

Shin to Loch Buidhe 132 kV Rebuild

Consultation Document – Alignment Options

August 2025



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GLOSSARY

Term	Definition
132 kV	132 kilo-volt capacity of an electricity power line.
Alignment	The centre line of an overhead line route, along with the location of key angle structures.
BNG	Biodiversity Net Gain
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.
EIA	Environmental Impact Assessment
ERSR	Environmental Route Selection Report
FLS	Forestry Land Scotland
HDD	Horizontal Directional Drilling
Kilovolt (kV)	One thousand volts
MCA	Multi-Criteria Analysis: an evaluation of the technical and environmental constraints was undertaken in the form of constraints analysis which included a combination of desk-based analysis, field work, consultation and liaison with the wider project team. These are then transferred to Geographic Information System (GIS) for analysis.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
MVA	Mega Volt Amps
NETS SQSS	National Electricity Transmission System Security and Quality of Supply
NPF4	Scotland's fourth National Planning Framework
Overhead Line (OHL)	An electric line installed above ground, usually supported by lattice steel towers or poles.
Preferred Alignment	An alignment for the overhead line taken forward to stakeholder consultation following a comparative appraisal of Route Options.
Preferred Alignment	An alignment taken forward to consent application. It comprises a defined centre line for the overhead line and includes an indicative support structure (tower or pole) schedule, also specifying access arrangements and any associated construction facilities
Proposed Development	The proposed overhead line supported by Trident wood poles which would be constructed following completion of routeing process.
Preferred Route	The Route Option which is considered to represent the optimum balance between the various environmental, engineering and cost considerations

Term	Definition
Proposed Route	The final route taken forward following stakeholder consultation within which alternative OHL route alignments will be defined and appraised.
RAG	Red / Amber / Green ratings
Route	A linear area of approximately 300 m 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
Routeing Study	The study undertaken to assess the potential environmental impacts of the Route Options and to identify a preferred route based upon the potential environmental impacts identified.
SAC	Special Area of Conservation - designated under Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (known as - The Habitats Directive)
SHE Transmission	Scottish Hydro Electric Transmission
SM	Scheduled Monument - monuments of national importance which have been afforded legal protection under the Ancient Monuments and Archaeological Areas Act 1979
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area – designated under Directive 2009/147/EC on the conservation of wild birds (the Birds Directive)
SSEN Transmission	Scottish and Southern Electricity Networks Transmission
SSSI	Site of Special Scientific Interest – designated by SNH under the Nature Conservation (Scotland) Act 2004
Stakeholders	Organisations and individuals who can affect or are affected by SSEN Transmission works.
Study Area	Each environmental discipline has defined its study area for the identification of environmental constraints. These are set out within the report.
UGC	Underground Cable

PREFACE

This Consultation Document has been prepared by Ramboll on behalf of Scottish and Southern Electricity Networks Transmission (SSEN Transmission), operating under licence held by Scottish Hydro Electric Transmission plc (the Applicant) to seek comments from all interested parties on the Preferred Alignment identified for the proposed Shin to Loch Buidhe 132 kV Rebuild project.

SSEN are seeking feedback on the Proposed Development specifically:

1. Has the project information provided explained the need for the Shin – Loch Buidhe 132 kV Rebuild project?
2. Do you feel sufficient information has been provided to enable you to understand what is being proposed and why?
3. Are there any additional factors, or environmental features, that you consider important and should be brought to the attention of the project team?
4. Do you have any other comments about the proposed alignments?
5. Following review of the provided information, how would you describe your understanding of the Shin – Loch Buidhe 132 kV Rebuild project?
6. Are there any particular concerns or queries you would like to highlight to the team about this project?

The Consultation Document is available online at: <https://www.ssen-transmission.co.uk/projects/project-map/shin-to-loch-buidhe-132kv-overhead-line-rebuild/>

The Consultation Event will take place on 27th of August 2025 in Bonar Bridge Community Hall, Bonar Bridge, IV24 3EA between 3pm - 7pm where further information regarding our proposals will be available alongside opportunities to meet the project team.

Comments on this document should be sent to:

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All comments are requested by Friday 26th September 2025.

1. INTRODUCTION

1.1 Purpose of Document

- 1.1.1 SSEN Transmission is proposing to construct and operate a new 132 kV connection between Shin Substation and the existing Loch Buidhe Substation, Highlands, Scotland, to replace the existing 132 kV line.
- 1.1.2 This Consultation Document describes the Alignment Option Appraisal undertaken, the alternative technologies considered and the identification of a Preferred Alignment. Comments are now sought from statutory authorities, stakeholders, elected representatives and the public on the alignment selection process and the Preferred Alignment identified (OHL Alignment Option A1 and UGC Alignment Option 4). All Alignment Options considered are illustrated in **Figure 1.1 (Annex A)**.

1.2 Structure of this Report

- 1.2.1 The report is structured as follows:
- **Chapter 1** introduces the need for the project and report structure;
 - **Chapter 2** describes the project need, the preferred technology and provides a project overview;
 - **Chapter 3** describes the alignment selection process and provides a summary of each alignment option.
 - **Chapter 4** analyses each alignment option against a series of environmental, technical, and cost considerations, followed by a comparative summary and description of the Preferred Alignment and technology; and
 - **Chapter 5** invites comments on the Preferred Alignment Option process, the identification of Preferred Alignment/Preferred technology and next steps.
- 1.2.2 The main body of this document is supported by a series of figures which can be found in **Annex A: Figures**.

1.3 Next Steps

- 1.3.1 As part of the consultation exercise, comments are sought from members of the public, statutory consultees and other stakeholders on the Preferred Alignment put forward in this report.
- 1.3.2 A Report on Consultation will be published following this consultation which will document the consultation responses received, and the decisions made in light of these responses, to select a Preferred Alignment for further design development during the Environmental Assessment stage.

2. THE PROPOSALS

2.1 Project Need

- 2.1.1 Scottish and Southern Electricity Networks Transmission (SSEN Transmission) operating under licence held by Scottish Hydro Electric Transmission plc has a statutory duty under Schedule 9 of the Electricity Act 1989 to develop and maintain an efficient, co-ordinated, and economical electrical transmission system in its licence area. Where there is a requirement to extend, upgrade or reinforce its transmission network, SSEN Transmission's aim is to provide an environmentally aware, technically feasible and economically viable solution.
- 2.1.2 There is a need to reinforce the online transmission infrastructure between Shin Substation and the existing Loch Buidhe Substation in the Scottish Highlands. To enable this reinforcement, SSEN Transmission is proposing to construct and operate a new 132 kV double circuit of approximately 9 km in length (depending on the Preferred Alignment) and dismantle the existing 132 kV OHL between Shin and Loch Buidhe Substation (the 'Proposed Development'). This is likely to comprise of approximately 6.5 km OHL supported by steel lattice towers with a section (approximately 2.5 km) of underground cable (UGC) required to connect into the Loch Buidhe Substation. A cable sealing compound (CSE) will be required at the transition point between the OHL and UGC sections. Access tracks will also be required to facilitate construction/dismantling.

2.2 National Planning Policy

- 2.2.1 Scotland's fourth National Planning Framework (NPF4) was published by the Scottish Government on 13th February 2023. NPF4 is a long-term strategy for Scotland (to 2045) that guides spatial development, sets out national planning policies, designates national developments and highlights regional spatial priorities. Alongside adopted local development plans, NPF4 now forms part of the statutory development plan for decision making in Scotland. In NPF4, transmission infrastructure is supported in both National Development ND3 'Strategic Renewable Electricity Generation and Transmission Infrastructure' and in Policy 11: *Energy*. However, proposals are still required to be assessed against all relevant development plan policies.
- 2.2.2 The Proposed Development would form a vital element to deliver network and grid infrastructure required to deliver the UK and Scottish Government's legally binding targets for net zero emissions and renewable energy electricity generation objectives.

2.3 Preferred Technology Solution

- 2.3.1 Several technology options were previously assessed to determine the Proposed Technology within which to define alignment options. The options considered comprise of a hybrid route of both UGC and OHL. The environmental factors considered comprise of the Strath Carnaig and Strath Fleet Moor Special Protection Area (SPA) that the Route Options pass through, the landscape character and visual receptors, habitats, hydrology and cumulative scheme technology. Preferences from each of these and professional judgement determined that the Preferred Technology would comprise of OHL, approximately 6.5 km and approximately 2.5 km of UGC into Loch Buidhe Substation.
- 2.3.2 An option to route the LT499 Shin to Loch Buidhe UGC section in a combined cable swathe alongside the LT430 Garvary Wind Farm UGC into Loch Buidhe Substation was also assessed and selected as the baseline UGC alignment. Further details are provided in **Chapter 4**.

2.4 Proposals Overview

- 2.4.1 To enable this reinforcement, SSEN Transmission is proposing to construct and operate a new 132 kV double circuit of approximately 9 km in length and dismantle the existing 132 kV OHL between Shin and Loch Buidhe Substation (the 'Proposed Development'). This is likely to comprise of approximately 6.5 km OHL supported by steel lattice towers and 2.5 km of UGC required to connect into the Loch Buidhe Substation. A CSE will be required at the transition point between OHL and UGC sections. Access tracks will also be required to facilitate construction/dismantling.

Access During Construction

- 2.4.2 Where possible, the installation of most overhead line structures will utilise the existing tracks established during the construction and operation of the existing Shin – Loch Buidhe Substation OHL connection. Preference will be given to lower impact access solutions including the use of low pressure tracked personnel vehicles and trackway in boggy / soft ground areas to reduce any damage to, and compaction of, the ground. The use of these accesses would be kept to a minimum to minimise disruption to habitats along the route.
- 2.4.3 However, where the Proposed Alignment deviates from the existing OHL route, it is anticipated that a permanent stone access track may be required to allow access into certain overhead line structure locations and UGC joint bays, and a temporary stone access track would be required in close proximity to any UGC in order to allow construction and the laying of cable. For the purposes of this assessment, a worst-case scenario of access roads needed for every joint bay / link box (approximately every 500 m) is included.
- 2.4.4 All temporary tracks would be restored as closely as possible to their pre-existing condition using natural regeneration techniques on construction completion. It is likely that borrow pits would be required to provide materials for the creation of stone tracks, but at this stage the precise requirements or locations are not known.
- 2.4.5 Permanent access tracks would only be required in more remote areas where access during construction requires a higher specification track, and where long-term maintenance needs require permanent access. It is intended to keep requirements for permanent access tracks to a minimum.

