Dunoon to Loch Long 132 kV OHL Rebuild

Consultation Document

October 2020

REF: 70065799-LT193_CD

Scottish & Southern Electricity Networks

Scottish & Southern
Electricity Networks

Scottish & Southern Electricity Networks

CONTENTS

Scottish & Southern Electricity Networks

Figures

Appendices

GLOSSARY

Term	Definition
Alignment	A centre line of an overhead line OHL, along with location of key angle structures.
Amenity	The natural environment, cultural heritage, landscape and visual quality. Also includes the impact of SHE Transmission's works on communities, such as the effects of noise and disturbance from construction activities.
Conductor	A metallic wire strung from structure to structure, to carry electric current.
Consultation	The dynamic process of dialogue between individuals or groups, based on a genuine exchange of views and, normally, with the objective of influencing decisions, policies or programmes of action.
Corridor	A linear area which allows a continuous connection between the defined connection points. The corridor may vary in width along its length; in unconstrained areas it may be many kilometres wide.
Environmental Impact Assessment (EIA)	Environmental Impact Assessment. A formal process codified by EU directive 2011/92/EU, and subsequently amended by Directive 2014/52/EU. The national regulations are set out in The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The EIA process is set out in Regulation 4(1) of the regulations and includes the preparation of an EIA Report by the developer to systematically identify, predict, assess and report on the likely significant environmental impacts of a proposed project or development.
Gardens and Designed Landscapes (GDLs)	The Inventory of Gardens and Designed Landscapes lists those gardens or designed landscapes which are considered by a panel of experts to be of national importance.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Kilovolt (kV)	One thousand volts.
Listed Building	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories A – C.
Micro-siting	The process of positioning individual structures to avoid localised environmental or technical constraints.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
National Scenic Area (NSA)	A national level designation applied to those landscapes considered to be of exceptional scenic value.
Overhead line (OHL)	An electric line installed above ground, usually supported by lattice steel towers or poles.
Plantation Woodland	Woodland of any age that obviously originated from planting.
Riparian Woodland	Natural home for plants and animals occurring in a thin strip of land bordering a stream or river.
Route	A linear area of approximately 1 km width (although this may be narrower/wider in specific locations in response to identified pinch points / constraints), which provides a continuous connection between defined connection points.
Route (preferred)	A route for the overhead line taken forward to stakeholder consultation following a comparative appraisal of route options.
Route (proposed)	A route taken forward following stakeholder consultation to the alignment selection stage of the overhead line routeing process.
Routeing	The work undertaken which leads to the selection of a proposed alignment, capable of being taken forward into the consenting process under Section 37 of the Electricity Act 1989.
Scheduled Monument	A monument which has been scheduled by the Scottish Ministers as being of national importance under the terms of the 'Ancient Monuments and Archaeological Areas Act 1979'.

Term	Definition
Semi-natural Woodland	Woodland that does not obviously originate from planting. The distribution of species will generally reflect the variations in the site and the soil. Planted trees must account for less than 30% of the canopy composition
Site of Special Scientific Interest (SSSI)	Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.
Span	The section of overhead line between two structures.
Special Area of Conservation (SAC)	An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status.
Special Landscape Area (SLA)	Landscapes designated by Argyll and Bute Council which are considered to be of regional/local importance for their scenic qualities.
Special Protection Area (SPA)	An area designated under the Wild Birds Directive (Directive 79/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981.
Stakeholders	Organisations and individuals who can affect or are affected by SHE Transmission works.
Study Area	The area within which the corridor, route and alignment study takes place.
Terminal Structure	A structure (tower or pole) required where the line terminates either at a substation or at the beginning and end of an underground cable section.
The National Grid	The electricity transmission network in the Great Britain.
Volts	The international unit of electric potential and electromotive force.
Wayleave	A voluntary agreement entered into between a landowner upon whose land an overhead line is to be constructed and SHE Transmission
Wild Land Area (WLA)	Those areas comprising the greatest and most extensive areas of high wildness. It is not a statutory designation, but wild land areas are considered nationally important.

PREFACE

This Consultation Document has been prepared by WSP UK Ltd. on behalf of Scottish Hydro Electric Transmission plc (SHE Transmission plc) to seek comments from all interested parties on the Preferred Route identified for the proposed Dunoon to Loch Long 132 kV replacement overhead line between the existing Dunoon substation and Tower 15 to the west of Loch Long.

The Consultation Document is available online at the project website:

www.ssen-transmission.co.uk/projects/dunoon

Under normal circumstances, consultation on the project would involve public engagement events held in the local area. However, as a result of the COVID-19 pandemic this has not been possible.

To continue engagement on the project SHE Transmission has developed an online consultation tool, to enable the local community to experience the full exhibition from home on a computer, tablet or mobile device. The online exhibition has been designed to look and feel like a real consultation in a community hall, with exhibition boards, maps, interactive videos and the opportunity to share views on the proposals.

Visitors will be able to engage directly with the project team, via a live chat function, where they can ask any questions they might have about the project and share their feedback on the current proposals.

The virtual consultation events will be taking place via the project website at the following times:

- 3rd November 2020; 10am-12.30pm and 5pm-7.50pm

Comments on this Consultation Document should be sent to:

Helen Batey

Community Liaison Manager

Scottish and Southern Electricity Networks

E: helen.batey@sse.com

M: +44(0)777 453 993

200 Dunkeld Road, Perth, PH1 3AQ

All comments are requested by **3rd December 2020**.

EXECUTIVE SUMMARY

Dunoon is currently connected to the wider electricity grid network by a twin-circuit 132 kV double circuit Overhead Line (OHL), supported on steel lattice towers between the existing Whistlefield substation, located north-west of Garelochhead, and the existing Dunoon substation located west of Sandbank, on Holy Loch, a short distance north of Dunoon.

The existing OHL west of the Loch Long crossing is supported by an old design suite of metal lattice towers which are coming towards the end of their operational life. The OHL route crosses some very steep and exposed terrain, and has a very high fault rate associated with it during high winds due to the design of tower used in the original build.

SHE Transmission have established a requirement to rebuild the OHL between the existing Dunoon substation and Tower 15 to the west of the Loch Long crossing.

Due to the requirement to maintain a 132 kV electricity supply to Dunoon during construction, the replacement OHL will require development on a different alignment to the existing OHL. To ensure secure supply and meet current clearance standards the replacement OHL will utilise different support structures to the existing OHL. Once the new OHL is constructed and in service, the existing OHL will be dismantled and removed.

SHE Transmission's OHL Routeing Guidance is being followed to determine the most appropriate alignment for the replacement OHL. This process includes stakeholder consultation at various stages, of which this document forms part.

A preliminary environmental study area, or corridor, was identified within which the identification and assessment of route options could be completed (see **Figure 1**). The corridor was developed to encompass a range of feasible route options between the two connection points.

Route options were identified which provided feasible areas for the replacement OHL to be developed, from which a Preferred Route has been selected which provides an optimum balance of environmental, technical and economic factors. This Consultation Document invites comments from all interested parties on the Preferred Route identified for the replacement OHL.

Moving forward, confirmation of the Preferred Route will be informed by this consultation exercise and through detailed surveys, which may identify any as yet unknown engineering, environmental or land use constraints. The Preferred Route will then be referred to as the Proposed Route and we will seek potential OHL Alignments within it, which will then be subject to further appraisal and consultation. On identification of a Proposed Alignment (after further consultation), Section 37 consent under the Electricity Act 1989 will be applied for the replacement OHL from the Energy Consents Unit of the Scottish Government.

Further public consultation on a Preferred Alignment will take place by summer 2021. It is anticipated that an application for consent for a Proposed Alignment will be submitted in spring 2022.

When providing comments and feedback on this Consultation Document, SHE Transmission plc would be grateful for your consideration of the questions below:

- Have we explained the need for this Project adequately?
- Have we explained the approach taken to select the Preferred Route adequately?
- Are there any factors, or environmental features, that you consider may have been overlooked during the Preferred Route selection process?
- Do you feel, on balance, that the Preferred Route selected is the most appropriate for further consideration at the alignment selection stage?

1. INTRODUCTION

1.1 Purpose of the Document

This Consultation Document invites comments from all interested parties on the Preferred Route identified for the replacement 132 kilovolt (kV) double circuit overhead line (OHL) between the existing Dunoon substation and Tower 15 to the west of Loch Long (**Figure 1.1**), a distance of approximately 16.4 km (hereafter referred to as the 'Proposed Development').

This Consultation Document describes the route options identified, the route options appraisal undertaken, and the identification of the Preferred Route. Comments are now sought from statutory authorities, key stakeholders, elected representatives and the public on the route selection process and the Preferred Route identified.

All comments received will inform further consideration of the Preferred Route, and subsequent alignment options therein.

1.2 Document Structure

This report is comprised of seven sections as follows:

1: Introduction – setting out the purpose of the Consultation Document;

2: The Proposals – describes the need for the proposals, the proposed technology solution and the typical construction methods;

3: Route Selection Process – sets out the route selection process and methodology that has been applied to date to derive a Preferred Route;

4: Description of the Route Options – describes the route options that have been identified;

5: Baseline Conditions – describes the local context and baseline environmental and engineering conditions;

6: Comparative Appraisal – analyses each route option against a series of environmental, technical and economic considerations to arrive at a recommendation for the Preferred Route; and

7: Consultation on the Proposals – invites comments on the route assessment process and identification of Preferred Route.

The main body of this document is supported by a series of figures (see **Appendix 1**).

1.3 Next Steps

As part of the consultation exercise, comments are sought from members of the public, statutory consultees and other key stakeholders on the Preferred Route recommended.

A Report on Consultation will be produced which will document the consultation responses received, and the decisions made in light of these responses.

Following the identification of a Proposed Route, further technical and environmental surveys will be undertaken to identify a preferred alignment within the route. Consultation on a preferred alignment will be undertaken during summer 2021.

2. THE PROPOSALS

2.1 The Need for the Project

Scottish Hydro Electric Transmission Plc (SHE Transmission) is a wholly owned subsidiary of the SSE plc group of companies. SHE Transmission owns and maintains the electricity transmission network across the north of Scotland and holds a license under the Electricity Act 1989 to *'develop and maintain an efficient, co-ordinated and economical electricity transmission system in its licensed area'*.

Dunoon is currently connected to the wider electricity grid network by a twin-circuit 132 kV double circuit OHL, supported on steel lattice towers between the existing Whistlefield substation, located north-west of Garelochhead, and the existing Dunoon substation located west of Sandbank, on Holy Loch, a short distance north of Dunoon (**Figure 1.1**).

The existing OHL crosses Loch Long by a 1.4 km span, with four special structures, two either side, forming the crossing. This crossing is to be reconductored, replacing the wires which carry the current and the associated fittings and fixtures, but reusing the four existing special structures which support the Loch Long crossing span. The refurbishment and reconductoring of the crossing will be the subject of a separate study and therefore is not considered further in this report.

As the existing OHL crosses Loch Long it passes between Transmission Network Operator areas. The transmission line to the west of the Loch Long crossing connecting to Dunoon substation is within SHE Transmission's licenced area, whilst the OHL on the east of the Loch Long crossing is maintained and operated by Scottish Power Energy Networks. The OHL east of the crossing is out-with the scope of this report.

The existing OHL west of the Loch Long crossing is supported by an old design suite of metal lattice towers which are coming towards the end of their operational life. The OHL route passes some very steep and arduous terrain and has a very high fault rate associated it during high winds due to the design of tower used in the original build.

A capability study of the OHL to see if it was suitable for upgrading with larger conductors was previously carried out, associated with a Transmission connection request to Dunoon Grid Supply Point (substation) which has subsequently been withdrawn. The outcome of this study shows that almost half of the towers were in an unsatisfactory condition. Records for the existing OHL circuits show poor performance in terms of electrical faults that even refurbishing and reconductoring the existing OHL would not resolve. Therefore, in order to ensure security of supply and meet current clearance standards, a new double circuit OHL is proposed to be constructed to replace the existing OHL.

SHE Transmission have established a requirement to rebuild the OHL between the existing Dunoon substation and Tower 15, to the west of the Loch Long crossing, using different support structures to ensure security of supply.

2.2 Preferred Technology Solution

Based on the options assessed, the preferred solution is a new 132 kV double circuit OHL supported on new support structures. This is the most economical option which minimises access requirements and environmental impacts during construction.

2.3 Alternative Options Considered

While SHE Transmission has determined that a double circuit OHL is the preferred technological solution for this project, other options, including buried cable, have been considered. The cost of a twin circuit 132 kV buried cable, and the impacts associated with it across the terrain required to be crossed are not justifiable compared to the cost and impacts of construction of a replacement OHL. Buried cables can also be much harder to repair in the event of a fault than an OHL.

2.4 Proposals Overview

SHE Transmission is proposing to construct a replacement double circuit 132 kV OHL between the existing Dunoon substation and Tower 15, the tower on the west side of Loch Long crossing. On energisation of the Proposed Development, the existing OHL will be removed.

The new double circuit OHL will be supported on support structures either steel lattice towers or the new suite of transmission structure (NeSTS)[1] steel monopole design. The choice of support is dependent on the outcome of a technical study.

