AOD, enclosed by Foothills to the south-east/ east; and the <i>Foothills LCT</i>, the Tinto Hills unit of Foothills landscape extends beyond the Douglas Water Valley to the south-east.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>Clyde Valley covers a central strip of land, around Douglas Water and a separate area in the north-west of the study area focused around Logan Water and the River Nethan. The north and north-east of the study area is within LCT 201 Plateau Farmland – Glasgow and Clyde Valley.</p> <p><i>LCT 213 Plateau Moorlands – Glasgow and Clyde Valley</i></p> <p>This area of Plateau Moorland is characterised by individually defined hills, frequently dissected by drainage lines rather than forming a continuous flat plateau. The hills are neatly rounded or have gently sloping ridges – often named ‘rigs’ – extending from them. The landscape is often covered in blanket peat, heather and grass moorland, with extensive conifer plantations, although areas of these have been felled to accommodate windfarm development.</p> <p>The windfarms have reduced the perception of undeveloped character although there are still pockets of landscape which feel remote. Where forestry permits, views tend to be relatively open across the surrounding valleys and adjacent hill</p>	<p>A small area to the west of the study area is in East Ayrshire, and the buffer zone covers an area of East Ayrshire Plateau Moorland LCT and East Ayrshire Upper River Valley LCT. These LCT are similar in character, quality and vulnerability to the landscape types on the South Lanarkshire side of the county boundary.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>groups. There are a number of man-made features visible, particularly road corridors and electrical infrastructure, though few visual foci are present.</p> <p>Within the July 2019 SNH assessment the key characteristics of the LCT are listed as:</p> <ul style="list-style-type: none"> • <i>Large scale landform;</i> • <i>Undulating hills and sloping ridges in the western areas; a more even plateau landform in the east;</i> • <i>Distinctive upland character created by the combination of elevation, exposure, smooth plateau landform, moorland vegetation;</i> • <i>Predominant lack of modern development;</i> • <i>Extensive wind turbine development, including one of the largest windfarms in Scotland, Black Law; and</i> • <i>Sense of apparent naturalness and remoteness which contrasts with the farmed and settled lowlands, although this has been reduced in places by wind energy development.</i> 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p><i>LCT 207 Upland River Valley – Glasgow and Clyde Valley</i></p> <p>This LCT is found where found where tributaries of the Clyde have cut shallow valleys into the plateau moorland and farmland between the Clyde Basin and the Ayrshire Basin.</p> <p>Within the July 2019 SNH assessment the key characteristics of the LCT are listed as:</p> <ul style="list-style-type: none"> • <i>A series of valleys formed along faultlines through the Plateau Moorlands and paired with valleys to the south and west in Ayrshire;</i> • <i>South-west to north-east orientation of the valleys;</i> • <i>Strong contrast between the wooded and settled character of the valleys and the exposed enclosing uplands; and</i> • <i>Transition from the exposed upper reaches to more sheltered lowland areas.</i> <p><i>LCT 201 Plateau Farmland – Glasgow and Clyde Valley</i></p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>This LCT occurs on the lower slopes of all the Plateau Moorland areas encircling Glasgow and the Conurbation. They are characterised by their transitional location between the sheltered landscapes of the valleys and lowlands, and exposed uplands and moorlands. There are wide views across this open, transitional LCT, but few visual foci. The area appears in the foreground when seen in views from or towards adjacent moorland and hills. The edges of this landscape are visible from within the Clyde Valley, forming the backdrop to the valley lowlands.</p> <p>Within the July 2019 SNH assessment the key characteristics of the LCT are listed as:</p> <ul style="list-style-type: none"> • <i>Extensive, open, flat or gently undulating landform;</i> • <i>Dominance of pastoral farming, but with some mosses surviving;</i> • <i>Limited and declining tree cover;</i> • <i>Visually prominent settlements and activities such as mineral working; and</i> • <i>Rural character of the Plateau Farmland has reduced as tree cover has declined and the</i> 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p><i>visual influence of settlements, transport infrastructure and mineral working has increased.</i></p> <p>Landscape Character (Map 8)</p> <p>The Landscape Character of the area is as classified in the South Lanarkshire Landscape Character Assessment produced by Ironside Farrar In November 2010 on behalf of South Lanarkshire Council. The landscape is classified in terms of broad character types and areas referred to as Landscape Character Types (LCT).</p> <p>The Study Area is predominantly within the Rolling Moorland LCT, with the exception of the northern end which is within Plateau Farmland, Plateau Moorland and Upland River Valley LCT. In addition, within the central and southern regions of the study area a strip of land, around Douglas Water, is classified as Upland River Valley LCT.</p> <p>The Rolling Moorlands LCT were first identified in the 2010 South Lanarkshire Landscape Character</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>Assessment, with the landscape previously classified as Plateau Moorland LCT.</p> <p><i>Rolling Moorland</i></p> <p>Excluding the land around Douglas Water (in the Upland River Valley LCT) this LCT occupies all of the central and southern areas of the study area, however it is also split into sub-sections LCT 7 Rolling Moorland, which covers areas in the west, east and south of the study area; LCT 7A Rolling Moorland Forestry, which covers sections in the south-east, south-west and north-west of the study area; and LCT 7B Rolling Moorland Windfarm which covers a section in the centre of the study area around Hagshaw Windfarm. It is noted that this Sub-section could now expand west within the study area to encompass the area of LCT 7 Rolling Moorland which now hosts Galawhistle East Windfarm.</p> <p>The sub-sections share the same characteristics as the main LCT, however 7A Forestry is also influenced by significant afforestation, which impacts the colour and texture of the landscape, as well as influencing</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>the distance of views. The sub-section 7B Windfarm is influenced by the presence of windfarms.</p> <p>The Rolling Moorlands, <i>'consist of blanket peat, heather and grass moorland, with areas of extensive forestry planting. The topography is rolling or undulating with generally soft contoured ridges together with more distinct individual hills falling to Upland River Valleys. The landscape is of an open, exposed and rather remote character despite areas of forestry, occasional isolated hill farms, and sheep and cattle grazing.'</i></p> <p>The key characteristics of the Rolling Moorland LCT are:</p> <ul style="list-style-type: none"> <i>'Distinctive upland character created by the combination of elevation, exposure, smooth, rolling or undulating landform, moorland vegetation and the predominant lack of modern development;</i> <i>These areas share a sense of apparent wildness and remoteness which contrasts with the farmland and settled lowlands and</i> 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p><i>the windfarm-dominated Plateau Moorlands; and</i></p> <ul style="list-style-type: none"> <i>There are extensive views over the surrounding Ayrshire and Lanarkshire lowlands from the hilltops.'</i> <p>The relevant identified key landscape issues affecting the LCT are:</p> <ul style="list-style-type: none"> <i>'Visual impact of tall structures including masts, pylons and particularly wind turbines in relation to the rolling landform and sense of remoteness;</i> <i>The prominence of any modern developments in this open upland landscape;</i> <i>The importance of striking a balance between large-scale conifer plantations and open hilltops and ridges;</i> <i>The pressures for mineral extraction, particularly large-scale open case mine working; and</i> <i>Potential presence of unrecorded archaeological sites, which may be at risk from development/ land use change.'</i> 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>This landscape type is relatively open and exposed, with the consequence that there is increased visual sensitivity and the introduction of tall structures would create a visual impact, which might often be visible from plateau to plateau. However, this does not apply within the heavily afforested areas of the landscape type (LCT 7A) and the forestry would often provide a level of screening for the overhead line. The removal of large sections of forestry, particularly in straight lines, can also create adverse visual impacts within a landscape and the route should be designed to follow the edge of forestry wherever possible.</p> <p>The presence of extensive grid infrastructure and extraction works also presents potential cumulative sensitivities within this landscape.</p> <p>Overall the Rolling Moorlands LCT is considered to have a medium value (low for the Forestry and Windfarm subsets) and a medium susceptibility (low for the Forestry and Windfarm subsets) to a proposed overhead wood pole line and therefore would be considered to have a medium sensitivity to the</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>proposed development (low for the Forestry and Windfarm subsets).</p> <p><i>Upland River Valley</i></p> <p>From south-west to north-east through the central region of the study area the landscape is classified as LCT 8 Upland River Valley. There are also sub-sections of this LCT, LCT 8A Upland River Valley Incised, located around Kennox Water to the north-east of the proposed Kennoxhead connection point; and LCT 8B Upland River Valley Opencast Mining, around the large opencast workings at Glentaggart and Mainshill. There is a further area of LCT8 Upland River Valley focused around Logan Water and the River Nethan within the north-west of the study area.</p> <p>The valley of the River Nethan and Logan Water, <i>'has steep sides and a sense of enclosure which clearly distinguish it from the surrounding moorland and farmland and provide a setting for the town of Lesmahagow. Reflecting its smaller scale there are no transport through routes, but only minor roads.'</i></p> <p>The valley of the Douglas Water, <i>'is tightly enclosed between steeply rising slopes leading to high ground</i></p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p><i>to the north and south. The valley's historic role as a communication corridor is reflected in the presence of castles and mottes. A dismantled railway runs along the north side of the valley, running alongside the existing A70. There are extensive areas of open-cast coal working on the boundary of the Rolling Moorland to the south-west of Douglas and within the valley to the west of the M74. Also highly evident are the windfarms on Hagshaw Hill above the valley and the M74 motorway where it crosses the lower valley.</i></p> <p>The key characteristics of this landscape type are:</p> <ul style="list-style-type: none"> • <i>'A series of valleys formed along faultlines through the Rolling Moorlands and Plateau Farmlands and often paired with valleys to the south and west in Ayrshire;</i> • <i>Strong contrast between the wooded and settled character of the valleys and the exposed enclosing uplands and farmlands; and</i> • <i>Transition from the exposed upper reaches to more sheltered lowland areas.'</i> 		



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	<p>The identified key landscape issues affecting the LCT are:</p> <ul style="list-style-type: none"> • <i>'Importance of maintaining the contrast between more sheltered valleys and the exposed uplands through which they pass;</i> • <i>The importance of maintaining and managing the existing woodland cover in the form of field boundary trees, shelterbelts, riparian woodlands and policies, particularly in the valleys' lower sections; and</i> • <i>Other infrastructure, including pylons, masts and wind turbines on neighbouring areas of high ground could affect these valley landscapes.</i> <p>This landscape type is relatively enclosed with woodland belts providing further enclosure and visual screening. However, these LCT are often aesthetically pleasing and the introduction of an overhead wood pole line where there are views across the landscape would be visually intrusive. In addition a large area of the Douglas Water Upland</p>		



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	<p>River Valley LCT is also within the Douglas Valley SLA.</p> <p>Overall the Upland River Valley LCT is considered to have a medium value and a medium susceptibility to a proposed overhead wood pole line and therefore would be considered to have a medium sensitivity to the proposed development.</p> <p><i>Plateau Farmland</i></p> <p>The north-east of the study area, which includes the settlement of Coalburn and the location of the Coalburn Collector Substation is within LCT5 Plateau Farmland, an area separating this LCT and the more prevalent Rolling Moorland LCT is classified as the sub-section LCT5B Plateau Moorland Opencast Mining.</p> <p>Plateau Farmlands, <i>'occur on the lower slopes of the Plateau Moorland and Rolling Moorland areas. The landform is predominantly flat, gently sloping or slightly undulating. Because of the uniformity of the landform, fields tend to be large, rectilinear and evenly spaced. Tree cover is generally limited to</i></p>	<p>Cumulative Context</p> <p>The buffer zone is relatively small compared to the study area, however the main features within the study area extend out of it into the buffer zone, particularly the windfarms along the western boundary and the 400kV overhead line at the northern boundary of the study area. In addition Broken Cross Windfarm is located in the buffer zone to the north-east of the study area.</p>	