Forestry Removal

- 2.4.6 Construction of the Proposed Development would require the removal of sections of commercial forest, which would be undertaken in consultation with Scottish Forestry and affected landowners.
- 2.4.7 After felling, any timber removed that is commercially viable would be sold and the remaining forest material would be dealt with in a way that delivers the best practicable environmental outcome and is compliant with waste regulations.
- 2.4.8 The operational corridor would be required to enable the safe operation and maintenance of the Proposed Development. For a hybrid connection, an approximate 80 m corridor is likely to be required. This will vary depending on the type of woodland (based on species present) in proximity to the Proposed Development. In areas of native and/or Ancient Woodland, it is usually possible to provide a narrower corridor due to a reduced risk of trees falling on the OHL.

2.5 Biodiversity Net Gain

- 2.5.1 Biodiversity Net Gain (BNG) is a process which leaves biodiversity measurably better than before the development and construction work started. Although it is an internationally recognised process and tool within the development industry, it is not a term that is widely used or implemented in Scotland¹, however there are areas of policy with goals relating to BNG². For example, the Scottish Government's National Planning Framework (NPF4)³ is a framework against which all planning applications will be assessed. Although the NPF4 does not mention BNG directly, it includes policy requirements for developers to 'conserve, restore and enhance biodiversity' and 'achieve significant biodiversity enhancements'⁴.
- 2.5.2 As discussed further in **Chapter 3**, reviewing various route options was considered unnecessary, and therefore only a preliminary BNG assessment was undertaken at route options stage. For the alignment stage, an update to the preliminary BNG assessment has been undertaken, along with a BNG optioneering toolkit to support the Environmental Alignment Selection Report.

¹ CIEEM. 2019. Biodiversity Net Gain in Scotland. CIEEM Scotland Policy Group. <https://cieem.net/wp-content/uploads/2019/06/Biodiversity-Net-Gain-in-Scotland-CIEEM-Scotland-Policy-Group.pdf>

² Scottish Biodiversity Strategy and COP 15 [Online]. Available at: <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy-and-cop>

³ NPF4 Available here: <https://www.gov.scot/publications/national-planning-framework-4/documents/>

⁴ It should be noted that, at present, enhancement that would classify as 'significant' has not yet been defined.

3. ALIGNMENT SELECTION AND DESCRIPTION

3.1 Overview

- 3.1.1 The approach adopted in identifying and assessing alternative Alignment Options is consistent with relevant SSEN Transmission guidance⁵. The guidance describes a process which aims to balance environmental, technical, and economic considerations throughout the Alignment Options assessment process.

The guidance splits the routeing stage of a project into four principal stages, as follows:

- Stage 0: Routeing strategy development;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection;
- **Stage 3: Alignment Selection,** and
- Stage 4: EIA and Consenting

- 3.1.2 Each stage is an iterative process and involves an increasing level of detail and resolution, bringing environmental, technical, and cost considerations together in a way which seeks to achieve the best balance at each stage. The stages carried out can vary depending on the type, nature and size of a project and consultation is carried out at each stage of the process as appropriate.

- 3.1.3 The existing OHL presents a constructable, direct alignment between the Shin and Loch Buidhe Substation. It was considered unlikely that the Proposed Development would deviate significantly from its existing alignment, and reviewing various route options was deemed unnecessary. Therefore, a detailed routing assessment stage (as per the SSEN OHL Route Selection guidelines) and associated deliverables was not undertaken as part of this project. Instead, a high-level Route Constraints Report was completed to provide a baseline for the alignment selection stage (Stage 3).

- 3.1.4 The high-level constraints analysis was completed to capture an approximate 1 km corridor from the existing OHL. The corridor extends approximately 10 km in length, stretching eastward from Shin Substation to Loch Buidhe Substation. The environmental factors considered comprise of natural heritage, hydrology, geology and soils, cultural heritage, people, landscape character, visual amenity, transport routes, land use and recreation, and planning policy. A summary of engineering considerations was also provided as part of this analysis.

- 3.1.5 The Proposed Development is currently at Stage 3: Alignment Selection, the objective of which is to identify an optimal Preferred Alignment.

3.2 Alignment Options

- 3.2.1 The four OHL Alignment Options and two UGC Alignment Options identified are shown in **Figure 1.1, Annex A** and are briefly described in the following sub-sections.

- 3.2.2 UGC Alignments 2 and 3 were discounted at this stage as they were not considered viable from an engineering perspective due to potential interface with another OHL project. Therefore, these options are not discussed further in this document.

OHL Alignment Option A1

- 3.2.3 OHL Alignment Option A1 is 6.2 km in length. This alignment option starts at Shin Substation and travels initially north-east, over the A837, with an eastern curve to travel across the B864 and Shin River where it joins OHL Alignment Option A2. It then travels east over the Far North Railway and A836, through an area of forestry and onto moorland with areas of Class 1 and 2 peatlands. Class 1 peatland refers to areas of *nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.* Class 2 peatland refers

⁵ SSEN Transmission (2020) PR-NET-ENV-501: Procedures for Routeing Overhead Lines and Underground Cables of 132kV and above. REV 2.00

to areas of *nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation and restoration value.* It continues on this trajectory for approximately 5.6 km, remaining within a range of 80-130 m north of the existing Shin to Loch Buidhe OHL Connection and 130-170 m north of OHL Alignment Option B. OHL Alignment Options A1 and A2 connect to the UGC section into Loch Buidhe Substation at the proposed CSE — a sealed joint that protects the transition point between the OHL and UGC — located just south of an existing access track.

OHL Alignment Option A2

- 3.2.4 OHL Alignment Option A2 is 6.3 km in length. The alignment starts at Shin Substation and travels initially north-east, over the A837, before veering north and joining OHL Alignment Option A1 to cross the B864 and Shin River. It then travels east over the Far North Railway Line and A836, through an area of forestry and onto moorland with areas of Class 1 and 2 peatlands, for approximately 5.6 km, remaining approx. 80-130 m north of the existing Shin to Loch Buidhe OHL Connection and 130-170 m north of OHL Alignment Option B. It then veers southwest to rejoin the path of OHL Alignment Option A1 next to an existing access track, where both alignment options connect to the UGC section into Loch Buidhe Substation.

OHL Alignment Option B

- 3.2.5 OHL Alignment Option B is 6.4 km in length. The alignment starts at Shin Substation and travels northeast, over the A837, then veers east to cross the B864 and Shin River roughly 190 m south of where A1 and A2 cross. It extends east for roughly 2.6 km crossing the Far North railway line, the A836, and area designated as a Scheduled Monument (240 m long) through forested land before reaching open moorland. Following the same trajectory, the alignment option crosses the moorland, underlain with Class 1 and 2 peatlands, over which it travels for approximately 3.5 km, approximately 70-100 m south of the existing Shin to Loch Buidhe OHL Connection and 130-170 m south of A1 and A2. OHL Alignment Option B links to its CSE upon meeting an existing access track roughly 330 m southeast of A1 and A2 and C's CSE.

OHL Alignment Option C

- 3.2.6 OHL Alignment Option C is 6.6 km in length. It follows a more northerly path compared to the other alignment options. Beginning at Shin Substation, it travels northeast, crossing the A864, before shifting to a more northerly direction for 0.88 km along an existing pathway. The alignment then veers slightly eastward to cross the B864, the River Shin, approximately 110 m of Ancient Woodland Inventory, the Far North Railway line, and the A836 - 0.59 km north of where OHL Alignment Options A1 and A2 cross. From this point, the alignment extends east for 0.88 km over predominately Class 2 peatland, with a short stretch of Class 1 peatland, before curving southeast for 1.9 km to join Alignment Option A1 and A2 just east of an existing access route. OHL Alignment Option C then follows the path of OHL Alignment Options A1 and A2 for 2.6 km across Class 2 peatland ultimately reaching the proposed CSE.

UGC Alignment Option 4

- 3.2.7 UGC Alignment Option 4 is 2.3 km in length. It follows the preferred alignment of the LT430 Garvary Wind Farm to Loch Buidhe Substation Connection Route within a shared cable swathe. It begins by heading southeast for 0.66 km across Class 1 peatland, then veers east, crossing an existing access track just south of a junction where the track splits. From there, the alignment continues east for 1 km, across Class 2 peatland and the Allt an Dubh watercourse, until it converges with UGC Alignment Option 1 at Lochbuie Road. It then crosses the road and enters Loch Buidhe Substation from the south.

UGC Alignment Option 1

- 3.2.8 UGC Alignment Option 1 is 2.2 km in length. It begins at the CSE, approximately 2 km west of Loch Buidhe Substation. This option takes a more direct route to the substation, meaning a shorter overall distance compared to

UGC Alignment Option 4. Initially, UGC Alignment Option 1 heads east for 0.2 km, across Class 1 peatland, crossing an existing access track, before shifting southeast for 100 m. It then resumes an eastward direction for 1.3 km, through majority Class 2 Peatland, crossing another access track and the Allt an Dubh watercourse, before converging with UGC Alignment Option 4 at Lochbuie Road. From this point, it follows UGC Alignment Option 4 into Loch Buidhe Substation.

4. COMPARATIVE APPRAISAL

4.1 Introduction

4.1.1 The comparative appraisal for each Alignment Option has been completed in accordance with the methodology set out in SSEN Transmission guidance⁶. The guidance states that each Alignment Option should be evaluated with reference to the following agreed environmental criteria:

- Ecology and Ornithology;
- Hydrology;
- Cultural Heritage;
- Landscape and Visual; and
- Land Use.

4.1.2 Engineering and cost criteria are also assessed. All criteria should be considered in terms of the potential for the Proposed Development to be constrained. The RAG rating approach is considered too broad at Stage 3 as it could generally result in similar ratings for all options. Instead, a more descriptive appraisal is adopted, allowing for more detailed considerations of the differences in constraint to development between each option. More detailed guidance for topic specific considerations is included in Annex 9 and 10 of SSEN Transmission's approach to routing.

4.1.3 This chapter provides a summary of the potential environmental, technical and cost constraints identified for each Alignment Option.