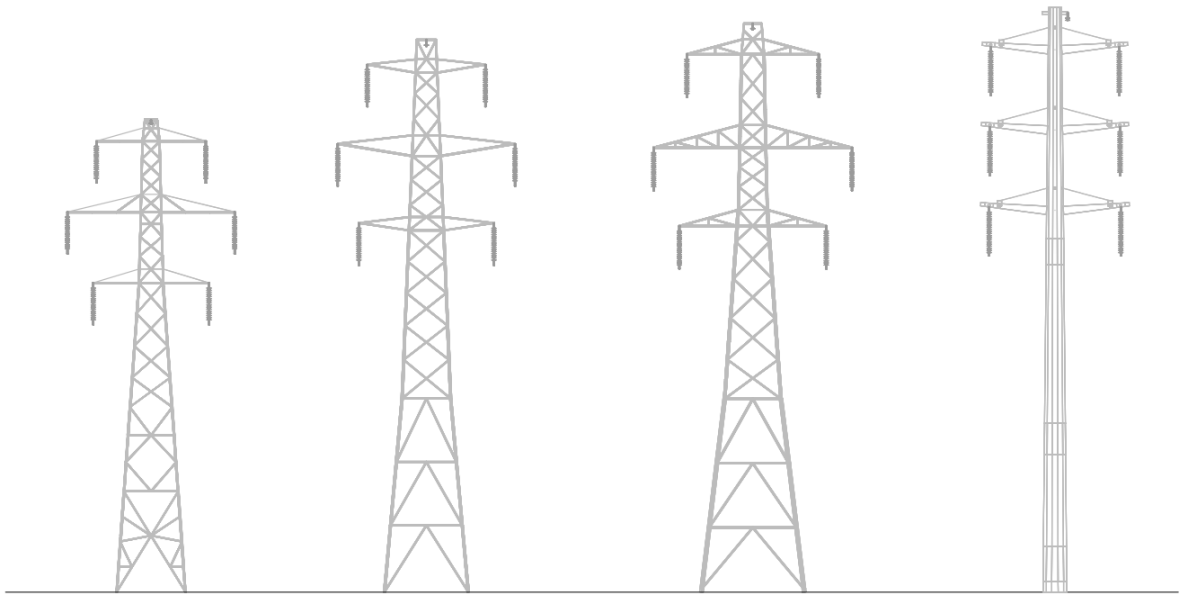
It is assumed that standard spans of approximately 300m would be achievable with these replacement structures and generally, this would allow for longer spans than the existing line (which has an average existing span of 220 m), meaning fewer support structures are likely to be required.

Including extensions, the height of the replacement structures, is between 26-44 m, compared to the height of the existing structures of approximately 22-35 m. The height range is due to extensions which can be added to allow clearance of topographical features on the ground, and to maintain necessary ground clearance of conductors under all operation and weather conditions. The selection of the supports suitable for the line are being considered separately to the OHL Routeing process.

The final designation of support type is generally dependant on three main factors: altitude, weather and the topography of the route. The size of supports and span lengths will also vary depending on these factors, with supports being closer together at high altitudes to withstand the effects of greater exposure to high winds, ice and other weather events. The support configuration, height and the distance between supports will therefore only be fully determined after a detailed alignment survey.

The proposed steel lattice or NeST structures will support six conductors (wires) on six cross-arms (three on each side) and an earth wire between the peaks, typical designs can be seen in **Plate 2.1**.

Plate 2.1 – Typical steel lattice tower design



2.4.1 Construction Activities

Construction activities are generally divided into seven phases, which include:

- alterations to the existing transmission and distribution network (if required);

[1] https://www.nestsproject.co.uk/

- enabling work (forestry clearance and establishment of temporary accesses and construction compound(s));
- erection of support structures;
- conductor stringing (including construction of temporary scaffolding);
- inspections and OHL commissioning;
- removal of existing OHL; and
- removal and reinstatement of any temporary access tracks.

All construction activities will be undertaken in accordance with a Construction Environmental Management Plan (CEMP) which would define specific methods for environmental survey, monitoring and management throughout construction. A CEMP will be produced and agreed with statutory stakeholders prior to the commencement of construction.

2.4.2 Forestry Removal

Any woodland removal which may be required prior to the construction work will be identified and described after a proposed alignment has been identified. The methods of woodland removal and management of timber would be described in a Woodland Management Document to be prepared as part of the application for consent under Section 37 of the Electricity Act 1989, as amended.

2.4.3 Access during Construction

Vehicle access is required to each support structure location during construction to allow excavation and creation of foundations and erection of the support structure. Existing tracks would be used where possible and upgraded as required. Preference will be given to lower impact access solutions including the use of low pressure tracked personnel vehicles and temporary track solutions in boggy / soft ground areas to reduce any damage to, and compaction of, the ground. These journeys would be kept to a minimum to minimise disruption to habitats along the route. Temporary access panel solutions may also be used to protect the ground, however, temporary stone tracks are likely to be necessary in some areas depending on existing access conditions, terrain and altitude. Helicopters may also be used to reduce access requirements.

Access requirements for the Proposed Development will be dependent upon the type of OHL support chosen. Consideration of impacts will be undertaken at alignment stage once the preferred support type has been confirmed. A more detailed plan for access during construction will be prepared once a Proposed Alignment has been identified and the preferred support structure type selected.

It is not anticipated at this stage that new permanent vehicular access tracks would be required to the chosen support structures for operation of the replacement OHL, however how access is taken for inspection, maintenance and repair of the OHL will have to be considered. All temporary construction access tracks would be removed upon completion of the Proposed Development with land being reinstated to its former condition. Any retention of new accesses will be included within the consent application for the replacement OHL.

2.4.4 Programme

It is anticipated that construction of the project would take place over a period of approximately 30 months, following the granting of consents, although detailed programming of the works would be the responsibility of the Contractor in agreement with SHE Transmission. Construction is anticipated to start in 2023 with completion in 2025.

3. ROUTE SELECTION PROCESS

3.1 Guidance Document

The approach to route selection, in identifying and assessing alternative OHL routes, is informed by SHE Transmission's Routeing Guidance[2]. The guidance develops a process which aims to balance environmental, technical and economic considerations throughout the route options process.

This report summarises the process of Stage 2: Route Selection from the guidance[2], which seeks to find a proposed route which, where possible, avoids physical, environmental and amenity constraints, is likely to be acceptable to stakeholders, and is economically viable, taking into account factors such as altitude, slope, ground conditions and access.

In consideration of these principles, the method of identifying a preferred route in this study has involved the following four key tasks:

- identification of the baseline situation;
- identification of alternative route options;
- environmental analysis of route options; and
- identification of a preferred route.

On finalisation of the Route Selection (Stage 2) process, SHE Transmission's Routeing guidance[3] will be followed as the project progresses through Alignment Selection (Stage 3) and onto the Consenting Process (Stage 4).

3.2 Area of Search

A preliminary environmental study area, hereafter known as the 'corridor', was identified within which the identification and assessment of route options could be completed (see **Figure 3.1**). This corridor encompassed a range of feasible route options between the existing Dunoon substation and Tower 15 (the crossing tower to the west of Loch Long).

The corridor is defined by the geography of the area between the two connection points. It is constrained to the west by Loch Eck and to the east by Loch Long. At the northern end it extends slightly north of Tower 15 to encompass the low point on the ridge, northeast of Glen Finart. At the southern end, the Area of Search extends approximately 3 km west of Strath Eachaig and slightly south of the existing Dunoon substation.

Baseline studies have been focussed within the corridor, although consideration of potential receptors outside of this area (e.g. environmental designations, visual receptors or cultural heritage sites) has been undertaken and these are referenced where relevant in this report.

3.3 Baseline Conditions

3.3.1 Desk Study

A series of desk-based studies have been undertaken to identify a broad range of potential constraints and opportunities within the corridor, and its adjacent context, which may be constraints to routeing.

This has included the following:

- identification of designated sites and other constraints from GIS datasets available from the NatureScot (previously Scottish Natural Heritage (SNH)) Site Link[4];

[2] Scottish & Southern Electricity Networks, 2017. PR-NET-ENV-501: Procedures for Routeing Overhead Lines of 132 kV and above

[3] Scottish & Southern Electricity Networks, 2020. PR-NET-ENV-501: Procedures for Routeing Overhead Lines and Underground Cables of 132 kV and above

[4] NatureScot. Site Link. [online] Available at:: https://sitelink.nature.scot/home

- identification of archaeological designations and other recorded sites, using GIS datasets available from Historic Environment Scotland[5,6];
- review of the Argyll and Bute Local Development Plan (2015)[7], Argyll and Bute Local Development Plan 2 (2020)[8]and Loch Lomond and The Trossachs National Park Local Development Plan (2017)[9] to identify further environmental constraints and opportunities, such as regional level designations or other locations important to the public;
- review of Landscape Character Assessments of relevance to the corridor[10];
- review of Ordnance Survey (OS) mapping (1:50,000 and 1:25,000 online mapping and terrain data from OS OpenData) and aerial photography (where available) to identify other potential constraints such as settlements, properties, walking routes, cycling routes etc.;
- extrapolation of OS OpenData to identify further environmental constraints including locations of watercourses and waterbodies and to undertake a preliminary slope analysis; and
- review of other local information through online and published media such as tourism sites and walking routes.[11,12]

3.3.2 Site Visits

Following the identification of route options (see section 3.4, below), site walkovers were undertaken by landscape and ecology specialists in July 2020 to ground truth the key constraints identified by the desk studies and, where appropriate to refine the route options.

A site walkover was undertaken by OHL engineering specialists in July 2020 to ground truth the key constraints identified in the initial desk-based exercise, as well as identify any construction and design hazards.

Site visits were also undertaken by SHE Transmission OHL engineers and other project team members to help inform the environmental, technical and economic appraisal of options.

3.4 Route Identification and Selection Methods

3.4.1 Route Identification

Route options (see **Figure 3.2**) were identified as part of the desk-based studies considering the most notable constraints. Considerations have included a review of the steps outlined in the Holford Rules and SHE Transmission plc's Routeing Guidance[2].

In summary, the following has been taken into account as far as is practicable at this routeing stage and will be considered in more detail during Stage 3 (Alignment Selection):

- Avoid if possible major areas of highest amenity value (including those covered by national and international designations and other sensitive landscapes). Areas considered included the Benmore Botanic Garden and Benmore Garden and Designed Landscape and extensive areas of native and semi-natural woodland[13].
- Avoid by deviation, smaller areas of high amenity value such as regional scenic areas.

[5] Historic Environment Scotland Data Services. Portal. [online] Available at: http://portal.historicenvironment.scot/

[6] Royal Commission on Ancient and Historical Monuments of Scotland. Canmore. [online] Available at: http://canmore.rcahms.gov.uk/

[7] Argyll and Bute Council (2015). Local Development Plan. Available at: https://www.argyll-bute.gov.uk/ldp

[8] Argyll and Bute Council (2020). Local Development Plan 2: Proposed Local Development Plan 2. Available at: https://www.argyll-bute.gov.uk/ldp2

[9] Loch Lomond and The Trossachs National Park Authority (2017). Local Development Plan. https://www.lochlomond-trossachs.org/planning/planning-guidance/local-development-plan/

[10] Scottish Natural Heritage. (2019). Scottish Landscape Character Types Map and Descriptions [online] Available at: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

[11] Munro Magic [online] Available at: http://www.munromagic.com/

[12] Walk Highlands [online] Available at: http://www.walkhighlands.co.uk/

[13] The Loch Lomond and Trossachs National Park is not included in this list as it is not possible to avoid this area.

- Other things being equal, try to avoid sharp changes of direction and reduce the number of larger angle towers required.
- Avoid skylining the route in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity.
- Avoid the highest terrain, where climatic conditions can impose extra loading (wind and ice) on OHL conductors.
- Target the route towards moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees (avoid slicing through landscape types and try to keep to edges and landscape transitions).
- Consider construction access and the availability of existing roads and tracks.
- Consider the appearance of other lines in the landscape to avoid a dominating or confusing wirescape effect.
- Consider technical issues related to crossing the existing OHL alignment, clearances, connectivity, outages, maintenance and faults.

3.4.2 Route Options

Route options were identified as shown on **Figure 3.2**.

The route options were initially identified at 1 km widths along areas where it was considered feasible to accommodate the Proposed Development e.g. parallel with roads or existing accesses for ease of access and through existing gaps in forestry to minimise felling requirements. Route options were then refined, narrowing in places to avoid baseline constraints and widening to allow for subsequent identification of alignments during the next stage of the process (Stage 3)[2].

At this stage it was recognised that finding an acceptable alignment across the settled valleys of Glen Finart and Strath Eachaig would be particularly challenging. These have been identified as 'nodes' where further detailed study is necessary to minimise potential environmental effects, this will be undertaken at the next stage of the process (Stage 3)[2].

Whilst the nodes illustrate challenges in routeing through the constrained communities, the potential for crossing between route options, or using the existing alignment, exists in these locations, enabling routes to be switched between the defined zones. The technical issues and risk elements associated with crossing the existing alignment whilst maintaining supply to Dunoon are reiterated, and all things being equal, it is preferable to not cross the existing OHL alignment.

For ease of assessment and interpretation, the corridor was divided into three 'Zones' for the definition of route options on the basis of these 'nodes' with the route options described within each zone:

- Zone A, north of Glen Finart;
- Zone B, between Glen Finart and Strath Eachaig; and
- Zone C, south of Strath Eachaig.

The route options are described in detail in section 4, below.

3.5 Appraisal Method

The appraisal of route options has followed the process defined in the SHE Transmission plc's Routeing Guidance[2], including the topics considered within. As stated above, for ease of assessment and interpretation, the corridor has been divided into three zones. **Table 3.1**, below, lists the topic areas considered as part of the route options appraisal.

Table 3.1: Topic Areas Considered

Constraint Type	Topic	Specific aspect of the topic
Environmental	Landscape and Visual	Designations
		Landscape Character
		Visual amenity
	Natural Heritage	Designations
		Protected Species
		Habitats
		Ornithology
		Geology, Hydrology and Hydrogeology
	Cultural Heritage	Designations
		Cultural Heritage Assets
	People	Proximity to Dwellings
	Land Use	Agriculture
		Forestry
		Recreation
	Planning	Policy
		Proposals
Engineering	Environmental Design	Major crossings
		Road crossings
		Elevation
		Flooding
	Ground Conditions	Terrain
		Peat
	Construction/ Maintenance	Access
		Angle towers
	Proximity	Clearance distance
		Proximity to windfarms
		Urban environments
Economic	Capital	Construction
		Diversions
		Public Road Improvements
		Felling
		Land Assembly
	Operational	Inspections
		Maintenance

Each route option has been considered in terms of its potential interaction with the environmental, engineering and economic characteristics, features and sensitivities. The route options have then been compared to determine which has the greatest and least capacity or potential to accommodate the Proposed Development.