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p><i>sparse rows of windblown trees along field boundaries</i>’.</p> <p>The key characteristics of this landscape type are:</p> <ul style="list-style-type: none"> • <i>‘Extensive, gently undulating landform;</i> • <i>Dominance of pastoral farming, but with some mosses surviving;</i> • <i>Limited and declining tree cover;</i> • <i>Visually prominent settlements and activities such as mineral working; and</i> • <i>The rural character of the Plateau Farmlands has suffered as tree cover has declined and the visual influence of windfarms, settlements, transport infrastructure and mineral working has increased.’</i> <p>The identified key landscape issues affecting the LCT are:</p> <ul style="list-style-type: none"> • <i>‘The fragmentation of land use and ownership near built up areas resulting in a decline in the landscape quality (some areas becoming Urban Fringe Farmland);</i> • <i>The effect of alternative activities and land uses such as mineral working and</i> 	<p>Visual Envelope (Map 15)</p> <p>The visual envelope of the buffer zone is simply an extension of that in the main study area, with the high ground to the west and south of the study area extending into the buffer zone, with the lower ground to the north and east extending there.</p> <p>Further blocks of forestry within the north-west, south and north-east of the buffer zone provide a further level of visual screening and block long distance views within the wider area.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p><i>commercial forestry, together with the decline of farming in some of the more marginal areas, resulting in a reduction in traditional forms of landscape management;</i></p> <ul style="list-style-type: none"> <i>• The open and extensive nature of the landscape means that new development is often visible over a wide area;</i> <i>• Conservation and management of historic gardens and designed landscapes, together with surviving historic houses and castles; and</i> <i>• The visual and landscape impacts of wind turbines, electricity transmission and communication infrastructure within and adjacent to this open upland fringe landscape.</i> <p>This medium scale landscape is already crossed by transport and communication routes, electricity pylons and telegraph poles, which exploit the relatively simple topography of the area. The visual and landscape impacts of wind turbines, electricity transmission and communication infrastructure within, and adjacent to, this open upland fringe</p>	<p>Settlements</p> <p>The only village or town in the buffer zone, but outside the study area, is Lesmahagow, the centre of which is approximately 2.3km north of the proposed Coalburn connection point and views towards the study area are generally screened by intervening vegetation.</p> <p>In addition, there are isolated properties or small hamlets, such as Glenbuck just inside the boundary of East Ayrshire, within the buffer zone.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>landscape is identified as a 'key landscape issue' in South Lanarkshire LCA.</p> <p>Therefore, the Plateau Farmland LCT is considered to have a low value and low susceptibility to the proposed development, meaning an overall sensitivity of low.</p> <p><i>Plateau Moorland</i></p> <p>A small section within the north of the study area to the west of the settlement of Coalburn is classified as LCT6 Plateau Moorland, which consist primarily of blanket bog, heather and grass moorland. The topography is comparatively level with extensive plateau basins rising to very softly contoured ridges.</p> <p>The key characteristics of this landscape type are:</p> <ul style="list-style-type: none"> • <i>'Distinctive upland character created by the combination of elevation, exposure, smooth, plateau landform, moorland vegetation and, with the exception of windfarms, a comparative lack of modern development;</i> • <i>These areas share a sense of apparent openness and exposure which contrasts with</i> 	<p>These properties are usually located adjacent to a local transport route such as the A70 or B7078.</p>	



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	<p><i>the farmed and settled lowlands but do not feel remote; and</i></p> <ul style="list-style-type: none"> <i>Increasingly these areas are subject to significant landscape change resulting from extensive large scale windfarm development and associated reduction in area of commercial forestry.'</i> <p>The identified key landscape issues affecting the LCT are:</p> <ul style="list-style-type: none"> <i>'Visual impact of extensive areas of windfarms on nearby settlements and landscape effects on adjacent farmland and river areas;</i> <i>The prominence of any modern developments, including tall structures such as wind turbines, masts and pylons in this open upland landscape; and</i> <i>Potential presence of unrecorded archaeological sites, which may be at risk from development/ land use change.'</i> 	<p>Transport Routes</p> <p>The M74 road corridor is a key strategic route which provides direct access between the south-west of Scotland and the north-west of England. The M74 forms the eastern boundary of the Study Area. Elevated transient views of the study area on the backdrop of distant hills, are available from the M74.</p> <p>The other transport routes within the buffer zone are as per those within the study area, which continue out of the study area.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>This open, relatively level landscape, increases its visual sensitivity to developments such as overhead lines and the prominence of such developments is identified as a key issue for the LCT. Overall the Plateau Moorland LCT is considered to have a medium value and medium susceptibility to the proposed development, resulting in an overall sensitivity of medium.</p> <p>Cumulative Context</p> <p>The Study Area contains Hagshaw Hil and Extension Windfarm, Nutberry Windfarm and Galawhistle Windfarm which are visible over a considerable distance, including much of the Study Area. In addition, the consented Dalquhandy and Douglas West and Kennoxhead Windfarms are within the study area.</p> <p>A 400kV pylon overhead line crosses the north of the study area, connecting into the substation at Coalburn. Other lower voltage overhead lines cross the study area, often following the main communication routes and connecting the settlements within the study area.</p>	<p>Tourism and Recreation (Map 18)</p> <p>The network of core paths within the study area extends within the Douglas Water valley and around/within the settlement of Lesmahagow.</p> <p>National Cycle Route 74 extends through the centre of South Lanarkshire, broadly, following the line of the M74 road corridor.</p> <p>It is unlikely that the proposed development would affect any tourism in respect of the recreational receptors within the buffer zone.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Visual Envelope (Map 15)</p> <p>The Study Area is on the north-western edge of the Southern Uplands and this topography heavily influences the visual envelope. The high ground in the study area is to the south and west and whilst the high ground can act as a visual screen it also means potential development on the high ground would be visually prominent, especially in a moorland type landscape.</p> <p>A considerable area of commercial forestry within the south, west and centre of the study area acts as a significant screen to long distance views from within the study area, and also when viewing into the study area from further afield.</p> <p>The more uniform and open areas of moorland to the north of the study area, around Coalburn and the area to its north-east, create a landscape where long distance views are possible, although even here roadside vegetation and occasional tree belts act as a visual filter within the landscape.</p> <p>The Douglas Valley is particularly enclosed by the surrounding landform and large forestry plantation to</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>its north, with views into and from the valley limited to the landscape within and immediately adjacent to the valley.</p> <p>Within the western central region of the study area, Common Hill (463m AOD) and the adjacent Hagsahw Hill (474m AOD) are the dominant landscape feature of the study area as a whole with views towards the hills, and the windfarm they host, possible from all around the study area.</p> <p>Settlements</p> <p>In the north of the study area, the village of Coalburn, which is associated with local coal mines, is located on the Coal Burn (a tributary of Poniel Water). The village is formed alongside two main streets; north to south directed Coalburn Road and south-west to north-east directed Bellfield Road. Views from the village are enclosed to the west/ south-west and south east by the topography, which ascends in these directions.</p>		



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	Study Area	Buffer Zone	Associated Figure
	<p>The village of Douglas is located in the eastern central area of the study area on the Douglas Water and the main A70 transport route runs through the village. The village is located in a wide low valley, with blocks of woodland to all sides, though generally set back from the village by at least 500m. Views tend to be confined to the valley landscape.</p> <p>The smaller village of Glespin is located 3km south-west from Douglas, also on the Douglas Water and A70. Glespin is not as enclosed as Douglas and longer distance views are possible, though still ultimately confined by the higher ground of the surrounding periphery of the Southern Uplands.</p> <p>In addition to the three main settlements there are a small number of scattered small groupings and individual properties/ farms throughout the study area. Most of these are within the north-west of the study area from Dalquhandy Wood northwards, up to and including Auchlochan Garden Village. There a small number of properties along the B7078 within the eastern boundary of the study area.</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>All residential receptors are considered to have a high susceptibility and sensitivity to the potential development. However, this decreases with distance from the development and away from the three main settlements the overall study is sparsely populated and it may be possible to route the potential development with little overall visual impact on residential receptors.</p> <p>Transport Routes</p> <p>The main transport routes through the study area are:</p> <ul style="list-style-type: none"> • A70, which runs broadly west to north-east for almost 10km through the central region of the study area along the Douglas Water valley; and • B7078, which runs broadly north to south for almost 10km along the eastern boundary of the study area (it is noted that it is usually outside the study area except for the most northern section), roughly parallel to the M74. <p>There are other minor local roads within the study area connecting the settlements, such as Coalburn,</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>with the wider highways network and larger towns outside the study area.</p> <p>Road users within the study area would be considered to have a low susceptibility and sensitivity to the proposed development.</p> <p>Tourism and Recreation (Map 18)</p> <p>As presented on Map 18 there are several core path networks within the study area particularly around the settlements of Coalburn and Douglas, within the Douglas Water valley and ascending Common Hill and Hagshaw Hill from Douglas Water. Depending on the location and existing visual amenity of individual core paths the sensitivity of walkers to the development would vary e.g. users of footpaths within the centre of Coalburn could be considered to have a low sensitivity to the development, whereas users of footpaths within the Douglas Valley SLA may be considered to have a high sensitivity. This is also further complicated by those core paths (CL/3461/1, CL/3460/2 and CL/3458/1) on the high ground around Common Hill which would usually be considered to have a high sensitivity to the proposed</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>development, but the paths are already directly within a wind turbine landscape, thereby reducing the likely sensitivity of the users of these paths. Overall the users of the majority of core paths within the study area are likely to be considered to have a medium susceptibility and medium sensitivity to the development.</p> <p>National Cycle Route No.74 follows the route of the B7078 within the study area. Users of the cycle route are considered to have a medium susceptibility and sensitivity to the development.</p> <p>Hollandbush Golf Club lies within the north of the study area. The golf club's official website notes that the golfers can enjoy <i>'the magnificent scenery and panoramic views of the Southern Uplands dominating to the East, South and West while playing the course and on a clear day, the peaks of Ben More and Ben Vorlich can be seen to the North.'</i> However, it should be noted that several wind turbines are visible in all directions from the golf course and lower level views from within the golf course are often filtered by mature vegetation within and adjacent to the course. Users of the golf course would be</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>considered to have a low susceptibility to the development and would be considered to have an overall sensitivity of low.</p> <p>The village of Douglas itself should be considered as a tourist and recreation location, and tourists/ visitors to the village would usually be considered to have a high sensitivity to the development. However, the landscape around Douglas is already host to windfarms, electricity structures and opencast mining works, therefore the susceptibility of tourists in Douglas to the development is reduced to medium and their overall sensitivity is classified as medium.</p>		
Geology, Hydrogeology and Hydrology	<p>Geology</p> <p>Superficial geology</p> <p>The superficial deposits are predominantly diamicton (glacial till), clays to sands and gravels, of Devensian age.</p> <p>There are glaciofluvial deposits of Quaternary age and alluvium of Holocene age within the study area, which are mainly confined to river valleys. The glaciofluvial deposits consist of sand and gravel with</p>	<p>Geology</p> <p>Superficial geology</p> <p>The superficial deposits are predominantly diamicton (glacial till), unsorted clays to gravels, of Devensian age. There are pockets of peat, particularly in the north-west, with smaller areas in the south-east and south-west. Alluvium of</p>	<p>Figure 3.6a – Private Water Supplies</p> <p>Figure 3.6b Surface Water Features</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>occasional lenses of silt, clay or organic material. The alluvium, of similar characteristics, comprises soft to firm, consolidated, compressible silty clay, with some layers of silt, sand, peat and basal gravel. The glaciofluvial and alluvium deposits are broader and more notable adjacent to Poniel Water, near the M74, and along the Douglas Water, from around Glespin and continuing north-east under the M74.</p> <p>There are some areas of discontinuous peat deposits across the hill slopes, and in isolated lowland areas such as to the south of Coalburn and the lower flanks of the North side of Hagshaw Hill and Henry's Hill.</p> <p>Areas with no superficial cover mainly identify former opencast coal mines, where the cover is no longer natural material (classed as 'made ground'), and some steeper hillslopes.</p> <p>Bedrock geology</p> <p>The bedrock geology of the study area is dominated by Carboniferous strata, which contain most of the potential resources in the area. The geology of the area is complex, consisting mainly of rocks from the Scottish Coal Measures, the Clackmannan Group, the Strathclyde Group and the Inverclyde Group.</p>	<p>Holocene age is present within the buffer zone, mainly confined to river valleys.</p> <p>Bedrock geology</p> <p>The bedrock geology within the buffer zone is essentially equivalent to the main study area, dominated by cyclic sedimentary sequences from the Scottish Coal Measures, the Clackmannan Group, the Strathclyde Group and the Inverclyde Group.</p> <p>The buffer zone includes more strata from the Silurian and Devonian periods than the main study area. These include interbedded sandstone and conglomerate from the Lanark Group, and a series of extrusive igneous rocks including mafic lavas and tuffs.</p> <p>Structural geology</p> <p>In common with the study area, the buffer zone shows extensive faulting. This is particularly</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>All the main rock formations are characterised by cyclic sequences of sandstones, siltstones and mudstones. They include interbeds of ironstone, seatearth, limestone and coal seams in varying proportions. The seatearths, coals and limestones have traditionally been the main units targeted for exploitation. The older Inverclyde Group is dominated by sandstones with silty mudstone interbeds, and is largely lacking coals, seatearths and exploitable limestone.</p> <p>The central-western part of the study area is characterised by rocks from the Lanark Group, of Silurian and Devonian age. These include the Swanshaw Sandstone and Quarry Arenite Formations and are typically sandstones with minor conglomerate and mudstone.</p> <p>Some igneous rocks are present, mainly also Silurian and Devonian in age. These consist of volcanic sequences within the Lanark Group, mainly basaltic in composition, and are present in the south-western and south-eastern parts of the study area.</p>	<p>prevalent in the northern, western and southern parts of the buffer zone. Faulting is much less extensive to the eastern side.</p> <p>Special designations</p> <ul style="list-style-type: none"> • North Lowther Uplands SSSI – Geological and Biological: mineralogy of Scotland, upland habitats, breeding birds, hen harrier, in the in the south of the buffer zone. • Muirkirk Uplands SSSI - Biological and Geological: moorland, acid grassland and blanket bog, birds, fossil-bearing rocks, in the south-west part of the buffer zone. • Red Moss SAC/SSSI – Biological: active raised bog, in the south-east part of the buffer zone • Birkenhead Burn SSSI/GCR – Geological: Silurian to Devonian chordate fossils, in the north-west part of the buffer zone. 	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>A series of dykes cuts across the region, with a characteristic north-west to south-east trend. These are all Palaeogene in age, associated with the volcanic activity on Mull and related areas, and are typically dolerite or quartz dolerite composition.</p> <p>Structural geology</p> <p>The area shows considerable faulting and formation of basin fold structures. Faults in the northern half of the study area broadly trend north-west to south-east; faults in the southern half of the study area broadly trend north-east to south-west. Faults are especially concentrated in the south-west corner of the study area and in the northern part of the site area, just west of Coalburn. Around these heavily faulted zones, coal seams are also present.</p> <p>The study area is located just north of the Southern Uplands Fault, a major extensional fault that forms the southern boundary of the Midland Valley of Scotland. A number of prominent regional north-east to south-west trending faults are associated with movement on the Southern Uplands Fault.</p>	<p>Soils</p> <p>The 1:250,000 National Soil Map of Scotland indicates that the soils of the buffer area are characterised by gleys, podzols, brown forest soils, and blanket and basin peats.</p> <p>Blanket and basin peats are identified in pockets around all parts of the buffer zone, although the main areas are in the west, south and south-east.</p> <p>The west, south and east parts are characterised by gleys and podzols. Brown forest soils are more common in the northern and north-eastern part.</p> <p>Hydrogeology</p> <p>The hydrogeology of the buffer zone is largely the same as the study area, with a mix of moderately productive and low productivity aquifers.</p> <p>The largest aquifer in the buffer zone is the Lanark Group, located mainly in the south-eastern section. The other large aquifers include the Clackmannan Group in the north east, and undifferentiated Silurian rocks in the north west.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>In addition, a series of west to east and north-west to south-east faults are associated with the formation of basins during the Carboniferous period. The study area contains part of a major local syncline (downfold) structure, the centre of which exposes the Passage Formation sandstones and coals at the top of the Clackmannan Group, located at the eastern side of the study area.</p> <p>Special designations</p> <p>Special designations within the study area include:</p> <ul style="list-style-type: none"> • Kennox Water SSSI – Geological: A 2 km stretch of Kennox Water and its associated riverbanks and cliffs. • Muirkirk Uplands SSSI - Biological and Geological: moorland, acid grassland and blanket bog, birds, fossil-bearing rocks, in the south-west part of the study area. • Ree Burn and Glenbuck Loch – Geological: stratigraphy, in the west-south-west edge of the study area. • Shiel Burn – Geological: a 325 m stretch of watercourse exposing fossils, in the western part of the study area. 	<p>Hydrology</p> <p>Watercourses</p> <p>The main watercourses in the buffer zone are: the River Nethan and its tributaries in the northern section; the Douglas Water and its tributaries in the western and southern sections; the Duneaton Water in part of the southern section; and the River Ayr including Glenbuck Loch in the western section.</p> <p>The River Nethan, Douglas Water and Duneaton Water are all tributaries to the River Clyde.</p> <p>Flood risk</p> <p>SEPA's Flood Map (2019) indicates that there is limited flood risk within the study area. Flood risk is largely restricted to watercourse channels, notably the flood plain around the Douglas Water.</p> <p>Private Water Supplies</p> <p>6 private water supplies are recorded within the Buffer Zone.</p>	