4.2 Environmental Topics

4.2.1 The environmental constraints discussed below are shown on **Figures 4.1- 4.8, Annex A**.

OHL Alignment Option A1

4.2.2 Although OHL Alignment Option A1 does not directly intersect with any statutory designated sites, it passes through semi-natural woodland listed on the Ancient Woodland Inventory (AWI) north of Shin Bridge. Ancient semi-natural woodlands are protected due to their irreplaceable nature, thus the removal of such woodlands is strongly discouraged. Additionally, the alignment has the potential to indirectly impact the River Oykel SAC through pollutants entering the River Shin. OHL Alignment Option A1 traverses various woodland habitats that are suitable for red squirrel, pine marten, and roosting bats, and crosses watercourses likely to be Ground Water Dependant Terrestrial Ecosystems (GWDTEs), providing habitat for otters and water voles. The area covered by the alignment is also suitable for a range of protected, breeding, and Schedule 1 birds.

4.2.3 OHL Alignment Option A1 is more favourable regarding hydrology. It interacts with fewer surface water features, and does not intercept any Drinking Water Protected Areas (DWPA) or Private Water Supplies (PWS). However, the alignment crosses two areas of fluvial flood risk. OHL Alignment Option A1 is also marginally preferred in terms of impacts to peat, with 62-64% of its route underlain by Class 1 or Class 2 peatland, compared to the 71% that OHL Alignment Option C crosses.

4.2.4 OHL Alignment Option A1 is significant in terms of cultural heritage impacts, as passes in close proximity to two Scheduled Monuments (SM 5462 and SM 5498). Additionally, there are 15 non-designated heritage assets, 6 of which are of medium sensitivity and the others of low sensitivity.

4.2.5 OHL Alignment Option A1 is preferred regarding landscape impacts, as it does not intercept any landscape designations and represents the least disturbance to residents, due to reducing the need for removal of woodland and riparian habitats, thereby minimising landscape effects during both construction stage and in the long term. OHL Alignment Option A1 is also preferable in terms of visual effects, as it passes through the area with minimal intrusion to the skyline, has greater screening by trees, and is relatively distant from visual receptors.

⁶ Routing Overhead Lines, SSEN Transmission [routing-overhead-lines.pdf](#)

- 4.2.6 OHL Alignment Option A1 avoids common grazing land and land included in the public register of crofts. The alignment also avoids interaction with commercial forestry. The alignment would not be contrary to local planning policy.

OHL Alignment Option A2

- 4.2.7 OHL Alignment Option A2 does not directly intersect with any statutory designated sites, it passes through semi-natural woodland listed on the AWI north of Shin Bridge. Additionally, the alignment has the potential to indirectly impact the River Oykel SAC through pollutants entering the River Shin. OHL Alignment Option A2 traverses various woodland habitats that are suitable for red squirrel, pine marten, and roosting bats, and crosses watercourses likely to be GWDTEs, providing habitat for otters and water voles. The area covered by the alignment is also suitable for a range of protected, breeding, and Schedule 1 birds.
- 4.2.8 Along with OHL Alignment Option A1, OHL Alignment Option A2 is more favourable regarding hydrology. It interacts with fewer surface water features, and does not intercept any DWPA or PWS. However, the alignment crosses two areas of fluvial flood risk. OHL Alignment Option A2 is also marginally preferred in terms of impacts to peat, with 62-64% of its route underlain by Class 1 or Class 2 peatland, compared to the 71% that OHL Alignment Option C crosses.
- 4.2.9 OHL Alignment Option A2 passes in close proximity to one Scheduled Monument (SM 5498) and one Category B Listed Building (LB 265). Additionally, there are 13 non-designated heritage assets, 6 of which are of medium sensitivity, and the others of low sensitivity.
- 4.2.10 OHL Alignment Option A2 does not intercept any landscape designations. It runs slightly closer to residential properties than OHL Alignment Option A1 east of Shin Substation but still minimises the removal of woodland and riparian habitats, thus minimising landscape effects during both the construction stage and in the long term. OHL Alignment Option A2 passes through the area with minimal intrusion to the skyline and has greater screening by trees.
- 4.2.11 OHL Alignment Option A2 avoids common grazing land and land included in the public register of crofts. The alignment also avoids interaction with commercial forestry. The alignment would not be contrary to local planning policy.

OHL Alignment Option B

- 4.2.12 OHL Alignment Option B is preferred regarding ecological impacts as it avoids statutory designations and AWI woodland. However, like the other OHL options, it still has the potential to impact the Strath Oykel and crosses woodland habitats that are suitable for red squirrel, pine marten, and roosting bats, and watercourses likely to be GWDTEs, providing habitat for otters and water voles. The area covered by the alignment is also suitable for a range of protected, breeding, and Schedule 1 birds.
- 4.2.13 OHL Alignment Option B crosses an additional drain and is in closer proximity to Allt Loch Leisgein. OHL Alignment Option B does not intercept any DWPA or PWS. However, the alignment is least preferred regarding flood risk, due to its proximity to Allt Loch Leisgein. OHL Alignment Option B is also marginally preferred in terms of impacts to peat, with 62-64% of its route underlain by Class 1 or Class 2 peatland, compared to the 71% that OHL Alignment Option C crosses.
- 4.2.14 The centreline of OHL Alignment Option B crosses Scheduled Monument (SM 5498) and it is in close proximity to one Category B Listed Building (LB 265). Additionally, there are 23 non-designated heritage assets, 4 of which are of medium sensitivity, and the other of low sensitivity.
- 4.2.15 OHL Alignment Option B is least preferred regarding amenity impacts to people, as it is closest to residential properties. Although OHL Alignment Option B does not intercept any landscape designations, it is less preferred than OHL Alignment Options A1 and A2 as it would likely cause more disruption to residents. Visual receptors are also more likely to experience impacts on views with OHL Alignment Option B.

- 4.2.16 OHL Alignment Option B avoids common grazing land and land included in the public register of crofts. The alignment also avoids interaction with commercial forestry. The alignment would not be contrary to local planning policy. The nearest of Balblair Wind Farm's turbines are proposed to be in closest proximity to Alignment Option B, approximately ~450 m south.

OHL Alignment Option C

- 4.2.17 Although OHL Alignment Option C does not directly intersect with any statutory designated sites, it passes through semi-natural woodland listed on the AWI north of Shin Bridge. Additionally, the alignment has the potential to indirectly impact the River Oykel SAC through pollutants entering the River Shin. Alignment OHL Alignment Option C traverses less woodland than the other options, although the woodland habitats it does intersect are of greater ecological value, suitable for red squirrel, pine marten, and roosting bats. OHL Alignment Option C crosses watercourses likely to be GWDTEs providing habitats for otters and water vole, and blanket bog habitats. The area covered by the alignment is also suitable for a range of protected, breeding, and Schedule 1 birds
- 4.2.18 While OHL Alignment Option C follows a more northerly path and has the same number of watercourse crossings as OHL Alignment Options A1 and A2, it is situated near a tributary of the River Shin, making it less favourable. OHL Alignment Option C does not intercept any DWPA or PWS. However, the alignment is least preferred regarding flood risk, due to its proximity to Allt Loch Leisgein. OHL Alignment Option C is least preferable in terms of impacts to peat, with 71% of its route underlain by Class 1 or Class 2 peatland.
- 4.2.19 OHL Alignment Option C does not pass in close proximity to any designated heritage asset, making it most preferable with regard to cultural heritage. Although, there are 15 non-designated heritage assets, 5 of which are of medium sensitivity, and the others of low sensitivity.
- 4.2.20 OHL Alignment Option C does not intercept any landscape designations. The initial segment of OHL Alignment Option C would pass through woodlands and roads that currently have no breaks. Minimising disturbance to riparian vegetation is essential to preserving the local character of the area, as a result, OHL Alignment Option C is least preferred. In the segment traversing the valley between Cnoc Breac and Sron Ach a Bhacaidh, OHL Alignment Option C will run along the mid-slope of Cnoc Breac. This will result in increased visual effects for receptors walking to popular nearby hills (Cnoc Breac and Sron Ach a Bhacaidh), as well as in the area near Aultnagar Lodge, where adjacent woodland would be felled to clear the wayleave corridor, introducing overhead lines into southern views (where previously no overhead lines were visible, with existing lines located behind the hill). As a result, OHL Alignment Option C is least preferred with regard to landscape and visual impacts.
- 4.2.21 OHL Alignment Option C avoids common grazing land and land included in the public register of crofts. The alignment does however intersect Achinduich Forest Plan Boundary. The alignment would not be contrary to local planning policy.

UGC Alignment Option 4

- 4.2.22 UGC Alignment Option 4 directly intersects the Strath Carnaig and Strath Fleet Moors SPA, SSSI and IBA, which is designated for its nationally important population of breeding hen harriers. UGC Alignment Option 4 passes through areas of wet heath, blanket bog, and flush habitat, which are likely GWDTEs. UGC Alignment Option 4 also crosses various watercourses suitable for water vole, with confirmed water vole burrows. As mentioned, the alignment directly occurs within the SPA/SSSI/IBA and interferes with habitat suitable for various protected and Schedule 1 species.
- 4.2.23 UGC Alignment Option 4 crosses the same number of watercourses as UGC Alignment Option 1, however, UGC Alignment Option 4 is located further from additional watercourses and drains and is therefore preferred. UGC Alignment Option 4 does not intercept any DWPA or PWS. UGC Alignment Option 4 is situated further from areas of high flood risk than UGC Alignment Option 1, so it is preferred. Both UGC Alignment Options cross large areas of Class 1 and 2 peatland with little difference between the total interface of each option.

- 4.2.24 There are no designated heritage assets crossed by UGC Alignment Option 4 or in its close proximity. Although, there are four non-designated heritage assets, all of which are of low sensitivity.
- 4.2.25 There is no substantial difference between the UGC Alignment Options regarding their potential visual impact on residential receptors, as constructional impacts are temporary and undergrounding the cables effectively mitigates most potential effects. Neither UGC Alignment Option will impact the Dornoch Firth National Scenic Area (NSA), which lies approximately 6 km to the south. However, UGC Alignment Option 4 is longer than UGC Alignment Option 1 and follows a slightly higher part of the slope along Sidhead Mor. Consequently, UGC Alignment Option 4 would affect a larger area of moorland grasses, which are a key characteristic of the Landscape Character Type (LCT); LCT 135: Rounded Hills – Caithness and Sutherland. Additionally, the open trenches and exposed soil during and after construction will be more visible, particularly from the footpath leading to Sleastary, which runs parallel to UGC Alignment Option 4. Therefore, to minimise landscape disturbance and visual impacts, UGC Alignment Option 4 is less preferred.
- 4.2.26 UGC Alignment Option 4 avoids common grazing land, land included in the public register of crofts, and commercial forestry. The alignment would not be contrary to local planning policy. All UGC options would pass beneath Lochbuidhe road and into Loch Buidhe Substation. The proposed Carnaig Substation (24/05062/FUL) will be constructed immediately south of Loch Buidhe Substation and use the same entrance for site access. The project teams will interface with each other.