In line with the RAG assessment criteria defined within the SHE Transmission Guidance, a RAG rating has been applied to each topic area within each zone. This rating is based on a three-point scale as indicated in **Plate 3.1** below[2].

Most Preferred  Least Preferred	Lower	Low potential for the development to be constrained.
	Moderate	Intermediate potential for the development to be constrained.
	Higher	High potential for the development to be constrained.

Plate 3.1: RAG Rating for Comparative Appraisal

3.5.1 Identification of a Preferred Route

The overall objective throughout the appraisal of route options has been to take full consideration of all known environmental factors to minimise any potential adverse impacts on the environment whilst taking into account engineering and economic considerations. Following a review and consideration of the potential route options, a Preferred Route Option was arrived at.

4. DESCRIPTION OF THE ROUTE OPTIONS

4.1 Identification of Sections and Route Options

The corridor was divided into three sections, referred to as 'zones' for the ease of comparative appraisal, from A to C for the definition of route options and ease of comparative appraisal:

- Zone A, north of Glen Finart;
- Zone B, between Glen Finart and Strath Eachaig; and
- Zone C, south of Strath Eachaig.

Route options have been defined to allow for subsequent identification of alignments during the next stage of the process (Stage 3)[2] (see **Figure 3.2**) Two 'nodes' have also been identified where further detailed appraisal will be required at Stage 3. The route options are as follows (all described from north to south).

4.1.1 Zone A – north of Glen Finart

Route Option AB1 crosses both zones A and B and is approximately 17 km in length. It is the most northerly of the route options and avoids the settled area of Glen Finart by heading west from Tower 15, for approximately 6 km, to cross the ridge to the north of the Glen Finart at a shallow col[14]. It then heads south-west for approximately 3 km, before heading south following the eastern flank of Lock Eck and Strath Eachaig until reaching the Strath Eachaig node.

Route Option A2 heads south-west from Tower 15 and travels parallel, to the west, of the existing OHL. It is relatively narrow for approximately 3 km to avoid higher ground of Creachan Mor and widens on the descent to Glen Finart to allow the possibility of passing north-west of the denser area of settlement until reaching the Glen Finart node. Route Option A2 is approximately 7 km in length.

Route Option A3 heads south from Tower 15 and travels parallel, to the east, of the existing OHL. The route option stays above most of the native & semi-natural woodland located along the shores of Loch Long. It narrows on the approach to Glen Finart to avoid the most densely settled area, along Finart Bay, until reaching the Glen Finart node. Route Option A3 is approximately 6 km in length.

4.1.2 Zone B – between Glen Finart and Strath Eachaig

Route Option B2 heads from the Glen Finart Burn within the Glen Finart node and travels south-west parallel, to the west, of the existing OHL. It narrows where it passes higher ground between Beinn Ruadh and Stronchullin Hill where it follows a broad shallow col. It continues for approximately 9 km until reaching the Strath Eachaig node.

Route Option B3 heads from the Glen Finart Burn within the Glen Finart node and travels south parallel, to the east, of the existing OHL. The route is then split into sub-options B3a and B3b either side of higher ground at Stronchullin Hill. Route Option B3a travels to the south-west around to the west of Stronchullin Hill following a broad shallow col and continuing in parallel to the existing OHL until reaching the Strath Eachaig node. Route Option B3b travels south around to the east of Stronchullin Hill following lower ground for approximately 3 km until Blairmore Hill where it heads west until reaching the Strath Eachaig node. Route Option B3a is approximately 9 km in length and Route Option B3b is approximately 10 km in length.

4.1.3 Zone C – south of Strath Eachaig

Route Option C1 is a broad route parallel, to the west, of the existing OHL. It is wide enough to allow the potential for an alignment west of Balagowan. The route heads south-west from the Strath Eachaig node across the valley of the Little Eachaig River downstream of Clachaig, until it reaches the B836. From here the Route Option C1 follows the valley of the Allt na Criche south until

[14] a low point between two higher points in a mountain range

Finbracken Hill where it turns south-east and follows the low narrow mountain pass until reaching the existing Dunoon substation. Route Option C1 is approximately 3 km in length.

Route Option C2 heads south from the Strath Eachaig node and continues to the east of the existing OHL until reaching the existing Dunoon substation. It is as it crosses the valley of the Little Eachaig River to avoid settlement along the A885. Route Option C2 is approximately 2 km in length.

4.1.4 'Nodes'

The 'nodes' identified are shown to highlight that a degree of more detailed consideration is necessary to minimise environmental effects in the settled areas surrounding Glen Finart and Strath Eachaig when developing a proposed alignment. The nodes represent centres of community through which the existing OHL, and Proposed Development alignment may pass through.

As alignment options through the nodes are anticipated to be limited, there is technical feasibility to rebuild the Proposed Development on the existing alignment through these sections, or for an alignment to cross the existing OHL. At this stage of Routeing, where route options naturally converge at the nodes, there is potential to cross the existing OHL alignment and switch between route options as the assessment of route options progresses.

Any option that crosses the OHL or requires rebuild on the existing alignment would complicate the project since supply would require to be maintained to Dunoon Grid Supply Point (GSP), so would require construction of temporary OHL bypasses to facilitate and would be constrained by outage availability.

It is noted that due to the same topographical constraints of the landscape, the settlements around which the nodes occur are on lower lying, less steep terrain, which would also provide the easiest point for any required crossing of the existing OHL or section of online rebuild, and temporary infrastructure required to facilitate this.

Although they are not coloured on the plans, for the purpose of comparative assessment the area within the nodes has been considered for all environmental topics as parts of the relevant route options to ensure that all constraints information is captured.

At Glen Finart (see **Plate 4.1**) the area north of the river and west of the existing OHL was considered as part of Route Option A2, whilst the area north of the river and east of the existing OHL was considered as part of Route Option A3. In a similar manner the area south of the river was split west-east by the existing OHL and considered as parts of Route Options B2 and B3 respectively.

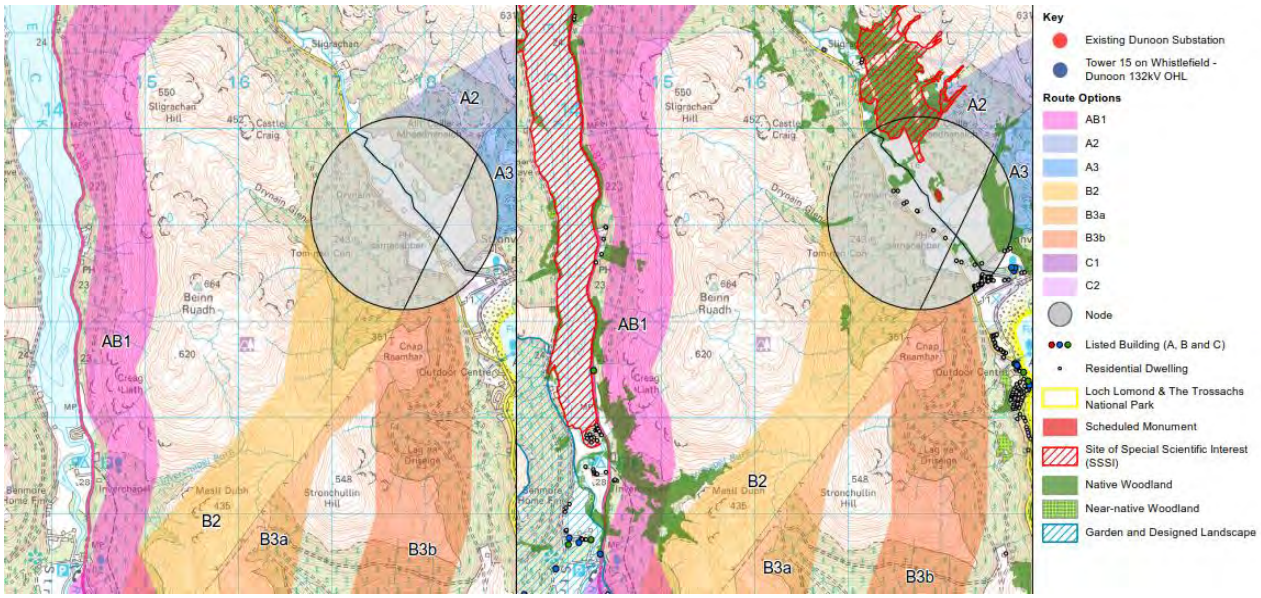


Plate 4.1: Glen Finart Node and constraints

The area of the 'node' at Strath Eachaig (see **Plate 4.2**) was again split into quadrants by the river and the existing OHL. The northern quadrant (west of the OHL and northeast of the river) was considered as part of both Route Options AB1 and B2. The eastern quadrant (east of the OHL and north-east of the river) was considered as part of Route Option B3. In a similar manner the area south-west of the river was considered as parts of Route Options C1 and C2, split by the existing OHL.

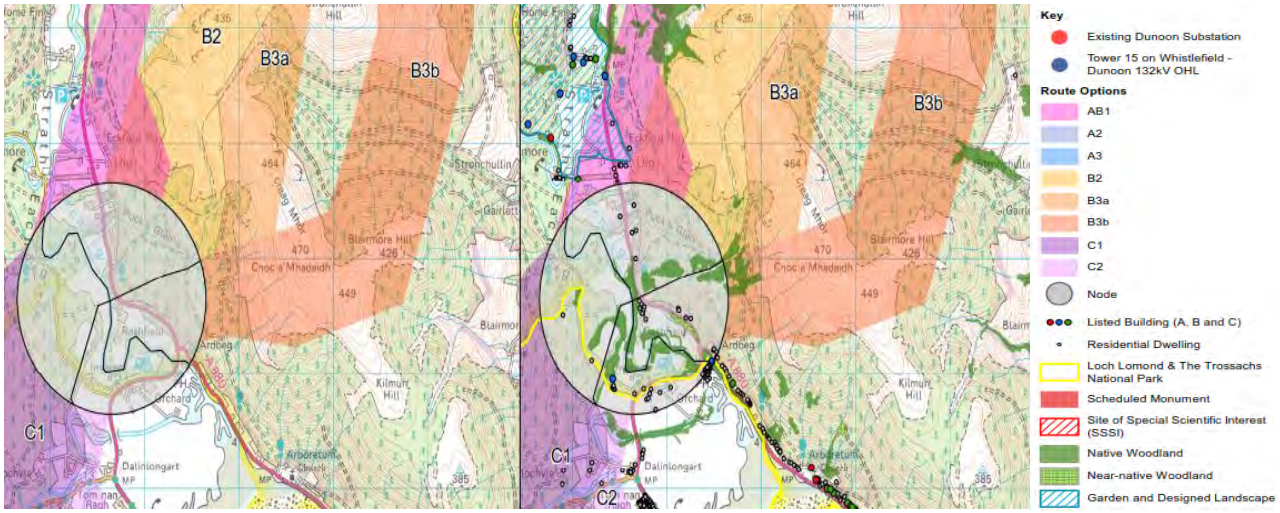


Plate 4.2: Node at Strath Eachaig

5. BASELINE CONDITIONS

5.1 Introduction

This section summarises the baseline information for the key environmental and engineering constraint types and their associated topics relevant to the Proposed Development, as listed in Table 3.1 (above). **Figure 5.1** shows the key environmental constraints within corridor.

5.2 Environmental Constraints

5.2.1 Landscape and Visual - Designated and Protected Landscapes

National Designations

The Loch Lomond and Trossachs National Park (hereafter called the 'National Park') is split into four distinct areas: the Cowal Peninsula, Loch Lomond, the Trossachs and Breadalbane. The zone of the National Park within which the corridor is located is the Cowal Peninsula.

The nearest National Scenic Area (NSA) is the Kyles of Bute NSA, which lies some 10km south-west of Zone C at its closest point.

Other Nationally Important Landscapes

There are no Wild Land Areas (WLAs) as defined by NatureScot within 10km of the corridor.

The Argyll Forest Park overlaps with the National Park and in the corridor covers the whole area between the River Eachaig / Loch Eck and Loch Long. Zones A and B fall entirely within the Forest Park.

The Benmore Gardens and Designed Landscape (GDL) occupies parts of the hillside where Glen Massan meets Strath Eachaig and much of the Strath between Uig and Benmore Home Farm, close to the southern end of Loch Eck.

Regional Designations

Argyll and Bute Council have designated regionally important landscapes as Areas of Panoramic Quality (APQ). Bute & South Cowal APQ, is approximately 9.8 km to the west of the Route Option C1 at its closest point and Loch Long (Coast) APQ is located approximately 1.7 km from the northern edge of Zone A.

5.2.2 Landscape Character

The corridor is broadly characterised by steep-sided, craggy topped mountains and hills, divided by deep glens, some of which contain narrow lochs, opening into broader straths. Extensive conifer plantations dominate the lower slopes whilst the upper hillsides are predominantly open moorland, with rock outcrops on upper slopes and summits. Mixed through the plantations are remnants of native deciduous woodland, generally birch-dominated on the upper slopes and burnsides and oak woodland on the lower slopes. Parts of Strath Eachaig are characterised by the mature and unusual conifers associated with Benmore Botanic Gardens and the Kilmun Arboretum. Settlement is mainly confined to narrow strips along the loch edges, valley bottoms, and the flatter land of Strath Eachaig. Mountain and hill tops form landmark features.

The corridor is composed of six Landscape Character Types (LCTs) as defined by the Landscape Character Assessments commissioned by SNH (now NatureScot) and partner authorities and consolidated in 2019 into a national map and database. The LCTs within the corridor are:

- LCT 34 - Steep Ridges and Mountains;
- LCT 250 - Steep Ridges and Hills;
- LCT 252 – Upland Glens – Loch Lomond & the Trossachs;
- LCT 253 - Straths and Glens;
- LCT 254 - Straths and Glens with Lochs; and

- LCT 265 - Settled Coastal Fringe.