	<p>Soils</p> <p>According to the 1:250,000 National Soil Map of Scotland, the soils of the study area are characterised by gleys, podzols, brown forest soils, and blanket and basin peats.</p> <p>Gleys form the dominant soil type across much of the study area. To the south-east, and in patches elsewhere in the south, podzols are identified. Brown forest soils have limited coverage, primarily around river valleys. Blanket and basin peats are limited in area, present only in parts of the northern study area.</p> <p>Basin and blanket peats are considered to be the most environmentally sensitive soil types present.</p> <p>Hydrogeology</p> <p>The area is primarily underlain by moderately productive aquifers, and approximately 15% is underlain by low productivity aquifers.</p> <p>These aquifers include, listed in order from south to north across the study area:</p> <ul style="list-style-type: none"> • Unnamed extrusive rocks, Silurian to Devonian – low productivity. Small amounts of groundwater in near-surface weathered zone and secondary fractures with rare springs yielding up to 2 l/s. • Inverclyde Group - moderately productive multi-layered aquifer with fracture flow yielding up to 10 l/s. 	
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Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<ul style="list-style-type: none"> • Clackmannan Group - Moderately productive multi-layered aquifer with low yields, except where disturbed by mining. Passage Formation, within the Clackmannan Group, has moderate yields up to 10 l/s. • Scottish Coal Measures Group – moderately productive aquifer. Regional, cyclic multi-layered aquifer with low yields from sandstones. Higher yields where mined but poor-quality water, including high iron and fluoride. • Lanark Group - moderately productive regional aquifer of primarily sandstones, with siltstones, mudstones, conglomerates and lavas in places. Locally yields up to 12 l/s. • Silurian rocks (undifferentiated) - low productivity aquifer. Highly indurated (hardened) clay-rich rocks with limited groundwater in near-surface weathered zone and secondary fractures. • Strathclyde Group – moderately productive multi-layered aquifer with fracture flow yielding up to 10 l/s locally. <p>The largest aquifers in the region are the Clackmannan Group, the Lanark Group and the Silurian rocks (undifferentiated).</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>Hydrology Watercourses</p> <p>The main watercourses in the study area are the Douglas Water with its tributaries the Kennox Water and the Glespin Burn, the Poniel Water and the River Nethan.</p> <p>The Douglas Water catchment is located in the southern part of the study area, draining roughly south-west to north-east parallel to the A70. Two significant tributaries, the Kennox Water and Glespin Burn, drain the southern part of the area and provide some constraint to routeing. The Douglas Water's northern tributaries, although mainly quite small, show some incising of the channels particularly in the headwater regions. Downstream of the study area, the Douglas Water joins the River Clyde.</p> <p>The Poniel Water and its tributaries drain the central part of the study area, also flowing mainly south-west to north-east to join the Douglas Water downstream of the study area. Much of the Poniel Water catchment and channels have been affected by opencast mining. Sections also show significant</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>incising of the channels, notably the Hagshaw Burn south of Coalburn.</p> <p>The River Nethan is present only in the northernmost part of the study area. However, it is a significant local watercourse and has a highly incised channel which could provide a significant design constraint. The River Nethan drains south-west to north-east and forms a tributary to the River Clyde, downstream of the Douglas Water confluence.</p> <p>The River Nethan, Poniel Water and Glespin Burn are classified as of Moderate status for overall water classification on SEPA's Water Classification Hub (2019). The Douglas Water is classified as of Good status.</p> <p>Flood risk</p> <p>SEPA's Flood Map (2019) indicates that there is limited flood risk within the study area. Flood risk is largely restricted to watercourse channels, notably the flood plan around the Douglas Water. Some localised areas of surface water flooding are noted, mainly within the restored opencast coal workings south of Coalburn.</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>Private Water Supplies</p> <p>18 private water supplies are recorded within the Study Area.</p>		
Mining	<p>Current and former mine workings</p> <p>The study area includes a number of former and active mine workings, including extensive opencast coal sites. The main coal mine sites are Dalquhandy and Glentaggart (Map 4). A smaller site, Mainshill, is present in the eastern part of the study area. Broken Cross, another major opencast coal site, is located just outwith the study area boundary to the north-east.</p> <p>The Dalquhandy Opencast Site occupied an area of approximately 10 km² and extracted from a number of coal seams within the Limestone Coal Formation. Dalquhandy is now completely restored.</p> <p>The Glentaggart Opencast Site exploited coal reserves within the Scottish Coal Measures.</p>	<p>Current and former mine workings</p> <p>Some of the mining areas identified within the study area extend into the buffer zone, notably Mainshill and Glentaggart East opencast sites in the south-eastern part of the buffer zone.</p> <p>The Glenbuck former opencast site lies partly within the buffer zone to the west side of the study area.</p> <p>The Broken Cross opencast site lies partly within the buffer zone to the north-east side of the study area.</p> <p>Some former coal mining and quarrying activity is noted near within the northern part of the buffer zone. This includes coal bings and shallow surface mining.</p>	<p>Mining Report Maps 1-6 & Figure 3.1</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>Glentagart was more recently restored and is now entering the final stages of aftercare.</p> <p>Work at Mainshill ceased in 2013 after its owner, Scottish Resources Group, went into administration. The site is currently undergoing restoration. It targeted coal within the Upper Limestone and Limestone Coal Formations.</p> <p>Former underground coal mine workings in the southern part of the study area, around Glespin, have left considerable numbers of shafts and adits in this area (Map 3).</p>		
Land Use and Infrastructure	<p>Agricultural Land Use:</p> <p>In terms of its agricultural classification, the study area comprises:</p> <p>4.1 – Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal.</p>	<p>Agricultural Land Use:</p> <p>In terms of its agricultural classification, the buffer area comprises:</p> <p>4.1 – Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal.</p>	<p>Figure 3.7a — Agricultural Land Use Classification</p> <p>Figure 3.7b -- -- Windfarms and Wind Turbines</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>4.2 – Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops.</p> <p>5.1 – Land capable of use as improved grassland. Few problems with pasture establishment and maintenance and potential high yields.</p> <p>5.2 - Land capable of use as improved grassland. Few problems with pasture establishment but may be difficult to maintain.</p> <p>5.3 – Land capable of use as improved grassland. Pasture deteriorates quickly.</p> <p>6.1 - Land capable of use as rough grazings with a high proportion of palatable plants.</p> <p>6.2 – Land capable of use as rough grazings with moderate quality plants.</p> <p>6.3 – Land capable of use as rough grazings with low quality plants.</p> <p>Urban – Urban.</p>	<p>4.2 – Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops.</p> <p>5.1 – Land capable of use as improved grassland. Few problems with pasture establishment and maintenance and potential high yields.</p> <p>5.2 - Land capable of use as improved grassland. Few problems with pasture establishment but may be difficult to maintain.</p> <p>5.3 – Land capable of use as improved grassland. Pasture deteriorates quickly.</p> <p>6.1 - Land capable of use as rough grazings with a high proportion of palatable plants.</p> <p>6.2 – Land capable of use as rough grazings with moderate quality plants.</p> <p>6.3 – Land capable of use as rough grazings with low quality plants.</p> <p>Urban – Urban.</p>	<p>3.7c –Existing Cables and OHLs</p> <p>3.7h -- Housing Allocations, Planning Designations and Settlement Distribution</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Figure 3.7a shows the land capability classification for agriculture (published by the Scottish Government) across the study area.</p> <p>Windfarms</p> <p>The boundaries of the following windfarms in the study area which are either in planning, consented or built are shown on Figure 3.7b.</p> <p><u><i>Built</i></u></p> <ul style="list-style-type: none"> Nutberry Windfarm Galawhistle Windfarm Hagshaw Hil and Extension Windfarm Hazelside Wind Turbine Low Whiteside Farm Wind Turbine Holmhead Farm Wind Turbine Yonderton Wind Turbine Johnshill Farm Wind Turbines JJs Farm Wind Turbine Harbro Wind Turbine 	<p>Figure 3.7a shows the land capability classification for agriculture (published by the Scottish Government) across the study area.</p> <p>Windfarms</p> <p>The boundaries of the following windfarms in the study area which are either in planning, consented or built are shown on Figure 3.7b.</p> <p><u><i>Built</i></u></p> <ul style="list-style-type: none"> Galawhistle Windfarm Andershaw Windfarm Middlemuir Windfarm Broken Cross Windfarm <p><u><i>Consented</i></u></p> <ul style="list-style-type: none"> Cumberhead Windfarm Auldton Heights Wind Turbine Penbreck Windfarm In Planning Glentagart Windfarm 	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p><u>Consented</u></p> <p>Douglas West Windfarm Dalquhandy Windfarm Kennoxhead Windfarm Cumberhead Windfarm Poniel Wind Turbines Low Whiteside Farm Wind Turbine Middlefield Farm Wind Turbine North Bankend Farm Wind Turbine Stockhill Farm Wind Turbine</p> <p><u>In Planning</u></p> <p>Douglas West Windfarm Extension Kennoxhead Windfarm Extension</p> <p>Cables and Overhead Lines</p> <p>A number of high voltage, extra high voltage, low voltage and transmission overhead lines are located within the study area. These include:</p>	<p>Cables and Overhead Lines</p> <p>A number of high voltage, extra high voltage, lowvoltage and transmission overhead lines are located within the study area. These include:</p> <ul style="list-style-type: none"> • EHV Cable (33kV) • EHV Overhead Line (33kV) • HV Cable (11kV) • HV Overhead Line (11kV) • LV Cable (230V) • LV Overhead Line (230V) • Transmission Cable (400kV) • Transmission Overhead Line (400kV) <p>Roads</p> <p>Main roads within the 2km Buffer Zone include the B7078, M74 and A70.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<ul style="list-style-type: none"> • EHV Cable (33kV) • EHV Overhead Line (33kV) • HV Cable (11kV) • HV Overhead Line (11kV) • LV Cable (230V) • LV Overhead Line (230V) • Transmission Cable (400kV) • Transmission Overhead Line (400kV) <p>Roads</p> <p>The primary road within the Study Area is the A70 which traverses the west boundary of the Study Area from west to northeast. The A70 road is a major road which runs a total of 13 km through the study area from Glenbuck through Glespin and Douglas. A network of B Class, unnamed roads and tracks provide access throughout Coalburn, Douglas, Glespin Windfarms and other small settlements located throughout the Study Area.</p>	<p>A 8.1km stretch of the B7078 traverses the section of the Buffer Zone to the north of Coalburn Substation. And along the Eastern boundary. ~2.9km within the study area</p> <p>A stretch of the M74 traverses the section of the Buffer Zone to the north of Coalburn Substation and along the eastern boundary of the Buffer Zone for 13km.</p> <p>A 2.3km stretch of the A70 traverses the eastern portion of the Buffer Zone running west to east from where the M74 overbridge at the A70 northeast towards Rigside.</p> <p>A 3km stretch of the A70 traverses the western portion of the Buffer Zone running west to east of Muirkirk (East Ayrshire) towards Glenbuck.</p> <p>The network of roads and tracks located throughout the Study Area are shown on Figure 1.1.</p>	