UGC Alignment Option 1

- 4.2.27 UGC Alignment Option 4 directly intersects the Strath Carnaig and Strath Fleet Moors SPA, SSSI and IBA, which is designated for its nationally important population of breeding hen harriers. UGC Alignment Option 1 passes through areas of wet heath, blanket bog, and flush habitat, of which are likely GWDTEs. UGC Alignment Option 1 also crosses various watercourses suitable for water vole, with confirmed water vole burrows. As mentioned, the alignment directly occurs within the SPA/SSSI/IBA and interferes with habitat suitable for various protected and Schedule 1 species.
- 4.2.28 UGC Alignment Option 1 crosses the same number of watercourses as UGC Alignment Option 4, however, UGC Alignment Option 1 is located closer to additional watercourses and drains, therefore, UGC Alignment Option 1 is less preferred. UGC Alignment Option 1 does not intercept any DWPA or PWS. UGC Alignment Option 1 is situated closer to areas of high flood risk than UGC Alignment Option 4, so it is less preferred. Both UGC Alignment Options cross large areas of Class 1 and 2 peatland with little difference between the total interface of each option.
- 4.2.29 There are no designated heritage assets crossed by, or in close proximity to, UGC Alignment Option 1. Although, UGC Alignment Option 1 does not include the area allocated to a ruined farmstead (MHG 63030), it does directly cross a possible field bank (HA 024), of low sensitivity.
- 4.2.30 There is no substantial difference between the UGC Alignment Options regarding their potential visual impact on residential receptors, as constructional impacts will be temporary and undergrounding the cables effectively mitigates any potential effects. Neither UGC Alignment Option will impact the Dornoch Firth NSA, which lies approximately 1 km to the south. However, UGC Alignment Option 1 is shorter than UGC Alignment Option 4 and follows a slightly lower part of the slope along Sidhead Mor. Consequently, UGC Alignment Option 1 would affect a smaller area of moorland grasses, which are a key characteristic of the LCT. Additionally, the open trenches and exposed soil during and after construction will be less visible, particularly from the footpath leading to Sleastary, which runs parallel to UGC Alignment Option 4. Therefore, to minimise landscape disturbance and visual impacts, UGC Alignment Option 1 is preferred.
- 4.2.31 UGC Alignment Option 1 avoids common grazing land, land included in the public register of crofts, and commercial forestry. The alignment would not be contrary to local planning policy. All UGC options would pass beneath Lochbuidhe road and into Loch Buidhe Substation. The proposed Carnaig Substation (24/05062/FUL) will be constructed immediately south of Loch Buidhe Substation and use the same entrance for site access. The project teams will interface with each other.

4.3 Engineering Topics

- 4.3.1 The following appraisal compares the four OHL alignment options based on technical and logistical engineering factors. Common characteristics are outlined below, while key differences are detailed within the individual OHL alignment sections.
- 4.3.2 All four alignment options cross the A837 adjacent to Shin Substation, the B864 near the the Shin River, and the A836 near the railway line. As such, all options are comparable in terms of road crossings.
- 4.3.3 Per a desktop study, none of the alignment options have contaminated land or unexploded ordinance (UXO) present, falling under low risk category. All options are comparable in terms of contaminated land.
- 4.3.4 Using SEPA flood map data, the Shin River presents a very low risk of flood for all alignment options, with minor flood risks at intersections easily mitigated by tower placements. Therefore, all options are comparable in terms of flooding.
- 4.3.5 All alignment options cross public roads with sufficient access routes available, making them comparable in terms of construction access.

OHL Alignment Option A1

- 4.3.6 Major crossings for OHL Alignment Option A1 include the existing 132 kV Shin-Loch Buidhe OHL due to termination at Shin Substation, one railway crossing near the Shin Substation, and a 42m-wide Shin River crossing which is not considered major. The route runs parallel to the north side of the existing Shin-Loch Buidhe OHL. OHL Alignment Options A1/A2 are the preferred alignments regarding major crossings.
- 4.3.7 Elevation profile for OHL Alignment Option A1 includes approximately 2.35km of the alignment above 200m AOD (38% of the route) with a maximum elevation of 222m. The terrain consists of high slopes near Shin Substation but flattens after crossing Shin River.
- 4.3.8 OHL Alignments Options A1, A2, and B have pollution ratings within low ranges for Carbon Dioxide, Nitrogen Oxides, Sulphur Dioxide, and particulate matters PM₁₀, PM_{2.5}, PM₁, and PM_{0.1}. They are largely comparable in terms of atmospheric pollution.
- 4.3.9 OHL Alignment Option A1 contains moderate terrain challenges with an average slope gradient and a PEAT class-2 near Loch Buidhe Substation.
- 4.3.10 OHL Alignment Options A1, A2, and C have higher angle support requirements compared to OHL Alignment Option B.
- 4.3.11 OHL Alignment Option A1 maintains a clearance of over 100m from nearby buildings and properties. No residential or urban developments within a close range.
- 4.3.12 OHL Alignment Options A1, A2, and C have sufficient distances from wind farms.
- 4.3.13 OHL Alignment Options A1, A2, and C avoid extra Distribution Network Operator (DNO) crossings compared to OHL Alignment Option B.
- 4.3.14 Overall, OHL Alignment Option A1 is identified as the preferred alignment from an engineering standpoint, with fewer crossings and terrain challenges compared to other options.

OHL Alignment Option A2

- 4.3.15 OHL Alignment Option A2 has similar major crossings as OHL Alignment Option A1, with an additional crossing of the 33kV OHL SHEPD which is not considered major. Like OHL Alignment Option A1, it runs parallel to the north side of the existing Shin-Loch Buidhe OHL, ending with one railway crossing and the 42m-wide Shin River crossing.
- 4.3.16 The route for OHL Alignment Option A2 has around 3.05km of its alignment above 200m AOD (48% of the route) with a maximum elevation of 223m. It shares a high-gradient near Shin Substation that flattens out after crossing Shin River, similar to A1.

- 4.3.17 OHL Alignments Options A1, A2, and B have pollution ratings within low ranges for Carbon Dioxide, Nitrogen Oxides, Sulphur Dioxide, and particulate matters PM10, PM2.5, PM1, and PM0.1. They are largely comparable in terms of atmospheric pollution. Similar to OHL Alignment Option A1 in terms of terrain challenges and peat areas. Both options run parallel to existing Shin-Loch Buidhe OHL.
- 4.3.18 OHL Alignment Options A1, A2, and C have higher angle support requirements compared to OHL Alignment Option B.
- 4.3.19 OHL Alignment Option A2 maintains a clearance of over 100m from nearby buildings and properties. No residential or urban developments within a close range.
- 4.3.20 OHL Alignment Options A1, A2, and C have sufficient distances from wind farms.
- 4.3.21 OHL Alignment Options A1, A2, and C avoid extra DNO crossings compared to OHL Alignment Option B.
- 4.3.22 Although OHL Alignment Option A1 is identified as the preferred alignment from an engineering standpoint, OHL Alignment Option A2 is also viable but may require additional mitigations.

OHL Alignment Option B

- 4.3.23 OHL Alignment Option B mirrors the major crossing features of OHL Alignment Options A1 and A2 but includes a possible interface with a new 400kV OHL. This route runs parallel to the south side of the existing Shin-Loch Buidhe OHL. It crosses the existing 132KV Shin-Loch Buidhe OHL, a 33kV OHL SHEPD, and has the same railway and Shin River crossings.
- 4.3.24 OHL Alignment Option B has only 0.55km of its alignment above 200m AOD (9%), with a maximum elevation of 213m. The gradient is less steep near Shin Substation and flattens after crossing Shin River. OHL Alignment Option B is the preferred alignment due to its lowest percentage of the route above 200 m AOD.
- 4.3.25 OHL Alignment Options A1, A2, and B have pollution ratings within low ranges for Carbon Dioxide, Nitrogen Oxides, Sulphur Dioxide, and particulate matters PM10, PM2.5, PM1, and PM0.1. They are largely comparable in terms of atmospheric pollution.
- 4.3.26 OHL Alignment Option B displays the lowest slope gradient near Shin Substation and has a less challenging terrain profile overall compared to OHL Alignment Option A1 and A2. Also contains a PEAT class-2 area.
- 4.3.27 OHL Alignment Option B has the least number of angle supports (03), making it preferred for cost and constructiveness, whereas OHL Alignment Options A1, A2, and C have higher angle support requirements.
- 4.3.28 OHL Alignment Option B has one property within 100m which poses slight proximity challenges.
- 4.3.29 OHL Alignment Option B has proximity issues with the proposed Balblair Wind Farm, thus it is least preferred
- 4.3.30 OHL Alignment Options A1, A2, and C avoid extra DNO crossings compared to OHL Alignment Option B.
- 4.3.31 Although OHL Alignment Option B has multiple advantages, such as fewer angle supports and moderate terrain, but proximity to existing properties and wind farms make it less favourable.

OHL Alignment Option C

- 4.3.32 Crossings for OHL Alignment Option C include the existing 132KV Shin-Loch Buidhe OHL, the 33kV OHL SHEPD, one railway crossing near Shin Substation, and the 42m-wide Shin River crossing which is not considered major. OHL Alignment Option C closely matches the crossings of OHL Alignment Options A1 and A2.
- 4.3.33 OHL Alignment Option C includes 2.93km of alignment above 200m AOD (44%), featuring high elevation gradients and similar terrain profile to OHL Alignment Option A1 and A2 with a high gradient near Shin Substation.
- 4.3.34 OHL Alignment Option C deviates into areas with slightly higher pollution rates, with 10% of the route falling in the mid-range for both Carbon Dioxide and Nitrogen Oxides, making OHL Alignment Option C least preferred.