5.2.3 *Visual Amenity*

The potential visual receptors within the corridor have been identified as shown in **Table 5.1** below.

Table 5.1: Potential Visual Receptors within the corridor

Type of Receptor	Identified Receptor
Residential (Settlements and residences)	Villages of Sandbank, Glenkin, Clachaig, Kilmun, Rashfield, Uig, Glen Massan, Ardentinny, and Coylet.
	Scattered residential properties in Glen Finart, along the shores of Lock Eck, across Strath Eachaig and in the valley of the Little Eachaig River and in Glen Massan.
Recreational and tourist	Benmore Botanic Gardens.
	National Cycle Network Route 75.
	Multiple promoted trails, mainly associated with Argyll Forest Park - notably Puck's Glen and the Kilmun Arboretum, also at Ardentinny, Sandbank and the west side of Strath Eachaig. Big Tree walks in the woods opposite the entrance to Benmore.
	Numerous campsites and holiday parks predominantly located along Glen Finart and in proximity to the A815 south of Loch Eck to Dunoon.
	Outdoor Centres at Benmore and Ardentinny.
	Numerous picnic spots and the beach at Ardentinny.
Transport	Main roads including the A815, A880 and the B836.
	Minor road from Invereck up Glen Massan and a minor road from Ardentinny along Glen Finart.

5.2.4 *Natural Heritage - Designations*

Statutory ecological designated sites which occur within 2 km of the route options and non-statutory designations which occur within 1 km of the route options are outlined in **Table 5.2**. There are no European Sites within 10km.

Table 5.2: Statutory Designated Sites Within 2 km and Non-Statutory Designated Sites within 1 km

Designation / Type	Statutory / Non-Statutory	Name of Designation
SSSI (biological)	Statutory	Craighoyle Woodland
SSSI (biological)	Statutory	Loch Eck
Marine Protected Area (MPA)	Statutory	Upper Loch Fyne and Loch Goil
Local Nature Reserve (LNR)	Statutory	Holy Loch
Argyll and Bute Local Nature Conservation Site (LNCS)	Non-statutory	Holy Loch
Ancient Woodland	Non-statutory	Name: Various
Native Woodland	Non-statutory	Name: Various
Near-Native Woodland	Non-statutory	Name: Various

5.2.5 *Natural Heritage - Protected Species*

An ecological desk study identified records of several European Protected Species (EPS), protected under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended)[15], those identified as priority species on the Scottish Biodiversity List[16] (SBL) and/or protected under national legislation such as the Wildlife and Countryside Act 1981 as amended (WCA) or Protection of Badger Act 1992 (PBA). The identified species/species groups include:

[15] http://www.legislation.gov.uk/uksi/1994/2716/contents/made accessed 12th August 2020

[16] The Scottish Biodiversity List is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland, as required by the Nature Conservation (Scotland) Act 2004.

- Bats (EPS and SBL).
- Badger (PBA).
- Red squirrel (WCA and SBL).
- Pine marten (WCA and SBL).
- Otter (EPS and SBL).
- Water vole (WCA and SBL).
- Reptiles.
- Amphibians.
- Fish and Freshwater pearl mussel.

5.2.6 Natural Heritage - Habitats

The corridor contains large areas of plantation conifer woodland in various stages of management, over steep valleys and hillsides and areas of pasture grazed by sheep. Between the plantations and on the slopes of hills, communities of bracken and wet and dry dwarf heath shrub mosaic habitats are found. In the flatter areas of the uplands, blanket bog is likely to be prevalent. Small burns flow through some of the valleys and Glen Finart Burn, River Eachaig and Little River Eachaig cut through the corridor, often framed by stretches of semi-natural woodland. Some open areas are likely to be subject to sheep grazing and deer browsing. There is likely to be invasive and non-native plant species (including rhododendron) in varying in abundance throughout the corridor.

Multiple Schedule 8 of the WCA and Annex 1 of the Habitats Directive ('Annex 1') plants are known to be present within the corridor as well as plants on the SBL. Bluebell are Schedule 8 plants protected under Section 13 of the WCA and are identified to be within the corridor. Mossy saxifrage, common juniper, *Hypotrachyna sinuosa* and *Parmeliella parvula* (both lichens) are all on the SBL and are identified from within the route options.

A high-level Biodiversity Net Gain (BNG) assessment of the identified route options within the corridor has been undertaken following the guidance outlined within SSEN's Biodiversity Net Gain Toolkit User Guide and the SSEN's Assessment Methodology & Associated Guidance. The report includes a calculation of baseline Biodiversity Units (BU) and Linear Units (LU) for each route option and provides recommendations for Stage 3 with regards to BNG.

The BNG assessment is a new component considered by SHE Transmission during the optioneering process and is not included within the version of the OHL Routeing Guidance which this routeing stage is following, and so is not compared in this OHL Route selection process. BNG would have been considered at this stage had the revised guidance including BNG been issued prior to commencement of the Route selection process (Stage 2) of the Route Optioneering and will be considered during appraisal of Alignment options (Stage 3) following the revised OHL Routeing Guidance incorporating BNG.

5.2.7 Natural Heritage - Ornithology

Many bird species have been recorded within the corridor including birds on the SBL such as the siskin, hooded and carrion crow, kestrel and owl species. The desk study identified records of bird species listed on Schedule 1 of the WCA[17] occurring within the corridor. In general, the corridor offers suitability to support a range of ground nesting birds amongst long vegetation and aerially nesting birds within woodland habitats as well as lochans and marine and coastal habitats.

5.2.8 Natural Heritage - Geology, Hydrology and Hydrogeology

There are no designations of relevance to hydrology, geology or hydrogeology within the corridor.

The majority of underlying bedrock geology in the corridor consists of Beinn Bheula Schist Formation with small areas of Mull Dyke-Swarm also present across the corridor. The corridor is

[17] http://jncc.defra.gov.uk/PDF/waca1981_schedule1.pdf accessed 12th August 2020

underlain by superficial deposits of Hummocky (Moundy) Glacial Deposits, Till, Devensian and Alluvium, with smaller areas of River Terrace Deposits, River Marine Deposits, Alluvium Fan Deposits and an isolated area of Glaciofluvial Ice Contact Deposits.

Brown soils, peaty gleys and peaty podzols are widely present throughout the corridor, with smaller areas of alluvial soils, mineral gleys and mineral podzols and an isolated area of immature soils in Route Option AB1.

Class 2 Peat (carbon rich deep peat) is shown as being present on higher ground throughout the corridor. A small area of Class 1 Peat is shown as being present on higher ground in the south-west of the corridor located on high ground at Strone Saul.

The corridor is underlain by the Cowal and Lomond groundwater (ID: 150689) which is classified as having good status for both water flows and levels, and water quality.

There are multiple small unnamed ditches and burns throughout the corridor plus larger watercourses including the River Finart, which bisects the northern/central part of the corridor, the Stronchullin Burn in the central eastern part of the corridor, and the River Echaig and the Little Eachaig River, which are located towards the south of the corridor.

The condition of the smaller burns is not classified under the Water Framework Directive (WFD), but the River Finart is in overall good condition, while the River Echaig and the Little Echaig River are both classified as being in moderate condition overall. The River Echaig is a heavily modified waterbody (HMWB) and its water flows and levels and ecological condition are affected by the upstream water storage. The Little Echaig River is also an HMWB and its water flows and levels are affected by upstream water storage for the purpose of hydroelectricity generation.

Coastal, river and surface water flood risk (in a 1:200 year flood event) have been identified within the corridor.

Three Type A Private Water Supplies (PWS) are identified within the corridor, one located in Glen Finart, with the other two in the southern part of the corridor. There are also three Type B PWS in the corridor, one in Glen Finart, one to the south of Lock Eck, and one in the south of the corridor.

Groundwater Dependent Terrestrial Ecosystems (GWDTE) in the categories of mires and calcifugous grasslands and montane communities are widespread across the upland areas of the corridor north of Holy Loch, with very small areas on the western and southern margins of Route Option C1.

5.2.9 Cultural Heritage- Designations and Heritage Assets

There are no World Heritage Sites or Inventory Battlefields within 3 km of the route options.

There are six Scheduled Monuments (SMs) within 3 km of the route options. These include;

- Carrick Castle (SM2495);
- Adams Cave, Cambered Cairn (SM6552);
- Dun Daraich, fort, Glen Finart (SM9190);
- Ardnadam, settlement, chapel and enclosure (SM3235);
- Dunloskin Wood, platforms and charcoal production areas (SM3894); and
- Kilmun Collegiate Church, tower and burial ground (SM5260).

There is a single inventory GDL within the 3 km of the route options, *Benmore, Younger Botanic Garden* (*GDL0056*). This is located within, and adjacent to the west of, Zone B.

There is a single CA within the 3 km of the route options, *Clachaig* (*CA489*).

Within the 3 km of the route options, there are 112 listed buildings (of which 7 are Category A, 39 and Category B and 66 are Category C).

5.2.10 People

The majority of the residential properties within the corridor are concentrated in and around the settlements at Sandbank, Glenkin, Clachaig, Kilmun, Rashfield, Uig, Glen Massan, Ardentinny and Coylet. Additional residences are scattered across the corridor in Glen Finart, along the shores of Lock Eck, across Strath Eachaig and in the valley of the Little Eachaig River.

5.2.11 Land Use - Agriculture

Agricultural land is predominantly a mix of Class 6.1, 6.2, 6.3 and Class 7 agricultural land, classified by The Macaulay System of Land Capability for Agriculture. Classes 6.1 to 7 are capable of use as rough grazing. The areas surrounding the River Eachaig, Little Eachaig River and Glen Finart Burn are Class 4.1, land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops. The area west of Dunoon and south of Dalinlongart is identified as Class 5.3 and a small area of Class 5.2; which is capable of use as improved grassland.

5.2.12 Land Use - Forestry

Forestry is a key land use within the corridor. Forestry considerations include:

- Native Woodlands - many discrete areas of native woodland are identified within the corridor and native woodlands are present in each route option. Within the corridor, native woodlands fall principally into three categories: wet woodland, upland birch woodlands and upland oak woodlands. The SSSI at Craighoyle Woods also encompasses these habitats.
- Plantations on Ancient Woodland Sites - There are substantial areas of plantation on ancient woodland sites (PAWS), typically contiguous with commercial forestry but alternatively adjoining native woodlands.
- Commercial forestry - Commercial forestry is present throughout the corridor and climatic conditions in the corridor are favourable toward fast-growing conifer crops.

5.2.13 Land Use - Recreation

The corridor is popular with walkers, hikers, cyclists, canoeists, anglers, whisky enthusiasts and heritage railway enthusiasts. Tourism, including the pursuit of recreational activities (particularly fishing)[18] contributes significantly to the local economy annually. Recreational and tourism sites are distributed throughout the corridor, often clustered near settlements, along main roads and near to other sites of tourist interest. In addition, National Cycle Route (No 75) crosses zone C in the south of the corridor.

Some of the major tourism draws to the area are the Benmore Botanic Gardens, the Holy Loch Polaris Regatta and the Cowal Highland Gathering.

There are a large number of walking routes and promoted trails, mainly associated with Argyll Forest Park, including the walk along Puck's Glen and Core Paths. The majority of these routes are accessible to cyclists and equestrians.

5.2.14 Planning - Policy and Proposals

The relevant Local Development Plans (LDPs) to the appraisal include the Argyll and Bute LDP (2015), the Argyll and Bute LDP2 which is currently being prepared and will replace the current LDP, and the Loch Lomond and Trossachs National Park LDP (2017-2021).

One planning application, reference 2013/0328/DET for the erection of 15 holiday dwellings, shop reception building, and three barbeque huts has been identified within the Corridor. No other relevant proposed infrastructure has been identified within the corridor, however a 0.3 MW hydropower scheme is currently under construction located on land west of Ballochyle Steading, Clachaig, Dunoon.

[18] The fishing season runs from 15th March to 31st October each year.

5.3 Engineering Constraints

5.3.1 Infrastructure Crossings and Construction/Maintenance

With the exception of the existing OHL, there are no known features that would result in major crossings[19] within the corridor.

The main roads in the corridor include the A885, A815, A880 and B836. There are also multiple smaller roads (assumed to be mainly local access roads) within the corridor and numerous forestry tracks which are present throughout the corridor. .

5.3.2 Environmental Design and Ground Conditions

The Proposed Development is located in close proximity to the shores of Loch Long and Holy Loch to the east and Loch Eck to the west.

Within the corridor, elevations range from sea level in Finart Bay and Holy Loch to approximately 664m AOD in the north-west around Beinn Ruadh. However, within the corridor the majority of the Route Options are above 200m AOD, with the exception of Route Options C1 and C2 which is predominantly below 200m AOD.

The terrain within the corridor is generally steep with gradients above 40% in many areas throughout the route options, with the exception of Zone C.

Peat is a particularly poor material for the construction of foundations, due to its low strength and density properties, often requiring larger sized pad & column foundations or pile foundations to be specified for the towers. The NatureScot 'Carbon and Peatland Map 2016' was used to identify areas where deep peat may be present (defined in the map guidance as a layer more than 0.5m thick). As noted in Section 5.1.2 Class 2 Peat (carbon rich deep peat) is shown as being present on higher ground throughout the corridor. A small area of Class 1 Peat is shown as being present on higher ground in the south-west of the corridor located on high ground at Strone Saul.

There are two main river and coastal catchments located within the corridor; the Cowal / Clyde Sealochs Coastal catchment which covers the majority of corridor and the River Eachaig catchment located along the western edge of the corridor of Zones A and B, and the north-western edge of Zone C. Numerous drains, ditches and watercourses and waterbodies have been identified within these catchments.