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>The network of roads and tracks located throughout the Study Area are shown on Figure 1.1.</p> <p>Housing Allocations, Planning Designations and Settlement Distribution</p> <p>Residential properties are concentrated around Glespin in the south, Douglas in the southeast and Coalburn in the north. Further properties are located along the minor roads and tracks located throughout the Study Area.</p> <p>A review of South Lanarkshire Local Development Plan 2 (approved May 2018) identified the following designations within the Study Area:</p> <ul style="list-style-type: none"> • A Strategic Economic Investment Area surrounding the John Dewar & Sons warehouse facility, Poniel. • A Residential Masterplan site located to the southeast of Douglas. • A Development Framework Area located to the east of Coalburn. This area should be used for the development of recreation, and 		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
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	<p>amenity and residential use, to include the reclamation of Bellfield Bing.</p> <p>Housing Allocations, Planning Designations and Settlement Distribution are shown on Figure 3.7h.</p>		
Forestry	<p>There is estimated to be 3,067.32ha of woodlands throughout the target area and approximately two thirds is commercial conifer plantations.</p> <p>The following table has been created from the Forestry Commission National Forest Inventory for woodlands.</p>	<p>There is a further 2,620 ha of woodlands within the buffer zone. Most of the woodlands are extensions of the main woodland blocks within the study area. Large blocks of forestry and woodland cover the 2km Buffer Zone,</p> <p>These include:</p> <ul style="list-style-type: none"> • Happendon Wood east of the M74 at Happendon Services. • Roddenhill Wood, Coalburn wood and Newtonhead Wood east of the M74 at John Dewar & Sons warehouses. • Part of the large plantation north of Hagshaw Hill. 	<p>Figure 3.8a – FC National Forestry Inventory Woodland Plan.</p> <p>Figure 3.8b – Ancient Woodland Inventory Scotland</p> <p>Figure 3.8c – Forestry Baseline</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT			Associated Figure																																												
	Study Area	Buffer Zone																																														
	<table border="1"> <thead> <tr> <th>Category</th> <th>Area (ha)</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Assumed woodland</td> <td>341.84</td> <td>11.14</td> </tr> <tr> <td>Broadleaved</td> <td>148.93</td> <td>4.86</td> </tr> <tr> <td>Conifer</td> <td>1,953.50</td> <td>63.69</td> </tr> <tr> <td>Felled</td> <td>274.50</td> <td>8.95</td> </tr> <tr> <td>Grassland</td> <td>33.90</td> <td>1.11</td> </tr> <tr> <td>Ground prep</td> <td>72.89</td> <td>2.38</td> </tr> <tr> <td>Low density</td> <td>11.91</td> <td>0.39</td> </tr> <tr> <td>Mixed mainly broadleaved</td> <td>6.65</td> <td>0.22</td> </tr> <tr> <td>Mixed mainly conifer</td> <td>17.93</td> <td>0.58</td> </tr> <tr> <td>Road</td> <td>7.85</td> <td>0.26</td> </tr> <tr> <td>Shrub</td> <td>1.16</td> <td>0.04</td> </tr> <tr> <td>Windblow</td> <td>15.11</td> <td>0.49</td> </tr> <tr> <td>Young trees</td> <td>181.15</td> <td>5.91</td> </tr> <tr> <td>TOTAL</td> <td>3067.32</td> <td>100.00</td> </tr> </tbody> </table> <p>The inventory is a little out of date, but the only changes relates to any felled areas and prep ground which have been re-planted with trees.</p> <p>The FC National Forestry Inventory Woodland Plan is shown on Figure 3.8a..</p> <p>The ancient woodland inventory of Scotland shows a large area of ancient woodlands, but most is established plantations on Ancient Woodland Sites (PAWS). This is largely concentrated in Long Plantation and Poniel Hill There are only two</p>	Category	Area (ha)	%	Assumed woodland	341.84	11.14	Broadleaved	148.93	4.86	Conifer	1,953.50	63.69	Felled	274.50	8.95	Grassland	33.90	1.11	Ground prep	72.89	2.38	Low density	11.91	0.39	Mixed mainly broadleaved	6.65	0.22	Mixed mainly conifer	17.93	0.58	Road	7.85	0.26	Shrub	1.16	0.04	Windblow	15.11	0.49	Young trees	181.15	5.91	TOTAL	3067.32	100.00	<ul style="list-style-type: none"> Part of the large plantation located to the west, south and east of the Scottish Coal site south of Glespin. <p>Smaller areas of forestry are found generally within the various river valleys located throughout the study area.</p> <p>The make-up of the woodlands within the buffer zone are very similar to those within the study zone (see table)</p> <p>The main woodlands are established plantations, comprised mainly of Sitka spruce. In addition, there is a considerable area that has been felled and these are concentrated to the north-west of the Hagshaw Hill plantation and within the plantation to the east of the Scottish Coal site.</p> <p>Some of the felled areas have now been replanted.</p> <p>There are some additional ancient woodlands to the NE of Poniel Hill and these are all Plantations on Ancient Woodland Sites (PAWS). There are no</p>	
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Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>separate ancient semi-natural woodlands (ASNW) as shown in green in Figure 3.8b.</p> <p>The larger of the two is Windrow Wood, which is 37.3ha and situated to the SW of Douglas.</p> <p>The other is Millers Wood, which is 12.33ha and is located immediately to the south of Windrow Wood. This wood is also an SSSI.</p> <p>In addition to the two ancient semi-natural woodlands, there are 6 major woodland blocks.</p> <p>A walkover was undertaken by Roy Dyer, Forester, RSK ADAS on 19th & 20th June 2019 to confirm the forestry baseline across the study area and 2km buffer. Forestry types are shown in Figure F3 and described below:</p> <p>1. Woodland area to the West of Coalburn</p> <p>This is shown as “young trees” on the Forestry Commission’s National Forest Inventory. The woodlands are comprised mainly of Sitka spruce, with some Japanese larch. The trees are estimated to be c. 20 years old. The whole area is a random patchwork of trees and a considerable amount of</p>	<p>Ancient and Semi-Natural Woodlands (ASNW) within the buffer zone.</p>	

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>open space. A rough estimate is that the whole area is approximately 75% stocked and 25% open space The Sitka spruce is variable in quality, ranging from quite stunted trees to trees that are up to 12 metres tall and potentially yield class 20</p>  <p>Woodland area to the West of Coalburn</p> <p>2. Woodland to the West of Station road, near the entrance to Hagshill Windfarm</p> <p>The majority of this woodland is planted with Sitka spruce which is estimated to be 8-10 years old</p>		

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Towards the southern end, is a fairly large wet lying area comprised of pure birch scrub and at the Northern end there is quite a large area of mature broadleaved woodland comprised mainly of beech and oak trees, with some ash and sycamore.</p>  <p>Woodland to the West of Station road, near the entrance to Hagshill Windfarm</p> <p>3. “Long Plantation” and Poniel Hill</p> <p>Although this is a privately owned woodland, it is also a community woodland named – Douglas West Community Woodland; it extends to 23.53ha. At the</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>southern end (just off Station Road) there is quite a bit of open space and some mixed plantings. Just before the main Sitka Spruce woodland there is a small area of young trees comprised of Sitka spruce, birch, alder and ash. There is a significant amount of Chalara ash dieback on the ash trees.</p> <p>In the middle of the wood is a very large dense area of Sitka spruce which is estimated to be c. 45 years old. The “top height” of the trees is c. 27m and the stand is potentially yield class 18 – 20. There is an area of c. 2 hectares within the Sitka spruce plantation that has been severely windblown. To the NE of the mature Sitka spruce plantation is a wet lying area comprised of pure birch scrub and also a younger stand of stand of Sitka spruce, which is not particularly well stocked.</p>		

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	 <p data-bbox="529 914 1140 971">“Long Plantation” and Poniel Hill (young planting with mature Sitka spruce in background)</p> <p data-bbox="573 1011 1140 1101">4. Large plantation to the west of Long Plantation and to the North of Hagshill Windfarm</p> <p data-bbox="529 1125 1140 1333">This is a large, dense Sitka spruce plantation estimated to be 30-35 years old. In common with all the other Sitka spruce plantations within the target area, this plantation has not been thinned, so it is assumed to be on a no thin management regime, due to the windthrow risk. At the western end of this plantation, is a large area that has recently been</p>		

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>felled. As there was no access permission for this area, it is not known whether or not this area has been replanted with trees.</p>  <p>Large plantation to the west of Long Plantation and to the North of Hagshill Windfarm</p> <p>5. Large plantation to the West of the Scottish Coal site near Glespin</p> <p>The land here was ploughed and planted with Sitka spruce c. 30 years ago. The vast majority of the woodland area is therefore now a dense plantation of 30 year old Sitka spruce which has a “top height” of</p>		

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>19.2m. There is however a large area in the NE corner that was felled prematurely. Most of the felled area was replanted with Sitka spruce, which is now 7-8 years old. Some of the felled area along the eastern edge was not replanted but used for mining/minerals extraction.</p>  <p>Large plantation to the West of the Scottish Coal site near Glespin</p> <p>6. Large plantation on the hill to the SE of the Scottish Coal site near Glespin</p> <p>This is another dense plantation of conifers aged 28-30yrs. Although the species here is predominantly</p>		

Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
	<p>Sitka spruce, this plantation also includes some Scots pine too. Prior to planting this site was ploughed and the spacing of the trees is 3.0 metres between the rows and 2.5 metres within the rows. The “top height of the trees is 11m</p>  <p>Large plantation on the hill to the SE of the Scottish Coal site near Glespin</p>		



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure
Recreation, Amenity and Tourism	<p>Tourist facilities within the Study Area include:</p> <ul style="list-style-type: none"> • Hollanbush Golf Club • Coalburn Leisure Centre • Netherfield Alpacas • Earl of Angus Monument • Douglas Victoria Bowling Club • The Cross Keys Inn • The Scrib Tree • Douglas West Community Woodland <p>There are a number of Core Paths and Rights of Way in the central and northeastern sections of the study area. These link Glespin, Coalburn and Douglas and pass through areas of plantation and forestry at several locations.</p> <p>Figure 3.7i shows all recreation, amenity and tourism features located within the Study Area.</p>	<p>A network of core paths are located within the Buffer Zone, particularly to the north of Coalburn Substation, to the east and to the southwest.</p> <p>Figure 3.7i shows all recreation, amenity and tourism features located within the Buffer Zone.</p>	<p>Figure 3.7i– and Recreation</p>



Topic	BASELINE ENVIRONMENTAL ASSESSMENT		
	Study Area	Buffer Zone	Associated Figure

APPENDIX 4 ENVIRONMENTAL CONSTRAINT SENSITIVITY ASSESSMENT

Constraint	Sensitivity (High – Red, Medium – Amber, Low – Green)	Buffer (m)	Sensitivity of Buffer (High – Red, Medium – Amber, Low – Green)	Notes
Landscape				
Scenic Area	N/A		N/A	None within the Study Area
Garden and Designed Landscape	N/A		N/A	None within the Study Area
Special Landscape Area	Low	0	Low	Part of the Douglas Valley SLA is located within study area.
Regional Landscape Area	N/A		N/A	None within the Study Area
Cultural Heritage				
Listed Buildings - A	High	50	Low	Buffer to reduce potential setting impacts
Listed Buildings - B	Medium	50	Low	Buffer to reduce potential setting impacts
Listed Buildings - C	Medium	50	Low	Buffer to reduce potential setting impacts
Scheduled Monuments	High	50	Low	Buffer to reduce potential setting impacts
Conservation Areas	Medium	50	Low	Buffer to reduce potential setting impacts
Ecology				
Site of Special Scientific Interest (SSSI)	High	50	High	The following SSSIs are located within the study area: <ul style="list-style-type: none"> • Millers Wood

Constraint	Sensitivity (High – Red, Medium – Amber, Low – Green)	Buffer (m)	Sensitivity of Buffer (High – Red, Medium – Amber, Low – Green)	Notes
				<ul style="list-style-type: none"> • Ree Burn and Glenbuck Loch • Shiel Burn • North Lowther Uplands • Kennox Water • Coalburn Moss • Muirkirk Uplands
Special Protection Area (SPA)	High	50	High	Muirkirk and North Lowther Uplands SPA located within study area.
Special Areas Conservation (SAC)	High	50	High	Coalburn Moss located within study area.
Important Bird Area	Moderate	-		North Lowther Hills and Airds Moss and Muirkirk Uplands Important Bird Areas located within study area
Ancient Woodland Inventory	High	50	High	Ancient Woodland located throughout study area.
Carbon and peatland (Class 1)	High	50	High	Areas of carbon and peatland (Class 1) located throughout study area.
Geology, Hydrogeology and Hydrology				
Waterbodies (rivers, burns, lakes, ponds etc.)	High	50	High	Buffer to ensure no infrastructure located within 50m.