- 4.3.35 OHL Alignment Option C exhibits the most challenging terrain with the highest slope gradients and similar peat areas as other options.
- 4.3.36 OHL Alignment Options A1, A2, and C have higher angle support requirements than OHL Alignment Option B.
- 4.3.37 OHL Alignment Option C maintains a clearance of over 100m from nearby buildings and properties. No residential or urban developments within a close range.
- 4.3.38 OHL Alignment Options A1, A2, and C have sufficient distances from wind farms.
- 4.3.39 OHL Alignment Options A1, A2, and C avoid extra DNO crossings compared to OHL Alignment Option B.
- 4.3.40 Overall, OHL Alignment Option C is least preferred due to higher pollution levels and terrain challenges.
- 4.3.41 **Table 4.1** below summarises the engineering appraisal RAG ratings.

Table 4.1: Engineering Comparison Table – OHL Alignments

Category	Option A1	Option A2	Option B	Option C
Infrastructure Crossing				
Major Crossings	H	H	H	H
Minor Roads	L	L	L	L
Environmental Design				
Elevation	H	H	L	H
Atmospheric Pollution	L	L	L	H
Contaminated Land	L	L	L	L
Flooding	L	L	L	L
Ground Condition				
Terrain	I	I	I	I
Peatland	H	H	H	H
Construction and Maintenance				
Access	I	I	I	I
Angle Towers	H	H	L	H
Proximity				
Clearance Distance	I	I	H	I
Windfarms	I	I	H	I
Communication Masts	L	L	L	L
Urban Developments	L	L	L	L
Metallic Pipes	L	L	L	L
Route Length	L	L	L	I
DNO Crossings	L	L	L	L

UGC Alignment Options 1 and 4

- 4.3.42 Both alignment options encounter multiple major crossings due to developments around Loch Buidhe Substation. These crossings include existing and future planned infrastructure such as 132 kV OHLs, railways, rivers/lochs, and major roads. Each crossing requires specific UGC solutions to address constraints. Both alignment options require

the same road crossings: one crossing of the existing stone access track, one crossing of the Lochbuie Rd (C-class public road), and one crossing of the Substation access road.

- 4.3.43 Higher elevations increase difficulty for construction and maintenance. UGC Alignment Option 4 has 25% of its alignment above 200m altitude, while UGC Alignment Option 1 has 19%. Steep slopes present significant routing challenges. UGC Alignment Option 4 encounters maximum slope gradients of approximately 9, while UGC Alignment Option 1 encounters gradients of 13%. For the remainder, mild slopes and elevation changes are common. Both options are therefore comparable.
- 4.3.44 Data from the National Atmospheric Emission Inventory shows no significant risk from atmospheric pollution across the entirety of the route between the proposed CSE and Loch Buidhe Substation. No known areas of contaminated land or UXO risk were identified in the initial desktop study for any of the alignment options.
- 4.3.45 SEPA maps indicate no surface water flooding risk along the alignment options, although surface water features from tributaries and peatland may incur seasonal high-water levels. Geological data indicates insufficient borehole records at this stage, though the terrain is expected to be rocky. The Carbon and Peatland Map (2016) data reveals varying depths of peat along the majority of each alignment option. Therefore, both options are comparable.
- 4.3.46 Access for construction and maintenance for both alignments is available via existing stone access tracks and substation road.
- 4.3.47 Both options are considered comparable in terms of angle deviations.
- 4.3.48 Both alignment options maintain more than 150 m from existing residential properties, 500 m from nearest wind turbines, and 1 km from nearest communication mast.
- 4.3.49 Both alignment options are less than 10 km, thus reactive compensation is not required. UGC Alignment Option 4 is 2.27 km, whilst UGC Alignment Option 1 is 2.2 km. Both options are similar length, implying comparable requirements for joint bays link box chambers.
- 4.3.50 Overall, both UGC alignment options are generally comparable across various criteria including major crossings, environmental impact, ground conditions and proximity considerations. However, UGC Alignment Option 4 is preferred due to potential efficiencies in sharing the UGC alignment and haul road with the LT430 Garvary Wind Farm Connection Project, which may minimise environmental impact and reduce construction costs.
- 4.3.51 **Table 5.2** below summarises the engineering appraisal RAG ratings.

Table 5.2: Engineering Comparison Table – UGC Alignment Options

Category	Option 1	Option 4
Major Crossings	High	High
Road Crossings	Low	Low
Elevation	Intermediate	Intermediate
Atmospheric Pollution	Low	Low
Contaminated Land	Low	Low
Flooding	Intermediate	Intermediate
Terrain	Intermediate	Intermediate
Rock	Intermediate	Intermediate
Peat	High	High
Access	Low	Low
Angles of Deviation	Low	Low
Cable Haul Road	High	High

Clearance Distance	Low	Low
Wind Farms	Low	Low
Communication Masts	Low	Low
Urban Environments	Low	Low
Metallic Pipes	Low	Low
Reactive Compensation	Low	Low
Joint Bays	Low	Low
Route Length	Low	Low
ESQCR	Low	Low
Existing Utilities	Intermediate	Intermediate
Project Interfaces	Low	Low

4.4 Cost

- 4.4.1 Costs were not assessed in detail as part of this alignment selection process but were considered during development design meetings in which the alignment options were discussed. The following provides an overview of the main considerations relating to cost.

Capital

- 4.4.2 Due to similarities in the alignment options, all options are generally considered comparable in terms of capital costs.
- 4.4.3 There is presence of woodland along all alignment options, however the capital costs associated with tree felling and compensatory planting are all within < 120% of least cost option.
- 4.4.4 All alignment options require use of underground cable which require greater capital costs associated with material procurement. Underground cable is notably more expensive than OHL solutions for any given distance, and generally used only in instances where an OHL is unsuitable. In this development, all alignment options would require to use a section of underground cable approximately 2.3 km in length to connect into Loch Buidhe Substation. Both UGC Alignment Option 1 and UGC Alignment Option 4 are considered comparable based on capital cost.

Operational

- 4.4.5 Operational costs relate to inspections and maintenance. Due to the similarities between the alignment options, operational costs are considered to be comparable with no notable preference.

4.5 Comparative Analysis Summary

Environmental Summary

Overhead Line

4.5.1 The key environmental considerations in determining the Preferred Alignment are as follows:

- Natural Heritage – Designations: OHL Alignment Option B is preferred in terms of designated sites as it avoids statutory designations. However, all options have potential to indirectly impact the River Oykel SAC.
- Natural Heritage – Habitats: OHL Alignment Option B is marginally preferable as this avoids crossing areas of AWI woodland northeast of Loch Shin Substation. All options cross woodland habitat, the River Shin, wet heath, blanket bog, flushes, watercourses, and likely GWDTEs. All options cross through wet heath and flush habitat confirmed as GWDTEs.
- Natural Heritage – Hydrology and Flood risk: OHL Alignment Options A1 and A2 are preferred, as they interact with fewer surface water features compared to OHL Alignment Options B and C. All four OHL Alignment Options cross two areas of fluvial flood risk: the River Shin and Allt Loch Leisgein. While there is little difference between the routes in terms of flood risk, OHL Alignment Options A1, A2, and C are marginally preferred over OHL Alignment Option B.
- Cultural Heritage: OHL Alignment Option C is the preferred OHL option as it does not pass in close proximity to any designated heritage asset.
- Natural Heritage – Peat: Deviation OHL Alignment Options A1, A2 and B are marginally preferred over OHL Alignment Option C as these interface with shorter areas of Class 1 and Class 2 peatland (approximately 62-64% of the total alignment lengths). OHL Alignment Option C deviates from the other three options by crossing Cnoc Breac, which is predominately mapped as an area of Class 2 peatland (approximately 71% of the total alignment length comprises Class 1 or Class 2 peatland).
- BNG – Overall, the results of the biodiversity assessment confirm that the Preferred Alignment for the Proposed Development is OHL Alignment Option A1. While this option contains areas of irreplaceable habitat—including approximately 5.84 ha of blanket bog and 0.51 ha of Ancient Woodland—it has been selected based on a balanced consideration of environmental, technical, and planning constraints. The assessment highlights that a significant portion of the alignment passes through Very High and High distinctiveness habitats, reinforcing the need for careful design and mitigation. Measures such as micro-siting and the use of low-impact construction methods (e.g. bog mats) are recommended to minimise biodiversity impacts in line with the mitigation hierarchy.
- Landscape and Visual – Overall, OHL Alignment Option A1 is preferred in landscape terms, as it avoids designated landscapes and causes the least visual disruption to residents. It also minimises woodland and riparian habitat removal, reducing landscape impacts both during construction and in the long term. Visually, OHL Alignment Option A1 is favourable as it introduces minimal skyline intrusion, benefits from greater tree screening, and remains relatively distant from key visual receptors.

4.5.2 Taking into account the conflicting preferences of the above key considerations and the trends in preference for other topics, on balance the overall marginal preference from an environmental perspective for the **OHL would be Alignment Option A1**, followed closely by the OHL Alignment Option B.

Underground Cable

4.5.3 The key environmental considerations in determining the Preferred Alignment are as follows:

- Natural Heritage - Hydrology: Both UGC Alignment Options cross the same number of watercourses, resulting in potential disturbances during the construction of associated infrastructure. However, UGC Alignment Option 1 is located in close proximity to additional watercourses and drains, increasing the potential for hydrological impacts. As a result, UGC Alignment Option 4 is preferred in terms of surface water features.
- Natural Heritage – Flood risk: UGC Alignment Option 1 is situated directly south of an area with a high risk of fluvial flooding associated with nearby drains. In contrast, UGC Alignment Option 4 is positioned further south,

effectively avoiding this flood-prone area. As a result, UGC Alignment Option 4 is preferred in terms of flood risk.

- Landscape and Visual: Due to the shorter distance compared to UGC Alignment Option 4, UGC Alignment Option 1 is preferred for both landscape character types and visual amenity.
- BNG: The Preferred UGC Alignment would be UGC Alignment Option 4. This option would likely have lower overall biodiversity impacts as it would pass through 0.4 km less irreplaceable blanket bog habitat than UGC Alignment Option 1.