As noted in Section 5.1.2 coastal, river and surface water flood risk (in a 1:200 year flood event) have been identified within the corridor. According to SEPA's flood map[20] there are multiple very small areas of high surface water flood risk across the corridor, many of which are in Glen Finart and the floodplain of the River Echaig, the Little Echaig and small watercourses to the north-west of Dunoon including the Alt a' Chromain. The SEPA flood map indicates that there are areas of high risk of river flooding in the majority of Glen Finart and the Stronchullin Burn catchment, and very extensive areas in the coastal floodplains of the River Echaig and the Little Eachaig River. The SEPA flood map highlights a high risk of coastal flooding at the lowest part of Glen Finart, and very extensive coastal flood risk in the coastal floodplain of the River Echaig and the Little Echaig River.

5.3.3 Proximity

As noted in 5.1.4, the majority of these properties (residential and private properties or buildings) are concentrated in and around the settlements at Sandbank, Glenkin, Clachaig, Kilmun, Rashfield, Uig, Glen Massan, Ardentinny and Coylet. Additional residences are scattered across the corridor in Glen Finart, along the shores of Lock Eck, across Strath Eachaig and in the valley of the Little Eachaig River.

No windfarms have been identified within the corridor.

---

[19] Major infrastructure crossings include high voltage transmission lines, rail lines, wide rivers (greater than 200 m), navigable canals, gas pipelines, and hydro pipelines.

[20] Scottish Environment Protection Agency Flood Maps online available at: http://map.sepa.org.uk/floodmap/map.htm. Accessed July 2020

5.4 Economic Constraints

5.4.1 Regulated company

SHE Transmission owns and maintains the electricity transmission network across the north of Scotland and holds a license under the Electricity Act 1989 to *'develop and maintain an efficient, co-ordinated and economical electricity transmission system in its licensed area'*. SHE Transmission are regulated by Ofgem, who determine how much revenue SHE Transmission can earn from customers to cover the cost of maintaining and reinforcing the electricity network.

Ultimately the costs associated with development, operation and maintenance of the Transmission systems for part of the energy user's bill.

Further information on how SHE transmission are Regulated be found here: https://www.ssen-transmission.co.uk/information-centre/industry-and-regulation/

5.4.2 Maintenance of supply

SHE Transmission are required to maintain a reliable network. It is highlighted that Route options which require crossing of the existing line will incur increased costs and risk elements associated with the required temporary OHL diversions which would be needed to maintain a Transmission connection (132 kV) to Dunoon during the construction phase.

5.4.3 Assumptions and Limitations

Due to the early stage of the project limited information was available to make a cost comparison appraisal, resulting in the requirement to make very high-level assumptions for each of the cost comparison elements considered. More detailed cost estimates of the investment required to build the replacement OHL will be derived as the project progresses.

6. COMPARATIVE APPRAISAL

This section provides a summary of the environmental characteristics of each route option relevant to each zone and an appraisal of the performance of each route option with reference to each characteristic. Reference should also be made to **Figures 4.1 to 4.9** which illustrate potential environmental baseline constraints identified under each topic.

Zones A and B are considered together to allow a clear comparison between Route Option AB1 and Route Options A2, A3, B2 and B3.

6.1 Environmental Appraisal

6.1.1 Landscape and Visual

Route Options within Zone A and B lie entirely within the National Park and the Argyll Forest Park. Route Options in Zone C cross the National Park at Strath Eachaig, with Route Option C1 passing through a slightly larger area of the National Park.

Route Option AB1 overlaps part of the GDL at Benmore, although it avoids the botanic gardens themselves (GDL discussed in more detail under Cultural Heritage, below). However, it overlaps the area of the Big Tree Walk area which is the entrance to the botanic garden.

Route Options within Zone A and B cross the Steep Ridges and Hills LCT and Straths and Glens LCT. In addition, Route Option AB1 crosses the Straths and Glens with Lochs LCT as it travels along the east of Loch Eck, whilst Route Option B3a/b crosses a small area of the Settled Coastal Fringe LCT near the settlement of Rashfield. Route Options within Zone C cross a small area of the Straths and Glens LCT at Strath Eachaig but mainly lie within the Steep Ridges and Mountains LCT.

Route Option AB1 introduces an OHL into landscapes not currently affected by one whereas, the landscape crossed by the remaining Route Options contains the existing lattice tower OHL and, to a degree, the pattern of the landscape may be considered to have developed to accommodate the existing OHL line.

All route options perform similarly in respect of the Holford Rules. Given the complex rugged terrain none can be described as fitting well to the form of the landscape. The key differences between the route options in respect of the Holford Rules being that Route Options AB1 and C1, when compared to the other route options, performs better in terms of Rule 4 ("*Choose tree and hill backgrounds in preference to sky backgrounds, wherever possible* …"), but noticeably worse for Route Option AB1 in respect of Rule 3 ("*Other things being equal, choose the most direct line* …")..

Route Option AB1, compared to a combination of the other route options in zones A and B, would affect fewer visual receptors by avoiding the settled area of Glen Finart. However, it would risk affecting views from viewpoints in Benmore Botanic Gardens. It would also risk being visually intrusive where it would have to cross a distinctive area of mature deciduous woodland wrapped around crags at the foot of Lock Eck. It is considered that there is greater potential to develop potential alignments to the west of the existing OHL, rather than to the east, through the 'node' located in the Glen Finart area.

All route options in zones A and B risk affecting the views from the Argyll Forest Park promoted recreational walking routes in Strath Eachaig. Route Option B2 has the highest risk of affecting Puck's Glen, whilst Route Option B3 may affect Kilmun Arboretum walks. Route Option AB1 offers the greatest potential for avoiding these.

There are a small number of sensitive visual receptors west of Route Option C1mainly scattered residential properties for which there appears to be the potential to avoid locations in their main outlook. There are a greater number of sensitive visual receptors to the east of the existing OHL in Route Option C2- residential properties, campsites and tourist users of the A815. Route Option C2 therefore has a greater risk of being visually intrusive, particularly across the lower Strath. There is

also a small cluster of houses immediately west of the existing Dunoon Substation which risk being adversely affected by Route Option C2.

Conclusions

The differences between the Route Options in Zones A and B is relatively small, such that no one route option, or combination of route options, stands out as considerably better able to accommodate an OHL alignment.

Route Option AB1 is considered to have the greatest risk of adverse effects on the landscape due to the introduction of an OHL into landscapes not currently affected by one, although that would to a degree be offset by the removal of the existing OHL from the landscape currently affected by its existence. The risk of visual intrusion at the foot of Loch Eck and on views from the Botanic Garden resulting from this route option is likely to be of concern. This Route Option has therefore been allocated a RAG rating of **Amber**.

Route Options A2, A3, B2, B3a and B3b are relatively similar in terms of potential effects on the landscape and capacity to accommodate an OHL. Route Option A2 has a RAG rating of **Green**, apart from the impact to landscape designation which has been allocated a RAG rating of **Amber**. The main risk for Route Option B2 is the potential landscape effect on the Pucks Glen area and therefore a RAG rating of **Amber** has been allocated. However, this is outweighed by the greater risk of visual effects crossing both Glen Finart and Strath Eachaig to the east of the existing OHL for Route Options A3, B3a and B3b, which has also been allocated a RAG rating of Amber, although it is considered that the landscape character impact of Route Option A3 is less with a RAG rating of **Green**.

In Zone C, Route Option C1 is considered to have the greater capacity to accommodate the Proposed Development and less risk of significant adverse effects and therefore has been allocated a RAG rating of **Green**. Whereas, Route Option C2 has been allocated a RAG rating of **Amber**.

On balance a route which utilises Route Options A2, B2 and C1 would be preferred as they would not introduce an OHL into a currently unaffected area of landscape and they avoid the more densely settled areas east of the existing OHL. However, this is on the understanding that an alignment can be found that avoids an unacceptable effect on Puck's Glen.

6.1.2 Natural Heritage - Designations

There are no statutory or non-statutory designated sites (excluding woodland) located within the Route Options with the exception of Craighoyle Woodland SSSI which occurs partially within Route Option A2 and is within 100m of Route Option B2. All other Route Options in Zones A and B are located over 500m from the SSSI; Route Option A3 is approximately 0.6 km west, Route Option B3 is approximately 0.85 km north-west and Route Option AB1 is approximately 1 km south. The Holy Loch LNR and LNCS are located within 1 km; approximately 300 m south, 900 m and 200 m east of Route Options B3b, C1 and C2 respectively. Proximity and presence of a potential pathway for effect, present a risk of impact to the qualifying interests of the designations. Without appropriate control there is potential that works associated with construction of the grid connection could directly and / or directly affect the qualifying interest of the SSSI, LNR and LNCS.

Route Options AB1, A2 and A3 are located within 500m of the Upper Loch Fyne and Loch Goil MPA at its closest point, which is the existing Tower 15. Route Option AB1 travels parallel to the Loch Eck SSSI for approximately 5 km.

There are numerous areas of Ancient Woodland Inventory woodland, native woodland and near-native woodland habitats present along all route options, apart from Route Options in Zone C which have no near-native woodland present. However, there are opportunities to avoid and minimise effects through careful siting and potential to increase biodiversity by focusing on less natural and more heavily managed commercial woodlands. Further information on forestry/woodland is presented in Section 6.1.5.

For ecologically designated sites and woodland alone Route Option AB1 is least favourable due to proximity to Lock Eck SSSI and has been allocated a RAG rating of **Red**. Route Options A2 and A3 are largely similar, having potential for effects on woodlands, Upper Loch Fyne and Loch Goil MPA and Craighoyle Woodland SSSI and therefore have been allocated a RAG rating of **Amber**. Route Options B2 and B3 appear less sensitive due to its distance from other designated sites and proportionally lesser coverage of woodland and therefore have been allocated a RAG rating of **Green**. Route Options C1 and C2 have a relatively small difference, such that no one route options, or combination of route options, stands out as very substantially better able to accommodate an OHL alignment and therefore have been allocated a RAG rating of **Amber**. Careful siting and construction measures could be utilised to reduce and mitigate for any impacts of the Proposed Development on areas within Route Options but are likely to be of more concern for Route Option AB1.

6.1.3 Natural Heritage - Protected Species

For all route options, there is abundant woodland, and woodland edge habitat, which could provide suitable habitat for badger, red squirrel, pine marten and bat species. Riparian zones could provide suitable habitat for otter. Minimising potential impacts on woodland and watercourses would ensure potential effects are reduced. Potential for impacts on protected species could be further reduced or eliminated by undertaking pre-construction surveys and adopting appropriate mitigation.

For protected species, the differences between the route options are relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to accommodate an OHL alignment. Therefore all route options have been allocated a RAG rating of **Amber**.

6.1.4 Natural Heritage - Habitats

All route options could potentially result in direct or indirect adverse effects to areas of sensitive (SBL or Annex 1) terrestrial habitat, invasive non-native species, watercourses and standing water. Route Options AB1, A3, C1 and C2 have substantial native woodland cover which is likely to be more intrinsically valuable than other woodland types since it will have a more ecologically diverse ground flora. NatureScot mapping has identified that Route Option C1 contains areas of Class 1 Peat, within the south-western edge. Route Options AB1, B2, B3a/b and C1 would pass through areas with soils identified as Class 2 Peat, Route Options B2 and B3a/b would pass through the largest area, with Route Option AB1 the least. Depending on land use, these peat areas could support more sensitive blanket bog and mire habitats listed on the SBL and / or Annex 1. All of the route options cross several watercourses. Route Options A2, A3, B2 and B3a/b cross the River Finart in the middle to lower end of the catchment and Route Options C1 and C2 cross the River Eachaig and Little Eachaig River. Careful siting and construction measures could be utilised to reduce and mitigate for any impacts of the Proposed Development on habitats; however, habitat surveys would be required to fully assess the likely habitat constraints.

For habitats, the differences between the route options are relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to accommodate an OHL alignment. Therefore all route options have been allocated a RAG rating of **Amber**.

6.1.5 Natural Heritage - Ornithology

All route options could potentially result in the loss areas of woodland and scrub habitat and/or wetland areas which support breeding bird species. Breeding bird surveys would be required to fully assess the likely ornithological constraints, including assessing potential disturbance to sensitive and protected bird species that may breed within the vicinity.

For ornithology, the differences between the route options are relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to

accommodate an OHL alignment. Therefore, all route options have been allocated a RAG rating of **Amber**.

6.1.6 Natural Heritage - Geology, Hydrology and Hydrogeology

Construction will be undertaken using best practice methodologies and it is therefore unlikely that any of the route options would have an adverse impact on the underlying geology, superficial deposits or the Cowal and Lomond groundwater.

Construction of the Proposed Development will be undertaken using industry best practice methodologies, building on SEPA's Good Practice Guide series. Consequently, it is unlikely that the construction phase would have an adverse impact on the water quality, morphology or other characteristics of surface waters.

The location of Class 1 and 2 peat identified from NatureScot mapping should be validated using field inspections. Route Options AB1, B2, B3a/b and C1 would pass through areas with soils identified as Class 2 Peat, Route Options B2 and B3a/b would pass through the largest area, with Route Option C1 the least. The south-western edge of Route Option C1 would pass through a small area with soils identified as Class 1 Peat located on high ground at Strone Saul. However, with careful tower location design, micro-siting and construction techniques the impacts of any route are likely to be minimised and mitigated.

All of the route options cross multiple small ditches and burns. Route Options A2, A3, B2 and B3a/b cross the River Finart in the middle to lower end of the catchment where the flood risk is higher than in the headwaters of the catchment where Route Option AB1 crosses the river. However, it is considered likely that this flood risk zone could be spanned by careful selection of tower locations. Route Options AB1, B2, and B3a/b must cross the River Eachaig at southern extents. Route Options C1 and C2 must cross the River Echaig and the Little Echaig River in the south of the corridor.