Constraint	Sensitivity (High – Red, Medium – Amber, Low – Green)	Buffer (m)	Sensitivity of Buffer (High – Red, Medium – Amber, Low – Green)	Notes
Recreation and Tourism				
Core Paths	Low	0	-	
Infrastructure				
Existing HV lines	Medium	70	Medium	Buffer allows for typical stand-off distance. Medium sensitivity assigned due to potential technical solutions for crossing.
Settlements and individual properties	High	100	High	Buffer to reduce potential impacts on residential amenity.
Windfarm turbine locations (existing, consented and application stage)	High	Variable depending on turbine height plus 10% = topple height.	Medium	Buffer defined as 3 x maximum wind turbine rotor diameter to avoid technical issues (wake effects).
Consented Mineral Sites	High			
Areas of Potential Future Mineral Extraction (low-medium)	Medium			

APPENDIX 5 ENVIRONMENTAL ANALYSIS OF ROUTE OPTIONS

1. Introduction

Three potential routes (with several potential deviations) were initially identified as feasible to accommodate the proposed OHL. Route options are shown on Figure 4.4.

ROUTE OPTION 1

1. A1 – B1 – C1b

ROUTE OPTION 2

1. A1 – B3 – B4 – B5 – C1a – C1b

ROUTE OPTION 3

1. A3-A5-C2a-C1a-C1b

This appendix presents the detailed environmental analysis of each route option, presenting a preference from each environmental discipline.

2. Ecology and Ornithology

2.1. General Study Area

A review of the phase 1 habitat surveys undertaken for planned overhead line infrastructure in the area as well as windfarms (planned, operational and consented) has identified a broad range of habitats throughout the survey area including: semi-natural road-leaved woodland, plantation broad-leaved woodland, semi-natural coniferous woodland, broad-leaved parkland, scattered trees, scrub, mixed plantation woodland, unimproved acid grassland, semi-improved acid grassland, unimproved neutral grassland, semi-improved neutral grassland, unimproved calcareous grassland, improved grassland, marsh/marshy grassland, bracken, tall ruderal, acid dry dwarf shrub heath, wet dwarf shrub heath, dry heath/acid grassland mosaic, blanket bog, raised bog, wet modified bog, dry modified bog, acid/neutral flush, swamp, standing water, running water, artificial mine, arable land, amenity grassland, ephemeral/short perennial, dry ditch and bare ground.

A comprehensive phase 1 habitat survey and national vegetation classification survey (NVC) will be undertaken on the preferred route next year during optimal survey conditions. This will also identify any groundwater dependent terrestrial ecosystems (GWDTEs) along the route. At the same time, a protected species walkover will be undertaken to determine the presence of Badger, Otter and Water Vole and the potential for roosting/foraging/commuting bats. Red Squirrel will also be considered given there are historic records of this species in the study area. Badger are known to be present in and around woodland throughout the study area it is also known that Common

Lizards are present throughout the study area however, the presence of Great Crested Newt has never been confirmed and SNH confirmed that no surveys are required for this species.

In terms of birds, several notable species have been observed throughout the study area with Curlew, Hen Harrier and Short-eared Owl having been confirmed as breeding. Black Grouse leks have also been identified in various locations within the study area. There are suitable breeding habitats (i.e. around waterbodies) for waders throughout the study area and areas of mature woodland present potential nest sites for raptors such as Goshawk and Merlin.

Below is an overview of the potential constraints currently identified in relation to each proposed route and variations.

2.2. Route Option 1

Breeding Hen Harrier are known to be present in the vicinity of Kennoxhead point of connection, therefore potentially affecting both sections A1. This section lies within an important bird area and is close to Muirkirk North Lowther Uplands SPA. This SPA supports breeding populations of Golden Plover, Hen Harrier, Merlin, Peregrine and Short-eared Owl. In addition, these sections of the route are close to Muirkirk Uplands SSSI as well as North Lowther Uplands SSSI. Black Grouse leks have also been identified in the Kennoxhead area.

B1 is likely to require some tree felling as it appears to pass through a block of woodland. This may have implications on protected species such as bats, Badger and nesting birds although the presence of such species in this area cannot be confirmed until after the ecological surveys have been completed. C1b runs very close to Coalburn Moss SAC however the footprint does not fall within this area of blanket bog. Badger, Otter and Water Vole are present in the vicinity of C1b, including around Coalburn.

A1 runs close to the woodland edge which may have nesting birds, Badgers and/or commuting and foraging bats present.

2.3. Route Option 2

Route 2 has the same constraints as Route Option 1 with regard to section A1. Both C1b is very close to Coalburn Moss SAC and C2a will involve passing through a large area of woodland. Badger, Otter and Water Vole are known to be present in the vicinity of C1a and C1b, including around Coalburn.

B3, B4 and B5 have little in the way of specific constraints identified at present. C2a is likely to require more tree felling than the other variations within this route option and is close to ancient woodland therefore the variations containing this section would be considered least favourable.

2.4. Route Option 3

The Route Option 3 has the same constraints as section A1 discussed above in regard to designated sites and bird species. A5 lies very close to Douglas Water which may support Otter however this would not be considered as a major constraint. Black Grouse leks have been identified in the Glentagart area which is close to A3, making this option possibly less preferred.

Sections C1a and C1b have the same constraints as Route Option 1 and Route Option 2 in this area. This option is the least preferred route due to the close proximity to ancient woodland.

3. Archaeology and Cultural Heritage

This section describes the main archaeology and cultural heritage interests which have been identified within the study area, including listed buildings.

The degree of interaction between each route option and these identified archaeological and cultural heritage sensitivities has been considered in order to identify differentiator(s) between the route options under consideration. The route option most able to avoid identified sensitivities, wherever possible, is preferable.

The locations of the designated archaeological and cultural heritage assets are shown on Figure 3.3.

3.1. General Study Area

The majority of identified heritage assets are concentrated around certain areas. The village of Douglas has the densest concentration of designated and non-designated assets. Beyond this settlement, there are higher densities of non-designated assets along the main watercourses in the Study Area such as the Kennox Water and River Nethan. This arrangement is likely to reflect historic (and possibly prehistoric) settlement and use patterns in the Study Area.

The high proportion of the Study Area previously subject to opencast mining is also worthy of note. This has eradicated traces of previous human activity within the opencast areas.

3.2. Route Option 1

There are several non-designated assets within Section A1: a hut circle, shieling and bank likely representing a medieval or later rural settlement ('MLRS') (HER No. 53094), a sheepfold, a possible cairn (HER No. 22701), possible platforms (HER No. 54097 and 54098), a structure (HER No. 22636).

Within Section B1, there is a farmstead at Burnside (HER No. 53135), and a record of Coalburn coal mine (HER No. 12277).

Section C1b passes to the west of the Coalburn Moss SAC before linking to Coalburn Substation. Within Section C1b, there is a record of a limekiln (HER No 58088), ponds and a pump house (HER No. 58087) and a building (HER No. 41261) at Coalburn. Auchlochan Colliery shafts 9 and 10 are recorded in the section (NRHE No. 131573).

There are no designated heritage assets within Route Option 1 (e.g. Scheduled Monuments, Conservation Areas or Listed Buildings). The closest designated asset is the Category B-listed Auchlochan Bridge (LB No. 339652), which is located 850 m northwest of section C1b. No effects on the bridge's setting is predicted should Option 1 be selected.

3.3. Route Option 2

There are several non-designated assets within Section A1: a hut circle, shieling and bank likely representing a medieval or later rural settlement ('MLRS') (HER No. 53094), a sheepfold, a possible cairn (HER No. 22701), possible platforms (HER No. 54097 and 54098), a structure (HER No. 22636).

Section B3 contains mining remains and a railway (HER No. 22648), Kennox No. 7 mine (HER No. 41012), a watermill (HER No. 9643), and a farmstead (HER No. 17303).

Section B4 contains a structure (HER No. 15770), enclosures (HER No. 10150), a sheepfold (HER No. 58101), suggesting a MLRS occupying the south-eastern facing slopes of Rob's Hill, with

further cropmarks recorded on the northeastern slope (NRHE No. 89288). However, the section is quite wide in this area (860 m) so direct impacts on known features should be avoidable. Additionally, there is a rifle range at Blackwood Hill (HER No. 58099).

Section B5 does not contain any heritage assets. However, Ordnance Survey mapping does identify a dismantled railway running parallel to the section for a distance of 1.1km.

Section C1a contains the farmstead of Alderburn/Westerhouse (HER No. 17333), a lime kiln (HER No. 17331) and a sheepfold (HER No. 58089).

There are no designated heritage assets within Route Option 2 (e.g. Scheduled Monuments, Conservation Areas or Listed Buildings). The closest designated assets are the concentrated around Douglas (for Section C2a).

3.4. Route Option 3

Section A3 runs along the southeast bank of the Kennox Water for approximately 1.7 km, as well as the northern slope of Kennox Hill. It contains a sheepfold (HER No. 22694) and structures (HER No. 22709). Section A3 has a 2.7 km-long sub-section that passes through a portion of the Glentaggart open cast mine that contains numerous non-designated assets such as mounds, enclosures and turf structures; however such remains will have been destroyed through the operation of the mine. Section C2a contains a findspot of an inscribed stone (HER No. 10156). It occupies sloping south-east facing terraces above the Douglas Water. The section runs closest to the concentration of designated assets near Douglas, such as the conservation area and St. Bride's Church scheduled monument and property in care (SM No. 90265). Section C2a is located 500 m northwest of the scheduled monument and centre of the settlement, and no impacts on the setting of designated assets are predicted.

Section C1a contains the farmstead of Alderburn/Westerhouse (HER No. 17333), a lime kiln (HER No. 17331) and a sheepfold (HER No. 58089).

There are no designated heritage assets within Route Option 3. The closest designated assets are the concentrated around Douglas (for Section C2a), and discrete listed buildings close to Section C2b. Section A5 (along the Douglas Water) is likely to be one of the areas within the Study Area with the higher potential for previously unidentified remains of past agricultural use and/or settlement.

4. Landscape and Visual Amenity

4.1. General study area

Appendix 3 Environmental & Technical Baseline describes the main landscape elements and visual amenity identified within the study area, including landscape designations and Landscape Character Types (LCT), settlements, transport routes, core footpaths and recreational landscapes which could be directly affected by the proposed development. The degree of interaction of each route option with these identified landscape and visual receptors has been considered in order to identify differentiators between the route options under consideration.

As detailed in Section 4, Route Selection (sections 4.3.14 to 4.3.18 for landscape and visual amenity six criteria have been applied at the initial route corridor appraisal stage as outlined below:

- Landscape Sensitivity – To find the best possible landscape ‘fit’. To avoid landscapes with greatest potential sensitivity to change (from overhead lines).
- Residential Amenity – To avoid proximity to residential properties as far as possible on the grounds of general amenity including views from private property.
- Visual Amenity – To minimise impacts on public visual amenity, including residents in settlements, users of main transport routes, and users of key recreational areas.
- Landscape Designations – To minimise impacts on areas designated for their landscape value.
- Length of corridor – To minimise impacts on the landscape, all else being equal.
- Forestry – Areas of ancient woodland should be avoided and, if possible, impact on other woodland/ forestry types should be kept to a minimum.

When considering these criteria for each route option, an initial judgement has been made with regard to their likely presence within the vicinity of each route and therefore potential susceptibility to the proposed overhead line and likely concerns. A judgement of high indicated that a particular aspect would most likely be adversely affected by the introduction of an overhead line and a judgement of low indicated that the route option would likely avoid adverse effects on this criteria. A judgement of none means that the criteria is not of concern e.g. if there are no residential properties within the vicinity of a route then the likely effects on residential amenity was considered to be ‘none’.

The routes and tables below focus on the two routes as detailed in Section 5.1 of this Appendix.

4.2. Route Option 1

From the south the landscape follows a valley moorland landscape located between Kennox Water and an area of commercial forestry, with limited publicly accessible visual receptors. The route then utilises some areas of degraded land (from opencast workings). At (or near) Carmacoup the route would be in the vicinity of a small number of residential receptors and then cross the A70 (road). Within the vicinity of the A70 (road) section A1 has a greater degree of tree cover than present within section A3, which would help provide filtering and backclothing of the OHL. Route Option 1 then heads north over an upland landscape covered initially in moorland before running through areas previously dominated by commercial forestry but now host to windfarms, again there are few visual receptors within the vicinity of the proposed route and the OHL would not follow the

highest ground, with a large portion of the route being on the eastern slopes of Hareshaw Hill (to the west of Monks Water) and screened from the wider study area by intervening landform.

As the route leaves the windfarm/ forestry landscape and enters the northern end of the route it crosses a transitional landscape between upland and lowland to the west of the settlement of Coalburn. At the very northern end of section B1 the proposed route would cross Right of Way/ Core Path CL/3310/1 and there would likely be localised significant visual impacts for the users of this path. This however is the only such path that Route Option 1 crosses.

For the final northern section of the route it runs through a simple moorland landscape, with signs of former and current opencast mine working visible within the landscape. The route would also pass in relative close proximity to Hollandsbush Golf Club and individual properties such as Stockhill Farm at the northern end of B1 and Glaikehead and Johnshill Farm to the west of section C1b. In this location the relatively level/ only slightly undulating lowland landscape is host to roadside, garden and other vegetation which would provide a reasonable visual filter from these scattered properties.