- 4.5.4 Taking into account the conflicting preferences of the above key considerations and the trends in preference for other topics there is little environmental preference between either UGC alignment option. **As such the UGC Alignment Option 4 is considered the preferred UGC option.**

Engineering Summary

Overhead Line

- 4.5.5 **OHL Alignment Option A1 is the preferred OHL alignment** from an engineering standpoint based on the data available, however it should be noted that OHL Alignment Option A2 is also a viable solution from a technical standpoint but may need to consider additional mitigations as a result of the higher angle on existing PL16 terminal tower at Shin Substation. Given the number of extra mitigations required to facilitate the OHL Alignment Options B and C, these would most likely be the most challenging options to develop and therefore the least preferable.

Underground Cable

- 4.5.6 **UGC Alignment Option 4 is the preferred UGC alignment.** UGC Alignment Options 1 and 4 are generally comparable when compared against all the criteria, however UGC Alignment Option 4 is preferred to UGC Alignment Option 1 since there is an opportunity to share the UGC alignment and therefore construction haul road with the LT430 Garvary Wind Farm Connection project, enabling efficiency in terms of the cable design and construction haul road design and costs, as well as minimising the environmental impact.
- 4.5.7 There are significant engineering challenges and risks associated with UGC Alignment Option 4 which need to be carefully managed and mitigated as the project progresses through detailed design and beyond. The main challenges include construction in peat, and major infrastructure crossings in terms of both existing OHL/UGC infrastructure including future planned developments in the area. Interfaces with other projects currently in development in the Loch Buidhe area will need to be carefully managed.

Cost Summary

- 4.5.8 Given the similarities between the alignment options, all are considered comparable in terms of capital costs with no notable preference.

4.6 Summary of Preferred Alignment

- 4.6.1 Based on the assessment of environmental and engineering constraints the preferred alignments are OHL Alignment Option A1 and UGC Alignment Option 4 (**Figure 4.8, Annex A**). OHL Alignment Option A1 is marginally preferred from both an environmental and engineering standpoint, while cost is not considered to influence the decision. There are minimal differences between UGC Alignment Option 4 and UGC Alignment Option 1, however UGC Alignment Option 4 passes through less irreplaceable habitat and has the benefit of sharing the UGC alignment and therefore construction haul road with the LT430 Garvary Wind Farm Connection project.

5. CONSULTATION ON THE PROPOSALS

- 5.1.1 SSEN Transmission 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.

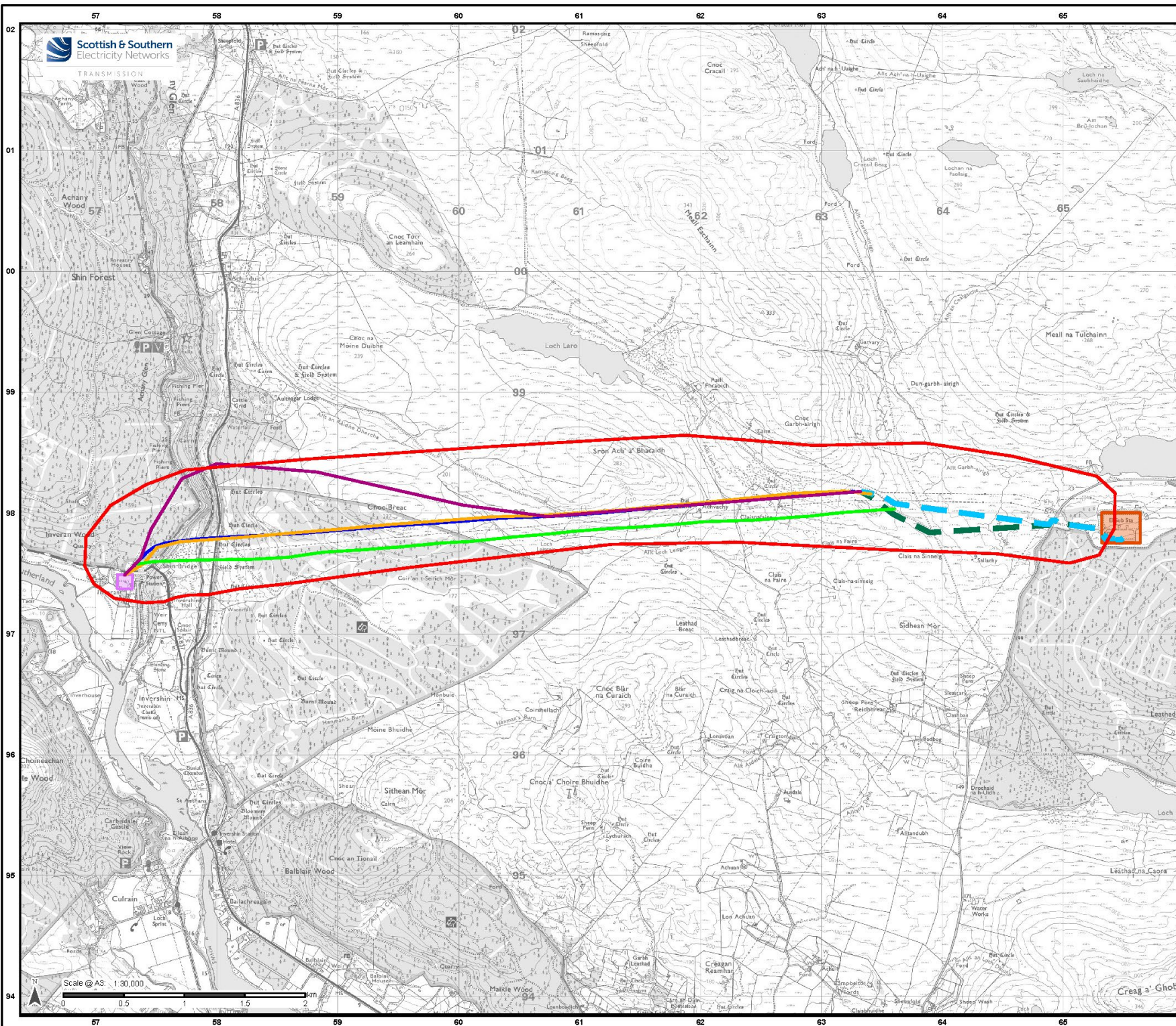
5.2 Questions for Consideration by Consultees

- 5.2.1 When providing your comments and feedback, SSEN Transmission would be grateful for your consideration of the questions below:
7. Has the project information provided explained the need for the Shin – Loch Buidhe 132 kV Rebuild project?
 8. Do you feel sufficient information has been provided to enable you to understand what is being proposed and why?
 9. Are there any additional factors, or environmental features, that you consider important and should be brought to the attention of the project team?
 10. Do you have any other comments about the proposed alignments?
 11. Following review of the provided information, how would you describe your understanding of the Shin – Loch Buidhe 132 kV Rebuild project?
 12. Are there any particular concerns or queries you would like to highlight to the team about this project?

5.3 Next Steps

- 5.3.1 A consultation event will be held on Wednesday 27th of August 2025 at Bonar Bridge Community Hall, Bonar Bridge, IV24 3EA between 3pm -7pm as detailed in the preface of this document. The responses received from the consultation event, and those sought from statutory consultees and other stakeholders, will inform further consideration of the Route Alignments put forward, and the identification of a Preferred Alignment Option to take forward to the next stage in consenting process (EIA stage).
- 5.3.2 All comments are requested by Friday 26th September 2025. A Report on Consultation will be produced following the consultation, which will document the consultations received and the decisions made in light of these responses.

ANNEX A: FIGURES

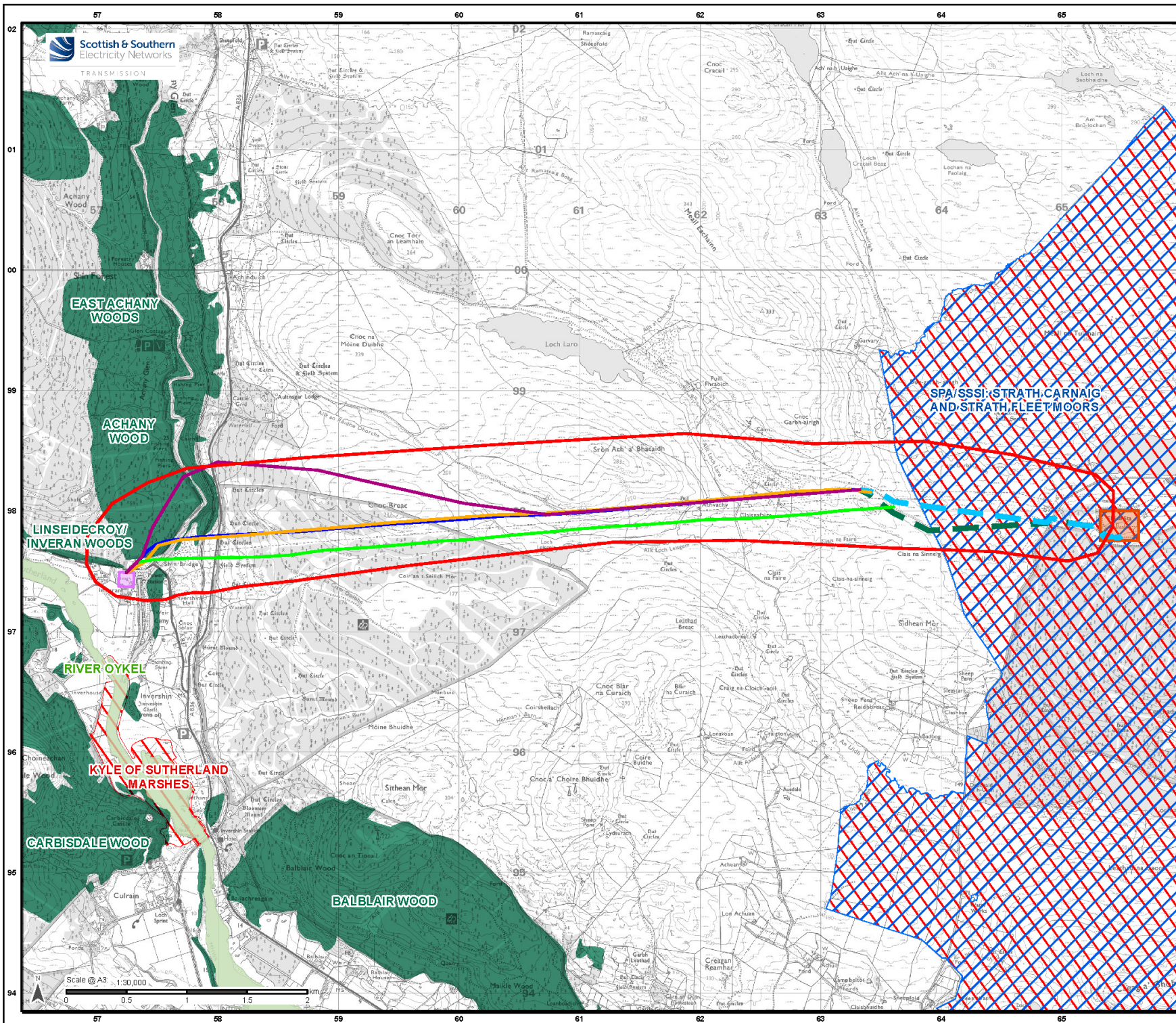


Legend

- Proposed Route
- Substation**
 - Loch Buidhe
 - Shin
- Overhead Line Alignment**
 - A1
 - A2
 - B
 - C
- Underground Cable Alignment**
 - - - 1
 - - - 4