Route Options A2 and B2 may be constrained by the presence of one PWS serving four properties, while Route Options A3 and B3a/b may be constrained by one PWS serving 71 properties, with Route Option AB1 located above one PWS at Inverchapel Farm House. Route Option C1 may be constrained by two PWS (serving five properties), while a Type A PWS serving 13 properties is located on the boundary of both Route Options C1 and C2. More detailed consideration of buffer zones (consisting of the upstream catchment for surface water-fed PWS, and a 250 m radius for spring-fed PWS) will be required at a later stage to confirm potential constraints on the route alignment. Careful routeing design, micro-siting, and best practice construction methods should avoid any adverse impacts on PWS.

The potential for the route options to affect GWDTE is greatest for Route Options AB1, B2 and B3a, which all pass through areas with large to very large areas of GWDTE. Lesser impacts are likely for Route Options A2, A3, B3b, C1 and absent from Route Option C2.

For soil, hydrology and hydrogeology constraints there is little difference between the route options and it is considered likely that all of the identified constraints could be appropriately mitigated through careful route selection, design, micro-siting and best practice construction. However, Route Options A3 and B3b avoid the greatest potential impacts on peat and GWDTE and C2 minimises the potential impact on properties served by a PWS.

6.1.7 Natural Heritage – overall conclusion

The differences between the route options are relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to accommodate an OHL alignment. All Route Options have been allocated a RAG rating of **Amber**, aside from Route Option A3 and C2 which have been allocated a RAG rating of **Green**. Route Option AB1 is considered to have the greatest risk of adverse impacts due to its proximity to Lock Eck SSSI. A combination of

Route Options A2,B2 and C1 is preferred as it is considered that these route options have greater opportunities for minimising potential impacts and therefore accommodating an OHL alignment.

6.1.8 Cultural Heritage- Designations and Heritage Assets

There are several cultural heritage assets, including Scheduled Monuments (SMs) and Listed Buildings (LB's) within and adjacent to the route options (see **Figure 4.6**) and these are listed in Table 6.3 below.

Table 6.3: Cultural Heritage Assets Potentially Impacted

Heritage Assets	Designated Cultural Heritage Assets
AB1	• No SMs within the route. Closest is Carrick Castle (SM2495, LB11815) at the north of the route circa 1.3 km south; • Three Category C LB's in the northern area of the route including: Hillside Place (LB50351), Craigard (LB50350) and Carrick Castle Church (LB50349); • 950 m to the east of the Category C LB, Whistlefield Inn (LB5060); • 3 km from Dun Daraich, fort, Glen Finart (SM9190); • Route within a section of the Benmore, Younger Botanic Garden (GDL00056) with the potential for both direct and Setting impacts.; and • LB's to the south, including one Category A, five Category B and four Category C. A single Category C building falls within the route option, Benmore Botanic Garden, footbridge (LB50413).
A2	• Dun Daraich, fort, Glen Finart (SM9190), within the route which it encounters on the descent to Glen Finart; and • Category C LB's associated with Glenfinart House (LB50341) which lie circa 700 m to the south-east of the edge of the route.
A3	• No SM's or LB's identified within Route; • Dun Daraich, fort, Glen Finart (SM9190) lies 300 m west at the southern route extent; and • Category C LB's associated with Glenfinart House (LB50341) which lie circa 130 m to the south-east of the edge of the route option.
B2	• No assets identified
B3a/b	• No assets identified
C1	• No SM's or LB's within Route. Closest SM's at the southern extent of the route option, Adams Cave, Chambered Cairn (SM6552), located circa 200 m to the east, Dunloskin Wood, platforms and charcoal production areas (SM3894), located circa 400 m to the south and Ardnadam, settlement, chapel and enclosure (SM3235) circa 580 m to the south; • Closest LB's include at the northern end, the Category B Invereck, Church of Scotland Eventide Home (LB50432), the Category B Gartochan House (LB11887), circa 970 m to the west of the central portion and a cluster of Category B and C buildings within the village of Sandbank; and • CA of Clachaig (CA489), abuts the route option at the B836, which contains no LB's or a Conservation Area Appraisal but the distinctive character of the area will need factored into proposals.
C2	• Adams Cave, Chambered Cairn (SM6552) located to the south of the route; • Close proximity to a number of LB's within the village of Sandbank including the Category C, Sandbank Parish Church (LB50828) and the Category B Benmore View (LB43020), both circa 150 m from the edge of the route option; and • There is a single LB within the route option, the Category B Invereck, Church of Scotland Eventide Home (LB50432).

All route options contain evidence of undesignated Cultural Heritage assets, relating from Prehistoric activity through to Medieval and post Medieval bloomery activity. Whilst this evidence is dispersed,

micro-siting during the details design phases should reduce any adverse impacts and therefore a RAG rating of **Green** has been allocated to all Route Options.

Conclusions

The differences between the route options is relatively small, such that no one route option, or combination of route options, stands out as considerably better able to accommodate the Proposed Development.

Route Option AB1 is considered to have a high risk of adverse effects on cultural heritage assets, as although the northern portion is shielded by topography from the Dun Daraich, fort, Glen Finart (SM9190), the introduction of an OHL alongside Loch Eck and the potential direct and Setting impacts on the Benmore, Younger Botanic Garden is of concern. Therefore, this Route Option has been allocated a RAG rating of **Red**.

Route Options A2 and A3 both pass in proximity to the Dun Daraich, fort, Glen Finart (SM9190), however Route Option A3 deviates further to the east, so there may be a reduction in Setting impacts from this route option, therefore Route Option A3 has been allocated a RAG rating of **Green**, whereas Route Option A2 has been allocated a RAG rating of **Amber**. It should be noted that any impacts on the LB's at Glenfinart House (LB50341), are likely to be occur, as the OHL is expected to be back clothed against Creachan Mor.

Route Options B2, B3a and B3b are similar, with respect to impacts on cultural heritage, with the main risk for Route Options B2 and B3a at the southern end with potential impacts on the Setting of Benmore, Younger Botanic Garden (GDL00056). Therefore, Route Option B2 has been allocated a RAG rating of **Amber**, whereas Route Option B2 has been allocated a RAG rating of **Green**.

Route Option C2 is considered to also have a high risk of adverse effects on cultural heritage assets, due to the presence of the SM, Adams Cave, Chambered Cairn (SM6552) within its boundary. Route Option C1, although further from the SM's does border the CA of Clachaig (CA489). Therefore, both Route Options in Zone C have been allocated a RAG rating of **Amber**.

On balance a combination of Route Options A3, B3b and C1 is preferred from a cultural heritage perspective, due to the distances from the SM at Dun Daraich fort, Glen Finart (SM9190) and the GDL Benmore, Younger Botanic Garden (GDL00056) and Adams Cave, Chambered Cairn (SM6552).

6.1.9 People

There are numerous dwellings scattered throughout the corridor, as shown on **Figure 4.9**. Particular pinch points for each of the route options are noted as:

- Route Option AB1: the area around Uig;
- Route Option A2: none identified;
- Route Option A3: the area around Glen Finart Burn;
- Route Option B2: the areas around Glen Finart Burn and Ardentinny;
- Route Option B3a/b: the areas around Finart Burn, Ardentinny and Rashfield;
- Route Option C1: the areas around Sandbank and east of Clachaig; and
- Route Option C2: the areas around Rashfield, Ardberg and Sandbank..

Conclusion

Route Option A2 contains no dwellings and therefore the Proposed Development is considered to have no effect in this area and has been allocated a RAG rating of **Green**. All other route options contain dwellings, however it is considered that there are some opportunities to minimise potential effects on dwellings for Route Options AB1, A3,B2, which have been allocated a RAG rating of **Amber**, and C1, which has been allocated a RAG rating of **Green**, at the alignment stage. Due to the density of dwellings Route Options B3a/b and C2 have greater constraints for minimising potential effects and have been allocated a RAG rating of **Amber**. On balance a combination of

Route Option A2, B2 and C1 is preferred as it contains fewest dwellings and offers the greater opportunities for minimising potential effects at the alignment stage.

6.1.10 Land Use - Agriculture

The majority of the agricultural land within the route options in Zones A and B is identified as Class 6.1, 6.2 and 6.3, land capable of use as rough grazing. The majority of the agricultural land within the route options in Zone C is Class 5.2 and 5.3, which is capable of use as improved grassland. Route Option C1 also passes through a mix of Class 6.1 and 6.2, land capable of use as rough grazing. There are several small sections of the route options within areas identified as Class 4.1, land capable of producing a narrow range of crops, surrounding Glen Finart, River Eachaig and Little Eachaig River. However, as the majority of the land is not a particularly sensitive or fertile category any impacts on agriculture as a result of the route options is considered to be low and therefore, they have been allocated a RAG rating of **Green**.

6.1.11 Land Use - Forestry

Within Route Options AB1 and A3 there are larger areas of native woodlands that extend the width of the corridor, making disruption to sites inevitable, therefore the impacts to native woodlands are considered substantial. Route Options A2, B2, B3a and B3b contain less extensive native woodlands, in a mosaic of smaller areas that present greater opportunities for avoidance at alignment stage. Route Options C1 and C2 present similar impacts to native woodlands. Narrow areas of native woodland extend the width of the route options close to the existing Dunoon Substation and some disruption is anticipated. It may be possible, however, to span these areas.

PAWS and commercial forestry considerations exist within each of the route options but are most likely impacted in Route Options A3, B3a, B3b and C1. Disruption to forestry may be considerable, with Route Options B3b and C1 presenting the highest level of commercial disruption. In each case, there is the potential to manage impacts and calculate revenues foregone. None of the route options are considered, therefore, to present unmanageable constraints based solely on commercial considerations. Overall, all the Route Options have been allocated a RAG rating of **Amber**.

6.1.12 Land Use - Recreation

There are numerous points of recreational interest, including various tourist and recreational locations, such as Glen Finart and Sandbank, along the route options (see **Figure 4.9**). Table 6.4 lists the recreational assets within each route option that may potentially be impacted:

Table 6.4: Recreational Assets Potentially Impacted

Recreational Assets	Route Option						
	AB1	A2	A3	B2	B3a/b	C1	C2
Loch Lomond and Trossachs National Park	X	X	X	X	X	X	X
Pucks Glen promoted walks	X			X			
River Eachaig promoted walks	X			X		X	
Big Tree walks promoted walks	X			X			
Ardentinny forest promoted walks				X	X		
Benmore Botanic Gardens	X						
Pucks Glen (Park and Garden)	X			X			

Recreational Assets	Route Option						
	AB1	A2	A3	B2	B3a/b	C1	C2
Ardentinny Forest Park		X	X		X		
Loch Lomond and Trossachs Nation Park Core Paths (number)	X (45)	X (8)	X (24)	X (45)	X (33/30)	X (12)	X (1)
Argyll and Bute Core Paths (number)						X (4)	X (1)
National Cycle Route 75						X	X
Other tourist and recreational locations in and around Glen Finart		X	X	X	X		
Other tourist and recreational locations in and around Ardentinny		X	X	X	X		
Other tourist and recreational locations in and around Bemore	X						
Other tourist and recreational locations in and around Puck Glen	X			X			
Other tourist and recreational locations in and around Rashfield	X			X	X		X
Other tourist and recreational locations in and around Ardberg					X		X
Other tourist and recreational locations in and around Sandbank						X	X
Other tourist and recreational locations in and around Clachraig						X	

6.1.13 Land Use – overall conclusion

The differences between the route options is relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to accommodate the Proposed Development. Route Options A2 and B2 have been allocated a RAG rating of **Green**. Whereas, Route Options within Zone C and the remaining Route Options in Zones A and B have been allocated a RAG rating of **Amber**. On balance it is considered that a combination of Route Options A2, B2 and C2 is preferred given the potential impacts on forestry and recreational assets resulting from Route Options AB1, A3, B3a/b and C1.

6.1.14 Planning - Policy and Proposals

Adherence to National, Regional and Local planning policy will in large part depend on avoiding or minimising potential constraints noted, particularly in relation to potential impacts on the natural environment given presence of designated sites and areas of landscape importance.

Route Option AB1 is considered to have the highest risk for adverse effects due to potential for impacts on Loch Eck SSSI and the Benmore GDL, and therefore has been allocated as a RAG

rating of **Red**. The differences between the remaining route options is relatively small, such that no one route option, or combination of route options, stands out as very substantially better able to accommodate an OHL alignment and therefore have been allocated as RAG rating of **Amber**. On balance it is considered that Route Option A2, as it limits potential visual effects compared to Route Option A3; Route Option B3a/b, as it is located further from the Benmore GDL and Puck's Glen; and Route Option C1, as it is considered to have the greatest potential to accommodate the required infrastructure and opportunities to minimise potential impacts is the preferred combination.

At the current stage there is one relevant planning application (2013/0328/DET) within the node at Glen Finart, however it is considered that this is likely avoidable through appropriate route alignment development. In addition, there is a proposed 0.3MW hydropower scheme currently under construction located on land west of Ballochyle Steading, Clachaig, Dunoon is located within Route Option C1. However there does not appear to be any notable planning proposals within the remaining route options.

6.2 Engineering Appraisal

6.2.1 Major Crossings

Major infrastructure features such as railway lines and wide rivers can present obstacles when designing and constructing an OHL. It is therefore advantageous to avoid multiple major infrastructure crossings if possible. The route options were assessed on various criteria. With the exception of the existing OHL no other major crossings were identified. Therefore, in accordance with SHE Transmission's guidance all route options have been allocated a RAG rating of **Green**.

6.2.2 Road Crossings

There is a single main road within the route options in Zones A and B, which is the A815. This is located within the node at Strath Eachaig and travels along the western edge of Route Option AB1. There are multiple smaller roads within the route options, of these an unnamed local road to Ardentinny is crossed by Route Option AB1, the remaining are are mainly local access roads crossed by the route options. These are predominantly located in the vicinity of the node at Strath Eachaig. Therefore given the potential impact on the A815 and unnamed local route, with road crossings anticipated to be notably greater in length with more angle changes than other route options, Route Option AB1 has been allocated a RAG rating of **Red**, all other route options in Zones A and B only have the potential impact on local access road and therefore have been allocated a RAG rating of **Green**.