Likely Susceptibility of Landscape and Visual Amenity Criteria to Proposed OHL for Route Option 1						
Route Sections	Landscape Sensitivity	Residential Amenity	Visual Amenity	Landscape Designations	Length of Corridor (approx.)	Forestry
A1	Low	Low/ Medium	Low	None	3.4km	Medium
B1	Low	Medium	Low	None	10km	Medium
C1b	Low	High/ medium	Low	None	3.3km	None

4.3. Route Option 2

Route 2 initially would follow the same path as Route 1 (Section A1), until arriving at Carmacoup at this point Route Option 1 heads north over an upland landscape, whereas Route Option 2 continues north-east broadly through the valley of Douglas Water. Route Option 2 (Section B3) crosses the northern slopes of the valley with the village of Glespin and the A70 (road) to the south, both receptors from which the OHL is likely to be visible on the moorland of the valley slopes.

As Route 2 continues north-east it would enter and pass through the Douglas Valley, including the Douglas Valley Special Landscape Area (SLA), and to the west of the village of Douglas. Within the SLA the tree cover associated with the former designed landscape around the village of Douglas increases and the overall landscape becomes more aesthetically pleasing. Within the SLA there are a greater number of Core Paths than any other location within the study area.

To the north-west of Douglas, Route 2 changes direction and heads north-west and exits the SLA. At this location there is existing overhead wirelines and associated infrastructure such as the Douglas Substation located near the confluence of sections B4-B5, and C1a.

Route Option 2 continues northwards across a landscape comprising moorland and large opencast areas (including Dalquhandy opencast coal site). The proposed route then loops around the south

and south-west of the village of Coalburn, although it is noted that views of the OHL from the village are likely to be filtered by intervening woodland around the periphery of the village. At this point Route 2 would follow the same proposed route as Route 1 northwards before connecting with Coalburn Substation.

Likely Susceptibility of Landscape and Visual Amenity Criteria to Proposed OHL Route Option 2						
Route Sections	Landscape Sensitivity	Residential Amenity	Visual Amenity	Landscape Designations	Length of Corridor (approx.)	Forestry
A1	Low	Low/ Medium	Low	None	3.4km	Medium
B3	Medium/ Low	High/ Medium	Medium	Medium/ Low	2.7km	None
B4	Medium/ Low	Low	Medium/ Low	Medium	3.4km	None
B5	Medium/ Low	Low	Medium	Medium	1.4km	High
C1a	Low	Medium	Low	None	4km	Medium/ High
C1b	Low	High/ medium	Low	None	3.3km	None

Route Option 3

Route 3 initially runs to the south and east of Routes 1 and 2, but through a similar valley moorland landscape located to the south of Kennox Water for approximately 3.1km, with limited publicly accessible visual receptors. The route continues across a large area (~2.3km) of opencast workings.

At the end of the opencast workings, approximately 750m south of Glespin, Route 3 continues north-east where it would enter and pass through the Douglas Valley, including the Douglas Valley Special Landscape Area (SLA). The route continues to the south of Douglas Water, before crossing the A70 and Douglas Water approximately 1.2km south-south-west of Douglas. This route runs through the SLA for approximately 5.9km. Within the SLA the tree cover associated with the former designed landscape around the village of Douglas increases and the overall landscape becomes more aesthetically pleasing. The route itself generally avoids areas of woodland.

Within the SLA there are a greater number of Core Paths than any other location within the study area. The route runs to the south of several core paths (including CL/3455/1, CL/3453/1,

CL/3451/1, CL/3346/1, CL/3345/1 and CL/3343/1) for a stretch of over 4km and is likely to be visible to users of these paths.

To the north-west of Douglas, Route 3 changes direction and joins section C1a and follows the same path as Route 2 as described above, before connecting with Coalburn Substation.

Likely Susceptibility of Landscape and Visual Amenity Criteria to Proposed OHL						
Route Option 3						
Route Sections	Landscape Sensitivity	Residential Amenity	Visual Amenity	Landscape Designations	Length of Corridor (approx.)	Forestry
A3	Medium/Low	Low	Low	None	6km	None
A5	Medium/Low	Medium	Medium	Medium	3.8km	Medium
C2a	Medium/Low	Medium/Low	Medium/Low	Medium	1.8km	Medium/High
C1a	Low	Medium	Low	None	4km	Medium/High
C1b	Low	High/Medium	Low	None	3.3km	None

4.4. Summary

The preferred route from a landscape and visual perspective is Route 1 via sections A1, B1 and C1b, although it should be noted that from a landscape and visual perspective all the preliminary routes are viable options.

Section B1 is preferable to the other 'B' sections and C1a/b due to the likely limited impacts on landscape designations (i.e. it avoids the Douglas Valley SLA), landscape sensitivity, residential amenity and visual amenity, with much of the proposed route not visible from publicly accessible locations. Section B1 avoids using sections A3 and A5 where the likely visual amenity impacts would be highest, due to the eastern sections of these routes crossing areas of open high ground that are perceptible from publicly accessible areas. Section B1 is far enough from residential properties to not significantly impact the residents. Section B1 also avoids the existing confluence of wind turbines and overhead lines to the west of Douglas (near where A5, B4, B5, B6, C1a and C2a converge) which is visible from publicly accessible areas. Section C1a is a route option which would have limited landscape or visual amenity impacts, however at its southern end it would have to connect to a section which went through the Douglas Valley SLA.

At this early stage of appraisal, it is considered unlikely that any significant landscape impacts would be identified should the development be located within the identified preferred Route 1 comprising sections A1, B1 and C1b. The main landscape effects would likely arise from the

introduction of the OHL into a relatively untouched moorland landscape across a small number of narrow burns; with potentially the need to fell some commercial forestry.

With respect to visual amenity should the development be located within the identified preferred Route 1 (comprising A1, B1 and C1b), it is considered there is the potential for significant visual impacts to be identified at a limited number of isolated residential properties and also a single localised significant visual impact on a single Right of Way. However, it is considered that should alternative options be selected the OHL would have much greater prominence within the wider study area, with more residents potentially experiencing significant visual impacts, particularly along Route 2 near Carmacoup and the southern end of Glespin. Both Route Option 2 and 3 would result in the users of many more Core Paths/ Rights of Way experiencing localised significant visual effects as the OHL crosses over or runs adjacent to those paths.

5. Geology, Hydrogeology and Hydrology

5.1. General study area

The main geological, hydrogeological and hydrological interests and constraints identified within the study area are covered in Sections 3 and 4. The main sensitivities that require consideration are private water supply intakes and infrastructure, surface watercourses and waterbodies, and areas of peatland.

There are no specific sensitivities relating to bedrock or superficial geology that have influence on the routing options. As groundwork for overhead lines is minimal, there are also no specific sensitivities relating to groundwater that need to be considered.

The following sections discuss the level of interaction for each route option, with any key sensitivities identified. Route sections B2 and C2b have been discounted for engineering practicality reasons and will not be considered within this section.

5.2. Route Option 1

Section A1 includes two watercourse crossings and passes two small waterbodies. This section also crosses approximately 1 km of blanket peat. A private water supply recorded at Kennoxhead is no longer used as the property has been demolished and all stonework removed.

Section B1 includes between 16 and 21 watercourse crossings, depending on the exact route selected. The watercourses include the Carmacoup Burn, Douglas Water and the headwaters of the Monks Water as well as a large number of tributaries to the Monks Water and other minor watercourses. The route runs parallel to the Monks Water for approximately 3.5 km. Two small waterbodies are also present.

This section also crosses two areas of blanket peat, of approximately 700m and 900m in length. Three private water supplies are located downslope of the route corridor: Inches, approximately 275 m from the corridor boundary; Dalquhandy, approximately 350m from the corridor boundary; and Todlaw, also approximately 350m from the corridor boundary.

Section C1b includes between four and six watercourse crossings, all of minor or modified watercourses. This section also crosses approximately 500m of basin peat. There are no private water supplies within 500 m of this section.

From a hydrology perspective section A1 limits the number of potential watercourse crossings in this area and would be over 250m away from the Kennox Water (SSSI).

5.3. Route Option 2

Section A1 includes two watercourse crossings and passes two small waterbodies. This section also crosses approximately 1 km of blanket peat. A private water supply recorded at Kennoxhead is no longer used as the property has been demolished and all stonework removed.

Section B3 includes between seven and twelve watercourse crossings, including a crossing of the Douglas Water and a large number of tributaries to the Douglas Water. Two private water supplies are located downslope of the route corridor: Carmacoup, approximately 90m downslope of the route corridor; and Parishholm, also approximately 90m downslope of the route corridor.

Section B4 includes between two and six watercourse crossings, depending on the route selected. There are no private water supplies within 500m of the corridor. A small area of blanket peat is present at the northern end of the corridor, which is approximately 200m in length. Careful route planning would be able to avoid this area of peatland.

Section B5 includes up to three watercourse crossings, depending on the route selected. There are no private water supplies within 500m of the corridor. A small area of blanket peat, contiguous with the area in Section B4, is present at the south-western corner of the corridor. This area is approximately 100m in length and could be completely avoided with careful route planning.

Section C1a includes four watercourse crossings, including a crossing of the Poniel Water which has a significantly incised channel. There are no private water supplies within 500m of the corridor. This section crosses approximately 450m of basin peat.

5.4. Route Option 3

Section A3 includes between eight and 12 watercourse crossings. This route runs parallel to the Kennox Water for approximately 1.8 km. A private water supply recorded at Kennoxhead is no longer used as the property has been demolished and all stonework removed. Two further private water supplies are located downslope of the route corridor – Earlsmill, at 110m, and Andershaw, at 350 m.

Section A5 includes between seven and eight watercourse crossings, including the Douglas Water and the Glespin Burn. The route runs parallel to the Douglas Water for approximately 1.7 km. There are no private water supplies within 500 m of the corridor.

Section C2a includes two watercourse crossings, including a crossing of the Broadlea Burn which has a significantly incised channel. There are no private water supplies within 500m of the corridor.

Section C1a includes four watercourse crossings, including a crossing of the Poniel Water which has a significantly incised channel. There are no private water supplies within 500m of the corridor. This section crosses approximately 450 m of basin peat.

Section C1b includes between four and six watercourse crossings, all of minor or modified watercourses. This section also crosses approximately 500m of basin peat. There are no private water supplies within 500m of this section.

6. Mining

6.1. General study area

The main mining interests and constraints identified within the study area are covered in Sections 3 and 4. The main sensitivities that require consideration are areas of former opencast workings

and areas with significant historical underground mining activity where shaft and adit entrances are present.

Sensitivities relating specifically to mining activity are detailed in the following sections. These sections discuss the level of interaction for each route option, with any key sensitivities identified.

6.2. Route Option 1

The extent of former workings is not entirely clear. Approximately 90% of section A1 passes through the Glentaggart opencast coal site as indicated on the South Lanarkshire Council's Minerals Local Plan from 2009. Approximately 1.6km of A1 also cross South Lanarkshire Council's Opencast Mines area for Glentaggart. This is likely therefore to have some localised ground stability concerns.

Much of Section B passes through an area with no mining history.

The northernmost 2.7 km of option B1 crosses an area affected by opencast coal mining and also includes a small number of identified shaft and adit entries.

B1 passes through areas identified as having prospect for construction aggregates (rock, sand and gravel).

Much of Section C passes through the now restored Dalquhandy opencast coal mining area. This affects the first 500 m of option C1b which joins B1.

6.3. Route Option 2

The extent of former workings is not entirely clear. Approximately 90% of section A1 passes through the Glentaggart opencast coal site as indicated on the South Lanarkshire Council's Minerals Local Plan from 2009. Approximately 1.6km of A1 also cross South Lanarkshire Council's Opencast Mines area for Glentaggart. This is likely therefore to have some localised ground stability concerns.

Much of Section B passes through an area with no mining history.

The southernmost 300 m of option B3 have been under opencast coal mining and has a number of shafts and adits indicated.

B3 and B4 passes through areas identified as having prospect for construction aggregates (rock, sand and gravel).

6.4. Route Option 3

Approximately 90% of Section A3 lies within the Glentaggart Opencast Coal Site as indicated on the South Lanarkshire Council's Minerals Local Plan from 2009.

Approximately 250m of Section A3 with a possible additional length of 400m (partial coverage) also crosses South Lanarkshire Council's Opencast Mines area for Glentaggart.

Section A3 also has areas with mapped mine entries at the northern end.

Much of Section C passes through the now restored Dalquhandy opencast coal mining area. This affects the entire length of option C1a and the first 500 m of option C1b. Option C2a is largely outwith areas with mining influence.

Options C1a and C1b also include areas with identified mine adit and shaft entries, most notably in the area around Coalburn.

7. Land Use and Infrastructure

7.1. General Study Area

As detailed in Chapter 3, land use varies throughout the study area between residential settlement, agricultural land, improved grassland, rough grazing, surface mining (previous activity), moorland and some pockets of plantation forestry and mixed woodland. The analysis documented here has taken account, where possible, of land use sensitivities. The locations of the relevant features discussed in this section are shown on Figure 3.7a-l and 3.8a-c.