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Project No: LT000499
Project: LT499 Shin to Loch Buidhe
Title: <div>Figure 1.1: Alignment Options</div>
Drawn by: AMYM
Date: 30/07/2025
Drawing: 1620017309-RAM-MA-IA-00031_Fig1.1AlignmentOptions_02



Legend

- Proposed Route
- Substation**
 - Shin
 - Loch Buidhe
- Overhead Line Alignment**
 - A1
 - A2
 - B
 - C
- Underground Cable Alignment**
 - 1
 - 4
- Natural Heritage**
 - Ancient Woodland Inventory
 - Special Areas of Conservation
 - Special Protection Area
 - Sites of Special Scientific Interest



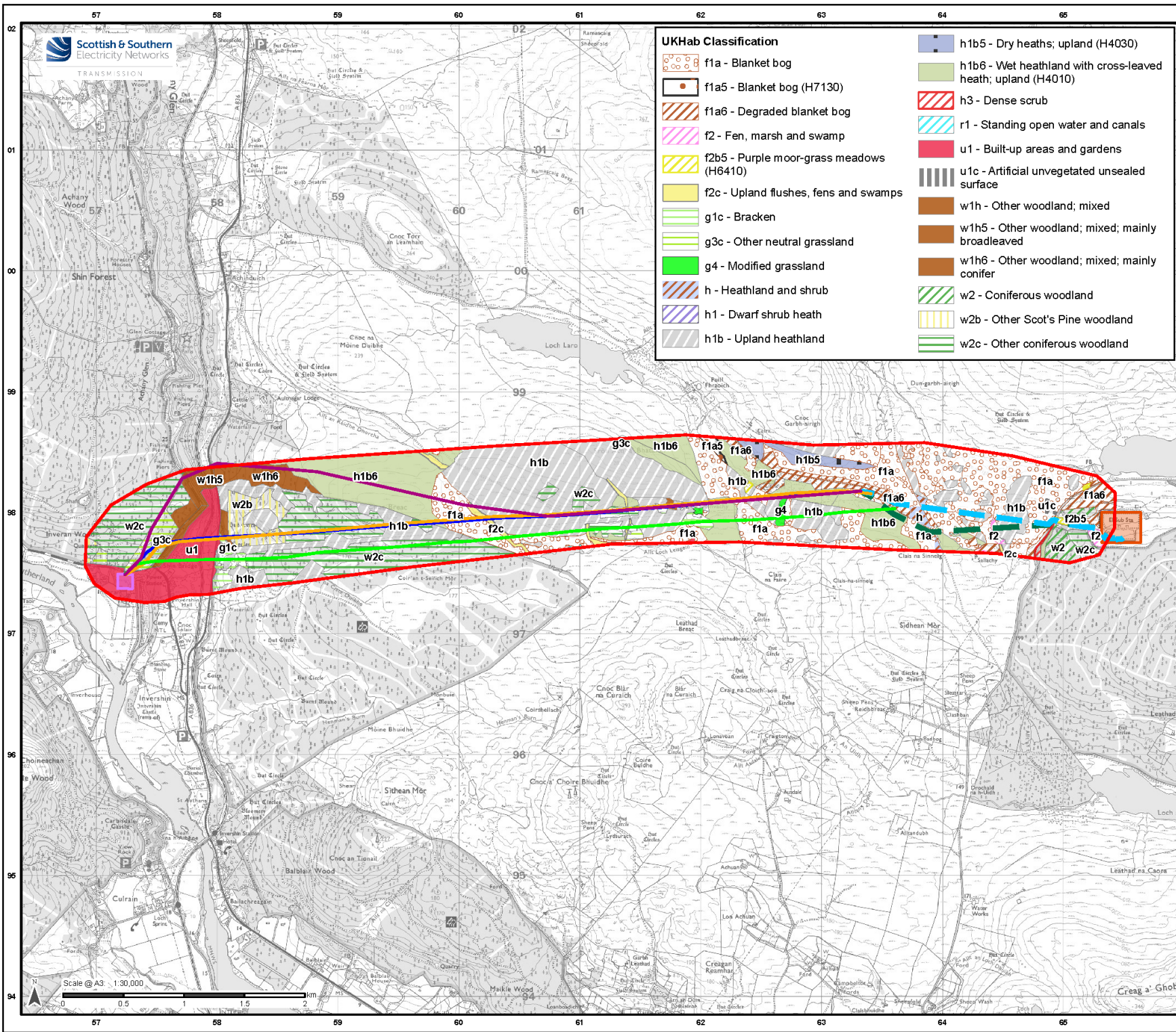
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Project No: LT000499
Project: LT499 Shin to Loch Buidhe

Title:
Figure 4.1: Natural Heritage Designations

Drawn by: AMYM Date: 30/07/2025

Drawing: 1620017309-RAM-MA1A-00032_Fig4.1NaturalHeritageDesignations_02



Legend

Proposed Route

Substation

Shin

Loch Buidhe

Overhead Line Alignment

A1

A2

B

C

Underground Cable Alignment

1

4

UKHab Classification

<div></div> f1a - Blanket bog	<div></div> h1b5 - Dry heaths; upland (H4030)
<div></div> f1a5 - Blanket bog (H7130)	<div></div> h1b6 - Wet heathland with cross-leaved heath; upland (H4010)
<div></div> f1a6 - Degraded blanket bog	<div></div> h3 - Dense scrub
<div></div> f2 - Fen, marsh and swamp	<div></div> r1 - Standing open water and canals
<div></div> f2b5 - Purple moor-grass meadows (H6410)	<div></div> u1 - Built-up areas and gardens
<div></div> f2c - Upland flushes, fens and swamps	<div></div> u1c - Artificial unvegetated unsealed surface
<div></div> g1c - Bracken	<div></div> w1h - Other woodland; mixed
<div></div> g3c - Other neutral grassland	<div></div> w1h5 - Other woodland; mixed; mainly broadleaved
<div></div> g4 - Modified grassland	<div></div> w1h6 - Other woodland; mixed; mainly conifer
<div></div> h - Heathland and shrub	<div></div> w2 - Coniferous woodland
<div></div> h1 - Dwarf shrub heath	<div></div> w2b - Other Scot's Pine woodland
<div></div> h1b - Upland heathland	<div></div> w2c - Other coniferous woodland

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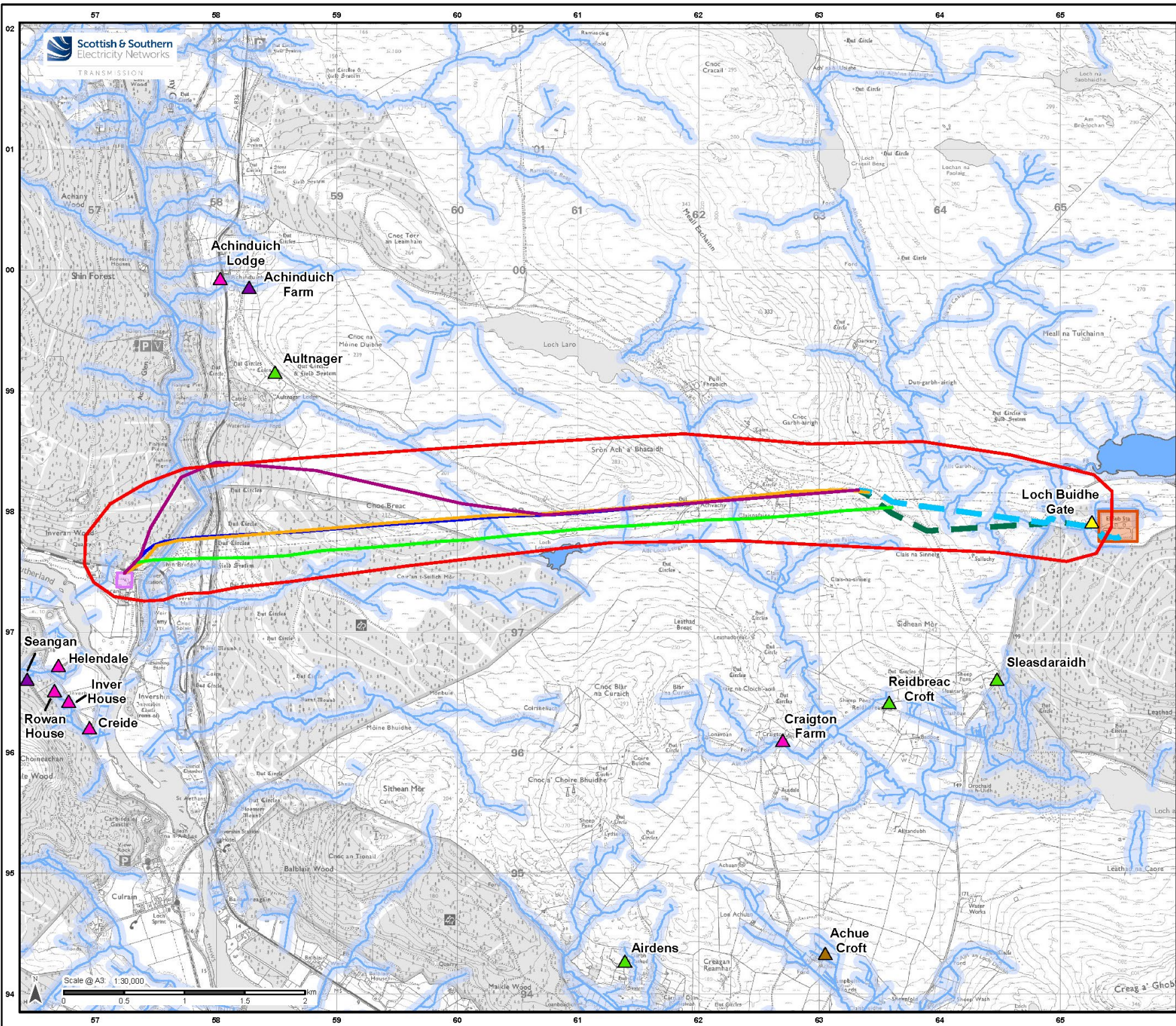
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Title: Figure 4.2: UKHab Classification