In Zone C, there are two main roads located within the route options, the A815, crossed by Route Option C2 and the node at Strath Eachaig and the B836 crossed by Route Options C1 and C2 and the node at Strath Eachaig. In addition, there are multiple smaller roads crossed by the route options which are predominantly local access roads. Both route options have been allocated a RAG rating of **Amber** due to the potential for the route options to cross main and local roads.

6.2.3 Elevation

The elevation on which an OHL is constructed can have a significant effect in terms of influencing both wind and ice loading. In order to limit the effects of wind and ice loading due to elevation, it is favourable to minimise the erection of overhead lines on land above 200 m AOD. However, elevations within all route options in Zones A and B will predominantly be above 200 m AOD and therefore all route options have been allocated a RAG rating of **Red**.

In Zone C, approximately 17% of Route Option C1 is located above 200 m AOD and therefore a RAG rating of **Amber** has been allocated. As the area covered by Route Option C2 is wholly below 200 m AOD a RAG rating of **Green** has been allocated.

6.2.4 Flooding

There are three types of flooding which must be considered; Coastal, Surface and River. As the corridor is in close proximity to the shores of Loch Long, Holy Loch and Lock Eck all types of flooding are considered relevant to the Proposed Development.

Based on the SEPA flood map, less than 2% of each route options' length in Zones A and B has 80% of its width in a 1 in 200-year flood zone. Therefore, all route options have been allocated a RAG rating of **Green**.

Based on the SEPA flood map, there are multiple areas within Route Option C1 and C2 which are located within the 1 in 200-year flood zone, in particular the area around the Little Eachaig River. In addition, Route Option C2 is partially located within the 1 in 200-year flood zone associated with the River Eachaig. Over 5% of Route Option C2 and over 80% of its width is located within the 1 in 200-year flood zone, and between 2-5% of Route Option C1 for over 80% of its length is located within the 1 in 200-year flood zone. Therefore, Route Option C2 been allocated a RAG rating of **Red** and Route Option C1 a RAG rating of **Amber**.

6.2.5 Terrain

Unfavourable terrain can lead to many design and construction related challenges for new OHL builds. Steep slopes, mountainous terrain and/or cliffs create difficult obstacles for OHLs to cross and therefore, it is preferred to limit construction in this terrain where possible. Another consideration -is pinch points and areas within the corridor with limited options to achieve a potential route.

In Zones A and B, the terrain is generally steep with gradients above 40% in many areas throughout all the route options, therefore all route options in these zones are allocated a RAG rating of **Red**.

In Zone C, the western section of Route Option C1 crosses multiple hill slops of generally less than 40% gradient. In addition, the terrain is generally flat to the eastern section of Route Option C1, closer to the existing OHL. Route Option C2 is relatively flat at its northern extent and crosses a peak to the south with sloping ground that cannot be avoided (generally 20%-30% gradient). Both route options in these zones are allocated a RAG rating of **Amber**.

6.2.6 Peat

Construction in areas of peat can pose engineering challenges during both the design and construction stages of an OHL build. In addition, construction in peat can lead to increased construction costs and therefore, should be reduced or avoided where possible.

There are no areas identified as Class 1 or Class 2 peat within the extents of Route Options A2, A3 or C2, and therefore these route options are allocated a RAG rating of **Green.** Although there is a small element of peat (Class 1 and 2) within Route Option C1 it is located at the very edge of the route option and would likely be avoided. It has therefore been allocated a RAG rating of **Green.**

All other route options contain areas of peat identified on the NatureScot 'Cabon and Peatland Map 2016' as Class 2. For Route Options AB1, B2 and B3b the extent of the peat identified covers less between 6% and 18% of the route option area and therefore has been allocated a RAG rating of **Amber.** Route Option B3a has an estimated 22% of its area where peat (Class 2) has been identified and therefore has been allocated a RAG rating of **Red.**

6.2.7 Construction / Maintenance (Access and Angle Towers)

Constructability is an important consideration for all OHL routes. Giving some forethought to both access routes and the number of critical angle towers to be used on this OHL is important for the construction and future maintenance requirements of the line.

Adequate access is an important consideration for both construction and maintenance activities. Positioning an OHL in close proximity to existing public roads and networks of tracks will provide ease of access and can greatly reduce costs associated with the construction stage.

All route options within Zones A and B are located within 1 km of public roads, predominantly at their northern and southern extents. In addition, all route options contain forest tracks to varying degrees. Route Options A2, B2 and B3a have limited forest tracks that would provide access to specific areas within them, but the level of access available across the length of the route options is generally poor. In contrast, Route Options AB1, A3 and B3b have forestry tracks which would provide access to a much greater percentage of the route option. Therefore, Route Options A2, B2 and B3a have been allocated a RAG rating of **Red** and Route Options AB1, A3 and B3b a RAG rating of **Amber**.

In Zone C, both route options are close to public roads, with the B836 road passing through both. Route Option C1 also contains several forestry tracks which allow access to the majority of the route, whereas Route Option C2 has limited accessibility from forestry tracks. Therefore, Route Option C1 has been allocated a **Green** RAG rating and Route Option C2 an **Amber** RAG rating.

In the design of an OHL, angle towers are used at positions where it is necessary to change the direction of the line. These changes in direction generally result from the need to avoid key constraints, such as difficult terrain, properties, environmental features etc. Angle towers may also have to be used in straight line positions, such as when a suspension tower (the normal type of tower used in straight line positions) is not suitable as a result of steep terrain. Angle towers are generally larger than suspension towers and therefore more costly, as well as more complicated from design and installation perspectives. It is therefore beneficial to minimise the number of angle towers used on an OHL.

Due to their length, number of potential angle changes and extent of difficult terrain, it is considered that Route Options A2, A3, B2 and B3a are likely to require the least angle towers and therefore have been allocated a RAG rating of **Green**. Compared to these route options, Route Options AB1 and B3b are considerably longer, are likely to require a greater number of angle changes across the route and are considered to encounter particularly challenging terrain. Therefore, Route Options AB1 and B3b have been allocated a RAG rating of **Red**.

In Zone C, Route Option C1 is longer than C2 and is also considered to require a larger number of angle changes, although the difference is not considered substantial. Therefore, Route Option C1 has been allocated a RAG rating of **Amber** and Route Option C2 allocated a RAG rating of **Green**.

6.2.8 Proximity (Clearance Distance, Windfarms and Urban Environments)

The location of an overhead line relative to structures and settlement of people is an important consideration when selecting a preferred route. Overhead lines must be an adequate distance from buildings in order to ensure electrical clearance limits are achieved, but also similarly to minimise the impact on properties of the construction of a piece of key infrastructure in their vicinity.

Assessment of the route options was undertaken to determine the clearance distances available between buildings and dwellings. As most of the route options either have properties within them or are in close proximity to properties in some areas, the clearance distances have been interpreted to mean the distance it would be possible to maintain to properties/buildings with an alignment through each of the route options.

Outside the nodes, there are no properties inside the route boundary for Route Options A2, A3, B2, B3a and B3b, therefore a RAG rating of **Green** has been allocated.

Multiple properties are located at the southern extents of Route Option AB1, including within the node at Strath Eachaig. The remainder of the route is free from properties. However given the other constraints present it is considered likely that any potential alignment could be positioned within 100 -150 m of properties resulting in an **Amber** RAG rating.

There are multiple properties within the extents of Route Options C1 and C2. For Route Option C1, the width of the route and distance between properties mean it is likely that any potential alignment could be designed within 100 -150 m of properties, although 250 m may be feasible. For Route Option C2 it is unlikely to be possible to maintain 100 m to the properties within its extents. Therefore, Route Option C1 has been allocated a RAG rating of **Amber** and Route Option C2 a RAG rating of **Red**.

From an operation and maintenance viewpoint, wind turbines near overhead lines have been found to potentially increase the occurrence of conditions suitable for aeolian vibration leading to the premature wear of the conductor through fatigue.

No windfarms or windfarm proposals are located within 1 km of the route options therefore a RAG rating of **Green** has been allocated for all route options.

The route options in Zones A and B have been allocated as a RAG rating of **Green** as they contain urban environments which cover less than 10% of the route extent. Although Route Option C1 contains multiple properties and buildings within its extents, it is considered possible to maintain a reasonable distance to the properties for potential alignments and therefore it isn't a dense urban environment, resulting in a **Green** RAG rating.

Most of Route Option C2 is free from properties and buildings, however there are properties in the northern and southern extents of the route for which potential alignments are considered unlikely to be able to avoid. Therefore, this route option has been allocated an **Amber** RAG rating.

6.3 Economic Appraisal

The cost components considered can be split into Capital expenditure (CapEx) and Operation Expenditure (OpEx), with five elements identified under CapEx and two under OpEx. Capex items considered at this stage are: Construction, Diversions, Public Road Improvements, Tree Felling, and Land Assembly. OpEx items specified for consideration are Inspection, and Maintenance. The various cost elements considered are not weighted or considered relative to each other, for example Construction costs noted likely to be significantly higher than other Capital cost elements considered.

6.3.1 Construction

Construction cost of the route options was assumed to be directly proportionate to the length of the route option, measured along the centre of each route option.

The construction method employed will have a significant bearing on construction costs, however at this stage the nature of construction methodology or access requirements have not been established and therefore costs for construction methodology are assumed equal across the length of the Proposed Development for all route options.

All the route options are between approximately 15 km and 21 km in length. However, a combination of Route Option AB1 and Route Options C1 or C2 is the exception to a combination of the remaining route options which are within 120% of the shortest distance. The combination of route options with the shortest distance will therefore be the least cost option. As a result, Route Option AB1 combined with Route Options C1 or C2 is allocated a RAG rating of **Amber** and all other route option combinations are allocated a **Green** RAG rating.

6.3.2 Diversions

Route options which require crossing of the existing OHL (e.g. Route Option AB1 combined with Route Option C2) were identified as requiring diversions to enable continued supply of electricity to Dunoon Grid Supply point during construction. Whilst those that require are an offline build wholly on one side of the existing OHL are assumed not to require diversions.

Route option combinations which do not require to cross the existing OHL have been allocated a RAG rating of **Green**, those which cross the existing OHL once have been allocated an **Amber** RAG

rating and those which would require two crossings of the existing OHL have been allocated a Red RAG rating.

6.3.3 Public Road Improvements

All route options will likely be accessed from the same, local council-maintained roads, namely the A815/ A885 and the unclassified road off the A815, towards the north end of Loch Eck, which crosses over to Ardentinny. It is assumed that the longer routes will require a longer length of access track to be built and also that all aggregate for the access tracks will be obtained from off-site, licenced quarries. Due to the length of a combination of Route Option AB1 and Route Options C1 and C2 these have been allocated a RAG rating of **Amber** and all other route option combinations have been allocated a RAG rating of **Green**.

6.3.4 Tree Felling

As noted in Section 5.2.5, forestry is a key land use within the corridor and includes native woodlands, PAWS and commercial forestry. At this stage of the project it is assumed that Forestry elements of the project will be an overall cost and that potential compensatory planting associated with the felling of woodland is assumed to pose a cost. For the purpose of the appraisal, the area of afforested land identified within the route options was measured and calculated to give a percentage of forest cover area. Based on the appraisal a combination of route options which include Route Option C1 are allocated a **Red** RAG rating, a combination of Route Options A3, B2 and C2 is allocated an **Amber** RAG rating and all others are allocated a **Green** RAG rating.

6.3.5 Land assembly

At this stage of the project, and for the purpose of the appraisal, land assembly costs have been derived to be proportionate to the length of the route options being considered. Due to the length of a combination of Route Option AB1 and Route Options C1 and C2 these have been allocated a RAG rating of **Amber** and all other route option combinations have been allocated a RAG rating of **Green**.

6.3.6 Inspection and Maintenance

Once the Proposed Development is constructed there would be ongoing costs associated with inspection and maintenance. Periodic inspection and maintenance of the OHL to ensure the line is in a safe and operational consideration in compliance with the Electricity Safety, Quality and Continuity Regulations (ESQR Regs). At this stage it is assumed that regular inspection across all options is considered to be every 12 months for visual inspection from the ground, with climbed inspection, or unmanned aerial vehicle inspection every five years.

Due to the length and availability of existing access, a combination of Route Option AB1 and Route Options C1 and C2 these have been allocated a RAG rating of **Amber,** as has the combination of Route Options A2, B2 and Route Options C1 and C2. All other route option combinations have been allocated a RAG rating of **Green**.

6.4 Comparative Appraisal Summary

Summary RAG tables presenting the comparative appraisals undertaken for environment, engineering and economic considerations are included in **Appendix 2**.

6.4.1 Zone A and Zone B Section Summary

For Zones A and B, a combination of Route Options A2 and B2 is preferred for landscape and visual, natural heritage and land use. These route options are preferred compared to other route options as they:

- avoid the introduction on an OHL into landscapes not currently affected by one;

- avoid the greater risk of visual effects crossing both Glen Finart and Strath Eachaig to the east of the existing OHL as done by Route Options A3 and B3;
- avoid the potential effects on Loch Eck SSSI likely to occur from Route Option AB1; and
- offer the greater opportunities for minimising potential effects at the alignment stage.

Although Route Options A2 and B2 were not the preferred for geology, hydrology, hydrogeology and cultural heritage aspects it was considered that the differences between the route options is relatively small, such that no one route option, or combination of route options, stands out as considerably better able to accommodate an OHL alignment in respect of these topics. In addition, it was noted that impacts could be reduced through careful tower location design, micro-siting and construction techniques.