7.2. Route Option 1

A 100 m trigger for consideration has been applied to individual residential properties within the study area. The only area where it has not been possible to adhere to this 100 m buffer is near Glaikhead where a pinch point is created between the residential buffer and the consented development at Auchlochan Bing to the south, where Sections C1a and C1b converge. This is discussed under Visual Amenity.

It has been necessary to extend the route into the application area for Auchlochan Bing to maintain a sufficient route width; however it is noted that route crosses the outer extent of the application site where no development is proposed and avoids the footprint of the Bing.

Route Option 1 (including both variations) would have up to four crossings to existing 11kV OHL transmission and distribution infrastructure: Route

Approximately 50% of the route is situated in Development high risk area/abandoned mines catalogue

Up to 5% of route is located in peat according to BGS records.

The route crosses a number of A and B roads including the A70, Shoulderrigg Road, Coalburn Road and up to 7 unclassified tracks/roads.

Approximately 46% of route crosses windfarms. There is a pinch point on section B1 with turbines each side of the route (300m apart). Farm wind turbines are also located close to the corridor. Galawhistle and Nutberry (operational) and Dalquhandy (consented) windfarms are located in the western part of the refined study area. Section B1 passes through the 3 x rotor diameter buffer of the turbines for all windfarms. However, the key constraint to avoid is the topple distance, which both of these sections do not encroach upon.

7.3. Route Option 2

A 100 m buffer has been applied to individual residential properties and settlements within the study area.

Route 2 crosses up to 8 x 33kV and up to 9 11kV OHL existing transmission and distribution OHL infrastructure.

Route 2 is located close to up to 5x Distribution OHLs.

100% of the route is situated in Development high risk area/abandoned mines catalogue.

Up to 5% of the route is located in peat according to BGS records.

The route crosses a number of A and B roads including the A70, Station Road, Shoulderigg Road/, Coalburn Road, Middlemuir Road and up to 4 unclassified tracks/roads.

Up to 27% of route is located adjacent to windfarms. Farm wind turbines are also located close to the corridor. Hagshaw Hill and Extension (operational) and Douglas West (consented) windfarms are located in the central part of the refined study area. Sections B4 to B6 pass through the 3 x rotor diameter buffer of the turbines for all windfarms. However, the key constraint to avoid is the topple distance, which all of these sections do not encroach upon.

8. Forestry

8.1. General Study Area

This site assessment has been carried out as a desk-based exercise i.e. no site visit has been made to date. This report is partly based on information obtained from the Scottish Forestry Map Viewer, which although now available is still subject to on-going updates and improvements. The map viewer does provide some useful information on Forest Plans within the target area, but many of the relevant felling licences have expired and there is no information on the actual felling dates or when the sites have been replanted. In general, it has been assumed that where felling licences have been issued and expired, then the felling has been carried out and the felled areas restocked. A further assessment of the forestry plantations has been carried out by viewing the aerial plans available on Google Maps (tempered by the fact that the maps could be up to 5 years old) and the following plan produced from the FC National Forestry Inventory, with an overlay of the route sections.

The routeing assessment carried out by RSK identified three potential route options. These sections have been studied individually to establish their potential effect on the commercial forestry plantations and other woodland areas.

One of the figures initially produced by RSK as part of the constraints assessment showed a significant area of ancient woodlands. This was checked with the Ancient Woodland Inventory Scotland and it was confirmed that there are actually less ancient woodlands throughout the study area than initially thought.

When choosing the three potential route sections, consideration has already been given towards avoiding woodland areas as much as possible. However, due to the extent of the woodlands within the study area, it has not been possible to avoid them completely and the initial forestry assessment confirms that several run through commercial forestry plantations and/or other woodland areas.

Comments specific to the sections of route options where woodlands have been identified are presented in the following section

8.2. Route Option 1

The sections where woodlands have been identified are:

A1 – From the southern end, the first two thirds of this section runs across rolling moorland, adjacent to a large coniferous plantation, but the remaining third runs through the plantation itself near to where it joins the start of sections B1 and B2. This coniferous plantation is managed under the Carmacoup Forest Plan which runs from 2017 – 2027.

B1 – The middle section (1.5km approx.) runs through what is shown on the NFI to have been felled and by now may have been replanted. The route actually includes a small area that has not been felled, but if the route could be moved slightly to the West then this could be avoided. Towards the northern end it crosses a woodland to the West of Coalburn, which appears to be 20 year old plantation established in 1999 under the property name of Dalquhandy Occs (Phase 1A).

C1 - From the Southern end this route crosses a small/narrow broadleaved area and then runs through a large section of coniferous woodland (about 1km long), owned by the Douglas and Angus Estates. Within this plantation it crosses part of a rectangular area that appears to have been felled pre 2014 and so is now likely to comprise very young trees (c. 5 yrs old). It then crosses the 20 year old plantation to the West of Coalburn (referred to in B6 above) and towards the end of the section there are only a few scattered hedgerow trees at various locations, some of which are likely to require felling if this section is chosen as part of the final route.

8.3. Route Option 2

A1 – From the southern end, the first two thirds of this section runs across rolling moorland, adjacent to a large coniferous plantation, but the remaining third runs through the plantation itself near to where it joins the start of sections B1 and B2. This coniferous plantation is managed under the Carmacoup Forest Plan which runs from 2017 – 2027.

C1a and b - From the Southern end this route crosses a small/narrow broadleaved area and then runs through a large section of coniferous woodland (about 1km long), owned by the Douglas and Angus Estates. Within this plantation it crosses part of a rectangular area that appears to have been felled pre 2014 and so is now likely to comprise very young trees (c. 5 yrs old). It then crosses the 20 year old plantation to the West of Coalburn (referred to in B6 above) and towards the end of the section there are only a few scattered hedgerow trees at various locations, some of which are likely to require felling if this section is chosen as part of the final route.

8.4. Route Option 3

A5 – At the southern end this section crosses a narrow strip of young tree and through a small section of woodland at the northern end to the West of Broadlea Burn. This appears to be comprised of mixed broadleaved and coniferous trees and not fully stocked. All woodland in this section is owned by the Douglas and Angus Estates.

C2 a and b – This starts immediately to the East of C1 and runs through a 2km section of the large commercial woodland referred to in C1 above. Like C1 it also crosses the small rectangular area which is assumed to be comprised of very young trees and then along the edge of the woodland to the West of the warehouses, which appears to have been recently thinned and is under the property name of Poniel. It then crosses, what is described by the NFI as some “assumed woodlands”. There are only a few scattered trees, mainly along hedgerows, beyond this point.

9. Recreation and Tourism

9.1. General Study Area

As described in Chapter 3, the recreational and tourist resources in the vicinity of the route options are limited to core paths and some recreational resources such as Hollandbush Golf Club.

The locations of key recreation and tourism features discussed in this section are shown on Figure 3.7i.

9.2. Route Option 1

Route Option 1 crosses several core paths to the west of Coalburn.

Hollandbush Golf Club is on the opposite side of Coalburn Road to the proposed to the northwest of section C1b. and trees along the eastern side of the road would offer screening of the OHL.

9.3. Route Option 2

Route Option 2 crosses several core paths to the north of the A70.

9.4. Route Option 2

Route Option 3 crosses several core paths around section A5, C2a and C1a and C1b.



Table 4.8 Significant Issue Investigation and Preferred Route Assessment
 (sections shaded black have been discounted during initial appraisal and technical reviews)

Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b Route Variations															Descriptive Text
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
Ecology and Ornithology	Yellow	Black	Yellow	Black	Yellow	Yellow	Black	Green	Green	Yellow	Black	Green	Yellow	Yellow	Black	<p>C1b will be very close to the Coalburn Moss (area of Class 1 Carbon and Peatland) SAC. C2a will involve passing through a large area of woodland, however, this will also be required for B1. A5 and C2a potentially involve going through or running adjacent to areas of ancient woodland.</p> <p>Badger, Otter and Water Vole are likely to be present in the vicinity of C1, including around Coalburn. A5 falls very close to the Douglas Water which could support Otter.</p> <p>Breeding Hen Harrier are known to be present in the vicinity of Kennoxhead point of connection, therefore potentially affecting A1 and A3. All three lie within an important bird area and close to Muirkirk North Lowther Uplands SPA.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Yellow	Black	Yellow	Yellow	Black	Green	Green	Yellow	Black	Green	Yellow	Yellow	Black	<p>There would be some preference for A3 rather than A1 as A1 runs close to the woodland edge.</p> <p>Of all the options available, the following would appear to have the least potential constraints: Route 2.</p> <p>In addition, the majority of this route supports land capable of use as improved grassland where pasture is easy to establish which would be beneficial during reinstatement etc.</p>
Archaeology and Cultural Heritage	Yellow	Black	Yellow	Black	Green	Green	Black	Green	Yellow	Yellow	Black	Green	Green	Yellow	Black	<p>No sections or routes include designated heritage assets. All route options considered contain non-designated assets relating to medieval or later rural settlement and agriculture, and more recent (post-medieval and modern) mining activity. A small number of known or suspected prehistoric remains such as cairns or standing stones, are also recorded.</p> <p>Sections A1, A3 and C2a involve running parallel to major watercourses, the Kennox Water (A1 and A3) and Douglas Water respectively, where the potential for the discovery of previously unidentified archaeological remains is likely to be higher than the case with Section</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Yellow	Black	Green	Green	Black	Green	Yellow	Yellow	Black	Green	Green	Yellow	Black	<p>B5. Section B4 is also assessed to be of moderate (amber) sensitivity due to the considerable number of assets related to settlement and agricultural activity located on Rob's Hill.</p> <p>Of all the options available, Route 1 would be preferable, as it avoids the most sensitive sections (A3, B4 and C2a).</p> <p>However, whichever route is taken, it is anticipated that significant effects on known heritage assets could be avoided at the routeing and design stage.</p>
Landscape and Visual Amenity	Green	Black	Yellow	Black	Yellow	Green	Black	Yellow	Yellow	Yellow	Black	Yellow	Green	Yellow	Black	<p><u>Landscape</u></p> <p>Route 1, comprising sections A1, B1 and C1b is the preferred route from a landscape perspective. This route is furthest from the designated landscapes of Douglas Valley SLA and Douglas Conservation Area and is likely to result in lowest adverse effects on the landscape resource within the study area. In addition, it utilises some areas of degraded land (from opencast mining) and, particularly within A1 the route takes advantage of a greater degree of tree cover than present within section A3, to achieve filtering and backclothing by vegetation. Section B1 also lies within a windfarm landscape, which although creating potential cumulative effects, is already</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b Route Variations														Descriptive Text	
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a		C2b
																<p>a landscape incorporating energy infrastructure and less susceptible to adverse landscape impacts resulting from an overhead Trident wood-pole line.</p> <p>For Route 3 section A3, would also have similar landscape impacts as section A1, however these routes connect into A5 and onwards to section C2a which is located within the Douglas Valley SLA..</p> <p>Within the central section of the study area, Route 1 (i.e. section B1) is the only option which avoids the Douglas Valley SLA.</p> <p>Within Routes 2 and 3, sections C2a and b would be a viable alternative to sections C1a and b (Route 1) with little difference in likely landscape impacts. However as with sections A3 and A4 to the south, sections C2a and b would have to connect with sections which are located within the Douglas Valley SLA.</p> <p>It is considered unlikely that any significant landscape impacts would be identified should the development be located within Route 1 (landscape preference) comprising sections A1, B1 and C1b. The main landscape effects would likely arise from the introduction of the OHL into a relatively untouched moorland landscape across a small number of narrow burns.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p><u>Visual Amenity</u></p> <p>Route Option 1, comprising sections A1, B1 and C1b is the preferred route. This route is furthest from the identified visual receptors within the study area, in particular the settlements of Douglas and Glespin. The route also avoids almost all the Core Path/ Rights of Way, which are generally focused around the central and eastern areas of the study area.</p> <p>The central (Route Option 2) and eastern (Route Option 3) route options are both viable for the purposes of this development, however it is clear that a greater number of residents and users of Core Paths/ Rights of Way would be likely to experience visual impacts should the development follow sections B3-B5 and C2a.</p> <p>Within Route 1, section B1 joins section C1b approximately 600m west of the northern end of Coalburn and for residents in this area the potential visual impact of the preferred route is greater than if section C2a was selected, overall however the likely visual impact on local residents would be reduced by following Route 1. At the very northern end of section B1 the proposed route would cross Right of Way/ Core Path CL/3310/1 and there would likely be localised visual impacts for the users of this path. This however is the only such path the preferred route crosses.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p>In addition to properties within the north of Coalburn, there are also a small number of scattered properties where the residents would potentially experience visual impacts as a result of the development being introduced along Route 1. These properties include Inches Cottages, Monkfoot and Debog at the southern end of section B1, Stockhill Farm at the northern end of B1 and Glaikhead and Johnshill Farm to the west of section C1b. Although the residents of these properties are likely to experience visual impacts should Route 1 be selected, the overall impact on residential receptors would be less than if either Route 2 or 3 were selected.</p> <p>The final benefit of the route following Route 1 (sections A1 and B1) is that a large section of the proposed route would not be visible from publicly accessible areas, with a large portion of the route being on the eastern slopes of Hareshaw Hill (to the west of Monks Water) and screened from the wider study area by intervening landform. As the route heads north and leaves the valley around Monks Water it passes through, and nearby, areas of commercial forestry which provide further visual screening within the study area.</p> <p>Should the development be located within the identified preferred Route 1 (comprising A1, B1 and C1b), it is considered there is the potential for visual impacts to be</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p>identified at a limited number of isolated residential properties and also a single localised significant visual impact on a single Right of Way. However, it is considered that should alternative options be selected the OHL would have much greater prominence within the wider study area, with more residents potentially experiencing visual impacts at greater distance, particularly along Route Option 2 near Carmacoup and the southern end of Glespin; and section A5 at the edge of Douglas. Furthermore, users of many more Core Paths/ Rights of Way would experience localised significant visual effects as the OHL crossed over those paths.</p>
Geology, Hydrogeology and Hydrology																<p>Sections A1, A3, A5: Section A1 is slightly less favourable as it crosses an area of blanket peat; A2 is slightly less favourable for hydrology as a result of the length of route parallel to a watercourse. No other clear preference.</p> <p>Sections B1, B3, B4, B5: B1 is slightly less favourable as it crosses two areas of blanket peat. No other clear preference.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Green	Black	Green	Yellow	Black	Green	Green	Yellow	Black	Yellow	Yellow	Green	Black	<p>Sections C1: C1 is slightly less favourable as it crosses two areas of blanket peat. Route preference:</p> <p>Any option avoiding sections B1 and C1 would be preferred to avoid potential impacts on blanket peat and hydrology.</p> <p>Route Options 1, 2 and 3 all cross watercourses and drainage ditches at various points. However, it should be possible to span the watercourses with minimum requirement for encroachment within the watercourse buffer.</p> <p>No PWS are located within close proximity of Route Options 1, 2 and 3.</p>
Mining	Yellow	Black	Yellow	Black	Green	Yellow	Black	Green	Green	Yellow	Black	Yellow	Yellow	Green	Black	<p>Sections A1, A3, A5: All options except A5 cross areas of reinstated open-cast mining and may encounter complex ground conditions, including old mine entries.</p> <p>Variation B1, B3, B4, B5: B1 crosses former open-cast mining area. As restoration for this site was completed a number of years ago risk of settlement is considered less than some of the other former open cast areas in the Study Area. No other clear preference.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Yellow	Black	Green	Yellow	Black	Green	Green	Yellow	Black	Yellow	Yellow	Green	Black	<p>Variation C1, C2: C1a crosses former open-cast mining area. As restoration for this site was completed a number of years ago risk of settlement is considered less than some of the other former open cast areas in the Study Area. No other clear preference.</p> <p>Route preference: Avoiding section A3 would restrict working over recently restored former open-cast mining areas and would help to minimise engineering complexity.</p>
Land Use and Infrastructure	Yellow	Black	Yellow	Black	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	<p>Route Option 1</p> <p>Crossings to existing OHL transmission and distribution infrastructure: Route crosses up to 4 x 11kV OHL.</p> <p>Ground Conditions: Up to 5% of route is located in peat according to BGS records.</p> <p>Road/Railway crossings along route: A70/Shoulderigg Road/Coalburn Road and up to 7 unclassified tracks/roads.</p> <p>Windfarms: ~46% of route crosses windfarms. Farm wind turbines are also located close to the corridor.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p>Residential/Industrial Areas: Coalburn is located in the proximity of the route.</p> <p>There is no clear preference between any of the section options</p> <p>Route Option 2</p> <p>Crossings to existing OHL transmission and distribution infrastructure: Route crosses up to 8 x 33kV and up to 9 11kV OHL</p> <p>Proximity to existing OHL transmission and distribution infrastructure: Route is located close to up to 5x Distribution OHLs.</p> <p>Ground Conditions: Up to 5% of route is located in peat according to BGS records.</p> <p>Road/Railway crossings along route: A70/Station Road/Shoulderigg Road/Coalburn Road/Middlemuir Road and up to 4 unclassified tracks/roads.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text		
	Route Variations																
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b		
																	<p>Windfarms: up to 27% of route is located adjacent to windfarms. Farm wind turbines are also located close to the corridor.</p> <p>Residential/Industrial Areas: Douglas and Coalburn are located in the proximity of the route.</p> <p>There is no clear preference between any of the section options.</p> <p>Route Option 3</p> <p>Crossings to existing OHL transmission and distribution infrastructure: Route crosses up to 3 x 33kV and up to 8 11kV OHL.</p> <p>Ground Conditions: Up to 5% of route is located in peat according to BGS records.</p> <p>Road/Railway crossings along route: A70/Station Road/Middlemuir Road/Shoulderigg Road/Coalburn Road/ and up to 9 unclassified tracks/roads.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Yellow	Black	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	<p>Windfarms: up to 13% of route is located adjacent to windfarms. Farm wind turbines are also located close to the route.</p> <p>Residential/Industrial Areas: Douglas and Coalburn are located in the proximity of the route.</p> <p>There is no clear preference between any of the section options.</p>
Forestry	Yellow	Black	Green	Black	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	Yellow	Yellow	Red	Black	<p>In deciding on the best route/s solely from a forestry point of view, account has been taken not only of the size of the woodland area affected, but also the assumed age and type of woodland.</p> <p>Route preference: Avoiding options A3, A5 and C2 would significantly reduce any impact on woodland areas. Micrositing of the line at A1 and C1a and C1b would also minimise impacts. From a forestry point of view</p>
Recreation and Tourism	Green	Black	Green	Black	Green	Green	Black	Yellow	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	<p>Route Option1</p> <p>There is no clear preference between any of the section options.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p>Route Option 2</p> <p>There is no clear preference between any of the section options. Sections B3 and B4 are less preferable to other sections given proximity to core paths for longer sections.</p> <p>Route Option 3</p> <p>There is no clear preference between any of the options. Route 1 requires the least amount of core path crossings. Both Route 2 and 3 require a number of core path crossings between sections. Sections B3 and B4 of Route 2 are less preferable to other sections given proximity to core paths for longer sections.</p>
Collective Preference																<p>Route preferences have been identified for ecology and ornithology, archaeology and cultural heritage, Landscape and visual amenity, geology, hydrogeology and geology, mining and recreation and tourism. No clear preference has been identified for the other</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
																<p>environmental topics that were considered in the comparative analysis.</p> <p>For ecology and ornithology there is a marginal preference for Route Option 2.</p> <p>For archaeology and cultural heritage there is a marginal preference for Option 1.</p> <p>For landscape and visual amenity there is a clear preference for Route Option1.</p> <p>For geology, hydrogeology and geology there is a marginal preference for Route Option 3.</p> <p>For mining there is a marginal preference for Option 1.</p> <p>For recreation and tourism there is a marginal preference for Route option 1.</p> <p>Based on the comparative analysis identifying no clear preferences for several environmental topics and marginal preferences for others on balance Route Option 1 causes least disturbance to the environment.</p>



Topic	ROUTE OPTION 1 A1– B1 – C1b ROUTE OPTION 2 A1 – B3 – B4 – B5 – C1a – C1b ROUTE OPTION 3 A3 – A5 – C2a – C1a – C1b														Descriptive Text	
	Route Variations															
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1a	C1b	C2a	C2b	
	Yellow	Black	Yellow	Black	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	Yellow	Yellow	Yellow	Black	<p>Route Option 1 is 17.5km in length compared to Route Option 2 which covers 18km. All things being equal, Holford Rule 3 recommends choosing the most direct line with the least sharp changes of direction.</p> <p>On this basis Route Option 1 is the preferred route.</p>

APPENDIX 6 HOLFORD RULES⁵

Appendix 1 : The Holford Rules

The Holford Rules for the Routeing of New High Voltage Overhead Transmission Lines

It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing overhead transmission lines, 'The Holford Rules', should continue to be employed as the basis for routeing high voltage overhead transmission lines. The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) Plc. (now National Grid Transmission (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 (SHEL) in 2003 to reflect Scottish circumstances. The principles of these guidelines for the routeing of new high voltage overhead transmission lines, with the NGC 1992 and SHEL 2003 notes have been considered within this Strategic Environmental Review. The Holford Rules are detailed below.

Rule 1

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

Note on Rule 1

(a) Investigate the possibility of alternative routes, avoiding altogether, if possible major areas of highest amenity value. The consideration of alternative routes must be an integral feature of environmental statements. If there is an existing transmission line through a major area of highest amenity value and the surrounding land use has to some extent adjusted to its presence, particularly in the case of commercial forestry, then effect of remaining on this route must be considered in terms of the effect of a new route avoiding the area.

(b) Areas of highest amenity value require to be established on a project by-project basis considering Schedule 9 to The Electricity Act 1989, Scottish Planning Policies, National Planning Policy Guidelines, Circulars and Planning Advice Notes and the spatial extent of areas identified.

Examples of areas of highest amenity value which should be considered are:

- Special Area of Conservation (NPPG 14)
- Special Protection Area (NPPG 14)
- Ramsar Site (NPPG 14)
- National Scenic Areas (NPPG 14)
- National Parks (NPPG 14)
- National Nature Reserves (NPPG 14)
- Protected Coastal Zone Designations (NPPG 13)
- Sites of Special Scientific Interest (SSSI) (NPPG 14)
- Schedule of Ancient Monuments (NPPG 5)
- Listed Buildings (NPPG 18)
- Conservation Areas (NPPG 18)
- World Heritage Sites (a non-statutory designation) (NPPG 18)
- Historic Gardens and Designed Landscapes (a non-statutory designation) (NPPG 18)

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.

Note on Rule 2

- (c) Small areas of highest amenity value not included in Rule 1 as a result of their spatial extent should be identified along with other areas of regional or local high amenity value identified from development plans.
- (d) Impacts on the setting of historic buildings and other cultural heritage features should be minimised.
- (e) If there is an existing transmission line through an area of high amenity value and the surrounding land uses

have to some extent adjusted to its presence, particularly in the case of commercial forestry, then the effect of remaining on this line must be considered in terms of the effect of a new route deviating around the area.

Rule 3

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

Note on Rule 3

- (a) Where possible choose inconspicuous locations for angle towers, terminal towers and sealing end compounds.
- (b) Too few angles on flat landscape can also lead to visual intrusion through very long straight lines of towers, particularly when seen nearly along the line.

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.

Notes on Rules 4 and 5

- (a) Utilise background and foreground features to reduce the apparent height and domination of towers from main viewpoints.
- (b) Minimise the exposure of numbers of towers on prominent ridges and skylines.
- (c) Where possible follow open space and run alongside, not through woodland or commercial forestry, and consider opportunities for skirting edges of copses and woods. Where there is no reasonable alternative to cutting through woodland or commercial forestry, the Forestry Commission Guidelines should be followed

(Forest Landscape Design Guidelines, second edition, The Forestry Commission 1994 and Forest Design Planning – A Guide to Good Practice, Simon Bell/The Forest Authority 1998).

- (d) Protect existing vegetation, including woodland and hedgerows, and safeguard visual and ecological links with the surrounding landscape.

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'.

Note on Rule 6

- (a) In all locations minimise confusing appearance.
- (b) Arrange wherever practicable that parallel or closely related routes are planned with tower types, spans and conductors forming a coherent appearance. Where routes need to diverge allow, where practicable, sufficient separation to limit the impacts on properties and features between lines.

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.

Note on Rule 7

- (a) When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development.
- (b) Alignments should be chosen after consideration of impacts on the amenity of existing development and on proposals for new development.
- (c) When siting substations take account of the impacts of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation.

⁵ Taken from Appendix 1 of: SP Energy Networks. 2015. *Major Electrical Infrastructure Projects: Approach to Routing and Environmental Impact Assessment*.

Explanatory Note on Rule 7

The assumption made in Rule 7 is that the highest voltage line is overhead.

Supplementary Notes

- (a) Residential Areas Avoid routeing close to residential areas as far as possible on grounds of general amenity.
- (b) Designations of Regional and Local Importance Where possible choose routes which cause the least disturbance to Areas of Great Landscape Value and other similar designations of Regional or Local Importance.
- (c) Alternative Lattice Steel Tower Designs

In addition to adopting appropriate routeing, evaluate where appropriate the use of alternative lattice steel tower designs available where these would be advantageous visually, and where the extra cost can be justified. [Note: SHETL have reviewed the visual and landscape arguments for the use of lattice steel towers in Scotland and summarised these in a document entitled Overhead Transmission Line Tower Study 2004].

Further Notes on Clarification to The Holford Rules

Line Routeing and People

The Holford Rules focused on landscape amenity issues for the most part. However, line routeing practice has given greater importance to people, residential areas etc.

The following notes are intended to reflect this.

- (a) Avoid routeing close to residential areas as far as possible on grounds of general amenity.
- (b) In rural areas avoid as far as possible dominating isolated house, farms or other small scale settlements.
- (c) Minimise the visual effect perceived by users of roads, and public rights of way, paying particular attention to the effects of recreational, tourist and other well used routes.

Supplementary Notes on the Siting of Substations

- (a) Respect areas of high amenity value (see Rule 1) and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area.
- (b) Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas.
- (c) Use space effectively to limit the area required for development, minimizing the impacts on existing land use and rights of way.
- (d) Alternative designs of substation may also be considered, e.g. 'enclosed', rather than 'open', where additional cost can be justified.
- (e) Consider the relationship of tower and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints.
- (f) When siting substations take account of the impacts of line connections that will need to be made.