Route Options A3 and B2 are preferred for engineering. Route Option A3 is preferred, compared to Route Option A2, as this option has greater accessibility available from existing forestry tracks. Route Option B2 is preferred compared to Route Option B3a as the latter has larger areas of peat potentially present. Route Option B3b, when compared to Route Option B2, is considered preferred as most of its length can be accessed by forest tracks , however as Route Option B3b is notably longer with more angle changes, likely requiring more angle towers to be used, therefore Route Option B2 would also be preferred.. Route Option AB1 was considered comparatively worse than the other route options due to the requirement for road crossings its notably greater length with more angle changes, likely requiring more angle towers to be used, and due to its proximity to existing buildings.

6.4.2 Zone C Section Summary

For Zone C, Route Option C1 is preferred over Route Option C2 because it provides greater opportunities for a reasonable landscape fit, contains a small number of sensitive visual receptors including dwellings, passes through a smaller section of Class 4.1 agricultural land, is a greater distance from the Holy Loch LNR and LNCS, contains areas less at risk of flooding and has greater accessibility. Although Route Option C1 was not preferred on other aspects it was considered that from and environment and engineering perspective the differences between the route options is relatively small but that the key advantage of Route Option C1 is the potential to maintain reasonable distances to properties. In addition, it was noted that impacts could be reduced through careful tower location design, micro-siting and construction techniques.

6.4.3 Economic Summary

The length of the route options and availability of access is a key driver for the cost elements, therefore a combination which includes Route Option AB1 is considered as least preferred (as is longer). For all other combinations of route options there is very little difference, however due potentially fewer felling requirements a combination of Route Options A2, B3a/b and C2 is preferred economically.

6.5 Preferred Route

A Preferred Route has been identified following consideration of both environmental, engineering and cost considerations.

The analysis to date has concluded that both Route Options A2, B2 and C1 provide advantages over the other route options and could offer a viable route and solution for the project from an environmental, engineering and cost perspective.

On balance and based on current analysis, it is considered that Options A2, B2 and C1 is the Preferred Route Option as it will:

- avoid the introduction on an OHL into landscapes not currently affected by one;
- avoid the greater risk of visual effects crossing both Glen Finart and Strath Eachaig to the east of the existing OHL as done by Route Options A3 and B3;
- provides greater opportunities for a reasonable landscape fit;
- avoid the potential effects on Loch Eck SSSI likely to occur from Route Option AB1;

- pass through a smaller section of Class 4.1 agricultural land as done by Route Option C2;
- be located at a greater distance from the Holy Loch LNR and LNCS compared to Route Option C2;
- provide greater accessibility for construction and maintenance compared to Route Option C2; and
- offer greater opportunities for minimising potential effects at the alignment stage.

The Preferred Route is illustrated on **Figure 6.1**.

The Preferred Route would require careful consideration during the alignment selection stage of the project to achieve an acceptable alignment with minimal environmental effects.

Should further site and desk-based analysis at the alignment selection stage identify a particular constraint, a further review of route or alignment options may be required prior to the identification of a preferred alignment.

7. CONSULTATION ON THE PROPOSALS

SHE Transmission plc places great importance on, and is committed to, consultation and engagement with all parties, or stakeholders, likely to have an interest in proposals for new projects such as this. Stakeholder consultation and engagement is an essential part of an effective development process.

7.1 Questions for Consideration by Consultees

When providing your comments and feedback, SHE Transmission would be grateful for your consideration of the questions below:

- Have we explained the need for this Project adequately?
- Have we explained the approach taken to select the Preferred Route adequately?
- Are there any factors, or environmental features, that you consider may have been overlooked during the Preferred Route selection process?
- Do you feel, on balance, that the Preferred Route selected is the most appropriate for further consideration at the alignment selection stage?

7.2 Next Steps

Virtual online consultation events will be held, as detailed in the preface of this document. The responses received from these consultation events, and those sought from statutory consultees and other key stakeholders, will inform further consideration of the route options put forward, and the confirmation of the Preferred Route to take forward to the next stage in the routeing process (alignment selection).

All comments are requested by 3rd December 2020. A Report on Consultation will be produced which will document the consultations received, and the decisions made in light of these responses.

Following the identification and confirmation of a proposed route, further technical and nvironmental surveys (e.g. Phase 1 Habitat / National Vegetation Classification (NVC) surveys, Protected Species Surveys and further input by landscape, ecology, cultural heritage, hydrology and forestry specialists) would be undertaken to identify a preferred alignment.

Consultation on a preferred alignment will be undertaken in a similar manner to the identification of a Preferred Route in summer 2021.

APPENDIX 1 – FIGURES

Date Saved: 01/10/2020

Document Path: \\uk.wspgroup.com\central data\Projects\700657xx\700657799 - LT193 Dunoon to Whistlefield\05 Models and Drawings\MXDs\EOA\LT193_DW_700657799_0004 - Figure 1.1 - Location.mxd

Key

- Existing Dunoon Substation
- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing OHL

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 1.1 Location

Date:	07 October 2020			Scale:	70,000 @ A3
Drawn:	MS	Checked:	CE	Approved:	JB

© Crown copyright and database rights 2020. OS 0100019808

Date Saved: 01/10/2020

Document Path: \\uk.wspgroup.com\central data\Projects\70065799xx\70065799 - LT193 Dunoon to Whistlefield\05 Models and Drawings\MXDs\EOAILT193_DW_70065799_0005 - Figure 3.1 - Corridor.mxd

Key

- Corridor
- Existing Dunoon Substation
- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing OHL

N

0 1.5 3 Kilometres

© Crown copyright and database rights 2020. OS 0100019808

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 3.1 Corridor

Date:	07 October 2020			Scale:	60,000 @ A3
Drawn:	MS	Checked:	CE	Approved:	JB

Date Saved: 08/10/2020

Document Path: \\uk.wspgroup.com\central data\Projects\70065799_LT193 Dunoon to Whistlefield\05 Models and Drawings\MXDs\EOA\LT193_DW_70065799_0007 - Figure 4.1 - Key Constraints.mxd

AB1

A2

A3

B2

B3a

B3b

C1

C2

N

0 2 4 Kilometres

Key

- Corridor
- Existing Dunoon Substation
- Tower 15 on Whistlefield - Dunoon 132kV OHL

Route Options

- AB1
- A2
- A3
- B2
- B3a
- B3b
- C1
- C2

- Node
- Listed Building (A, B and C)
- Residential Dwelling
- Existing OHL
- Loch Lomond & The Trossachs National Park
- Scheduled Monument
- Site of Special Scientific Interest (SSSI)
- Native Woodland
- Near-native Woodland
- Ancient Woodland Inventory
- Garden and Designed Landscape

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 5.1 Key Environmental Constraints

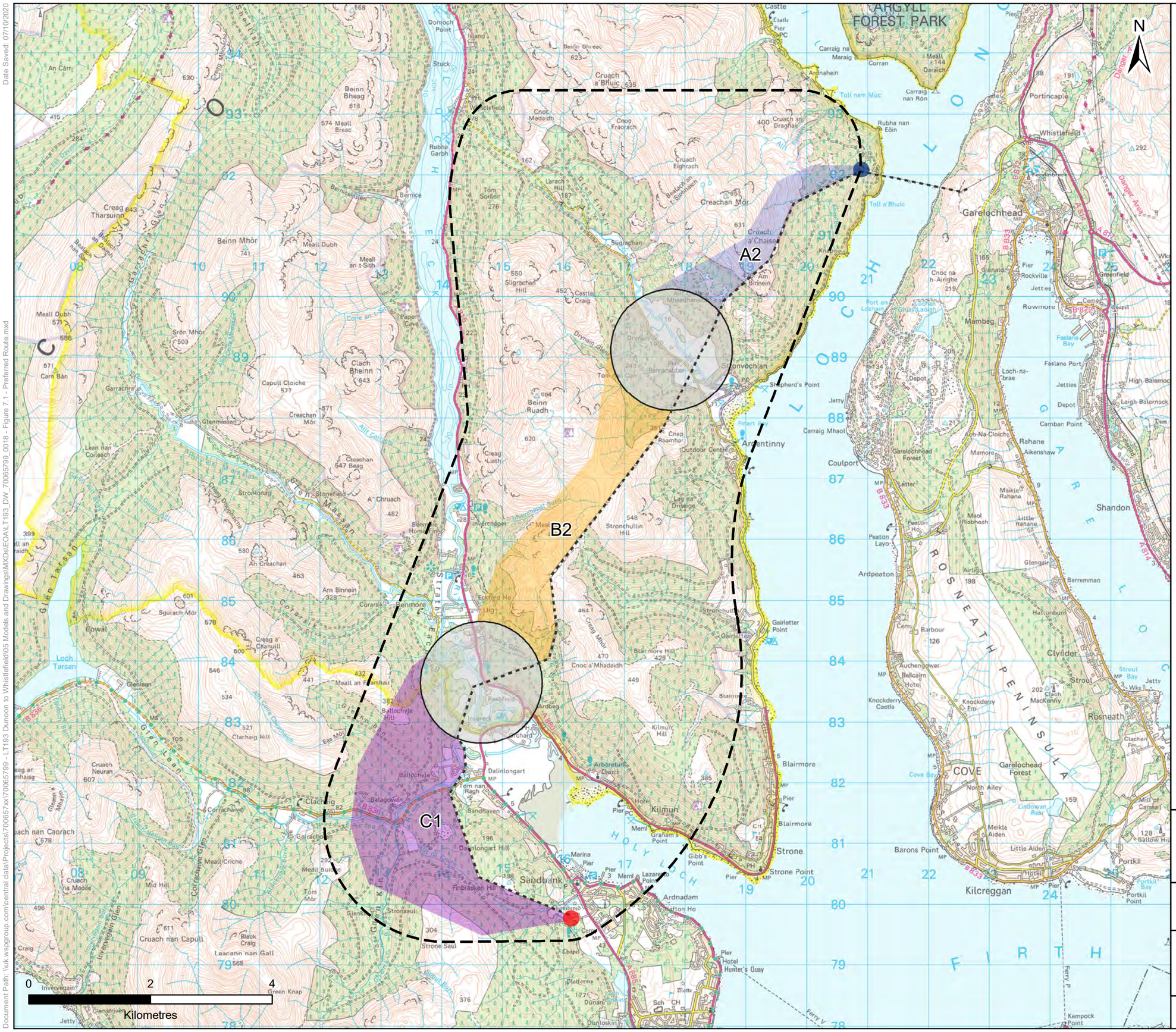
Date: 07 October 2020 Scale: 60,000 @ A3

Drawn: MS Checked: CE Approved: JB

(Copyright Scottish Natural Heritage) Contains Historic Environment Scotland and Ordnance Survey data © Historic Environment Scotland - Scottish Charity No. SC045925 © Crown copyright and database rights 2020. OS 0100019808

Date Saved: 07/10/2020

Document Path: \\uk.wspgroup.com\central data\Projects\700657xx\700657799 - LT193 Dunoon to Whistlefield\05 Models and Drawings\MXDs\EOA\LT193_DW_70065799_0018 - Figure 7.1 - Preferred Route.mxd



Key

- Corridor
- Existing Dunoon Substation
- Tower 15 on Whistlefield - Dunoon 132kV OHL

Preferred Route

- A2
- B2
- C1
- Node
- Existing OHL

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 6.1 Preferred Route

Date:	07 October 2020			Scale:	60,000 @ A3
Drawn:	MS	Checked:	CE	Approved:	JB

© Crown copyright and database rights 2020. OS 0100019808

APPENDIX 2 – SUMMARY RAG TABLES

Environmental Summary RAG Rating Table

Route	RAG Impact Rating – Environmental														
	Landscape and Visual			Natural Heritage					Cultural Heritage		People	Land Use			Planning
	Designations	Character	Visual	Designations	Protected Species	Habitats	Ornithology	Geology, Hydrology & Hydrogeology	Designations	Cultural Heritage Assets	Proximity to Dwellings	Agriculture	Forestry	Recreation	Policy and Proposals
AB1															
A2															
A3															
B2															
B3															
C1															
C2															

Engineering Appraisal Summary RAG Rating Table

Route	RAG Impact Rating - Engineering										
	Infrastructure Crossings		Environmental Design		Ground Conditions		Construction/ Maintenance		Proximity		
	Major Crossings	Road Crossings	Elevation	Flooding	Terrain	Peat	Access	Angle Towers	Clearance Distance	Windfarms	Urban Environments
AB1											
A2											
A3											
B2											
B3a											
B3b											
C1											
C2											

Economic Summary RAG Rating Table

Route Options	RAG Impact Rating – Costs						
	Capital					Operational	
	Construction	Diversion	Public Road Improvements	Felling	Land Assembly	Inspection	Maintenance
AB1, C1							
AB1, C2							
A2, B2, C1							
A2, B2, C2							
A2, B3, C1							
A2, B3, C2							
A3, B2, C1							
A3, B2, C2							
A3, B3, C1							
A3, B3, C2							

Preferred Route Option Summary RAG Rating Table

Constraint Type	Topic	Specific aspect of the topic	Route Option		
			A2	B2	C1
Environmental	Landscape and Visual	Designations			
		Landscape Character			
		Visual amenity			
	Natural Heritage	Designations			
		Protected Species			
		Habitats			
		Ornithology			
		Geology, Hydrology and Hydrogeology			
	Cultural Heritage	Designations			
		Cultural Heritage Assets			
	People	Proximity to Dwellings			
	Land Use	Agriculture			
		Forestry			
		Recreation			
	Planning	Policy			
		Proposals			
Engineering	Environmental Design	Major crossings			
		Road crossings			
		Elevation			
		Flooding			
	Ground Conditions	Terrain			
		Peat			
	Construction/ Maintenance	Access			
		Angle towers			
	Proximity	Clearance distance			
		Proximity to windfarms			
		Urban environments			
Economic	Capital	Construction			
		Diversions			
		Public Road Improvements			
		Felling			
		Land Assembly			
	Operational	Inspections			
		Maintenance			