Drawn by: AMYM

Date: 30/07/2025

Drawing: 1620017309-RAM-MA-1A-00033_Fig4.2UKHabitatTypes_02



Legend

- Proposed Route
- Substation**
 - Shin
 - Loch Buidhe
- Overhead Line Alignment**
 - A1
 - A2
 - B
 - C
- Underground Cable Alignment**
 - 1
 - 4
- Surface Water Features**
 - Watercourse
 - Waterbody
 - Watercourse/body 50 m Buffer
- Private Water Supply**
 - Borehole
 - Spring
 - Rainwater
 - Stream
 - Well



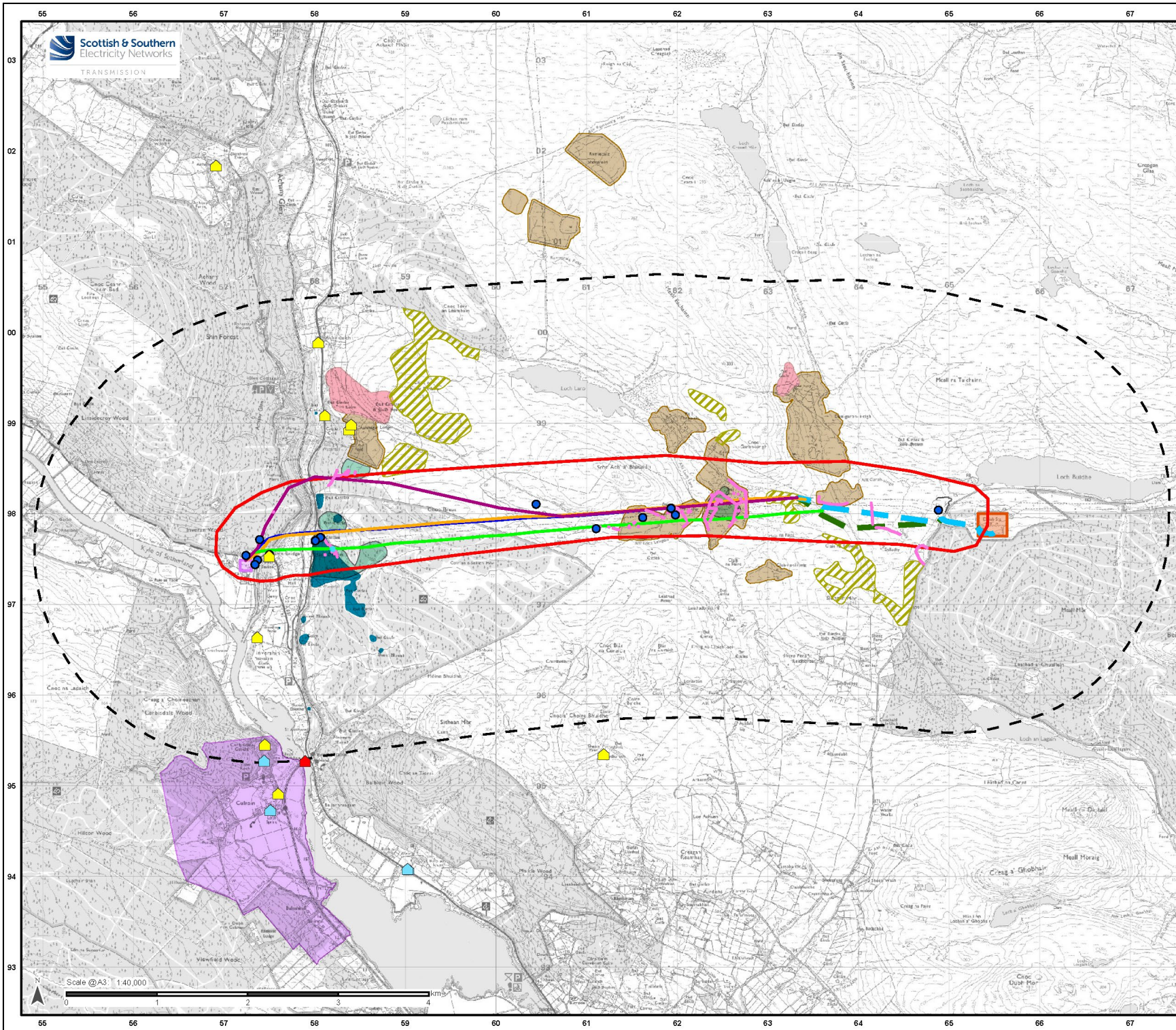
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Title:
Figure 4.3: Surface Water Features

Drawn by: AMYM Date: 30/07/2025

Drawing: 1620017309-RAM-MA-IA-00035_Fig4.3SurfaceWaterFeatures_02



Legend

- Proposed Route
- 2 km Study Area Buffer
- Substation**
 - Shin
 - Loch Buidhe
- Overhead Line Alignment**
 - A1
 - A2
 - B
 - C
- Underground Cable Alignment**
 - 1
 - 4
- Cultural Heritage**
 - Cultural Heritage Point
 - Cultural Heritage Line
 - Cultural Heritage Polygon
 - Traditional Peat Cutting
 - Scheduled Monument
 - Med/Post-Medieval Settlement Area
 - Prehistoric Settlement Area
 - Battlefield
- Listed Building**
 - Category A
 - Category B
 - Category C



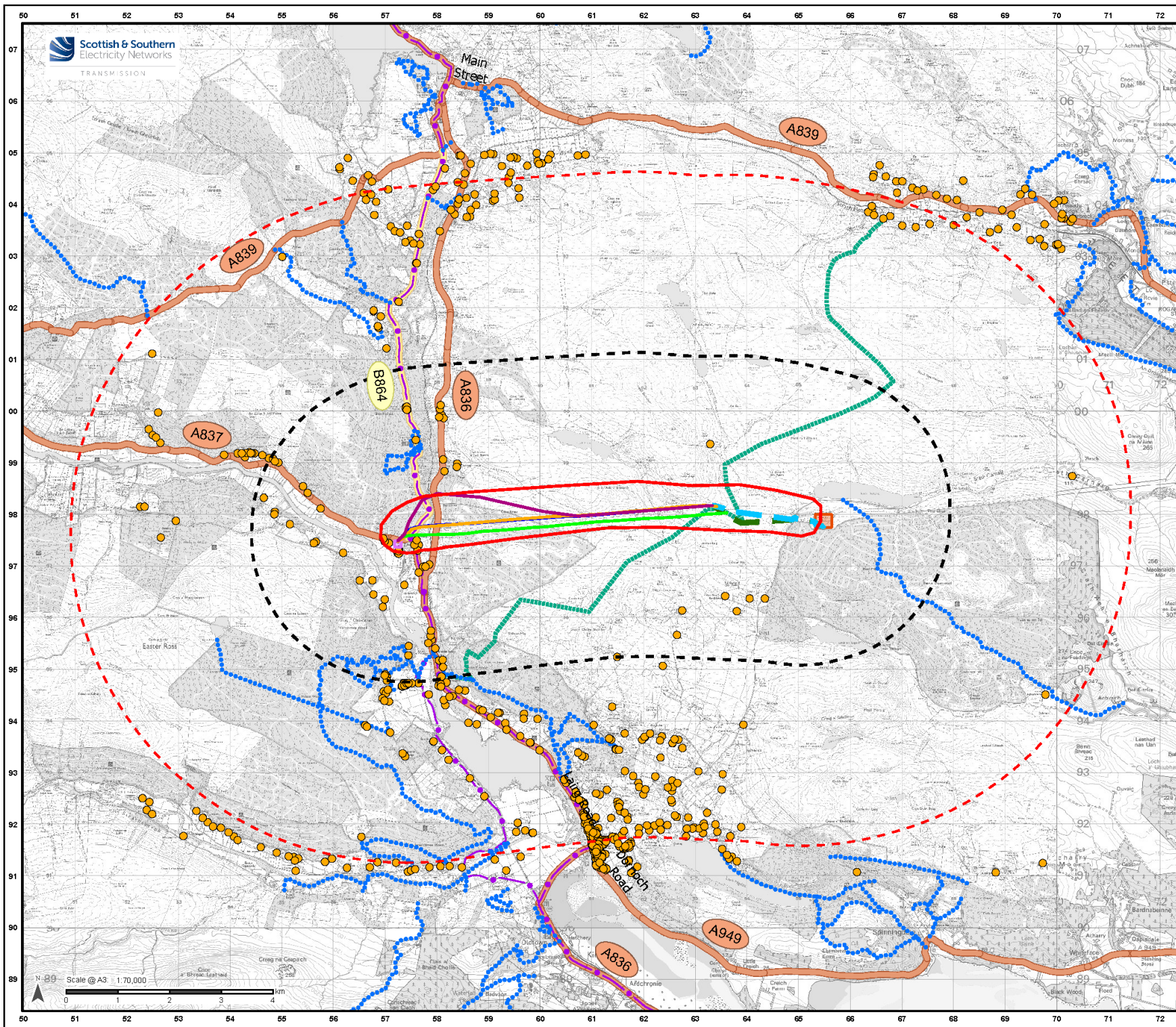
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Title:
Figure 4.4: Cultural Heritage Assets

Drawn by: AMYM Date: 30/07/2025

Drawing: 1620017309-RAM-MA-IA-00039_Fig4.4CulturalHeritageAssets_02



Legend

- Proposed Route
- 2.5 km Study Area Buffer
- 6 km Study Area Buffer
- Substation**
 - Shin
 - Loch Buidhe
- Overhead Line Alignment**
 - A1
 - A2
 - B
 - C
- Underground Cable Alignment**
 - 1
 - 4
- Visual Receptors**
 - Residential Property
 - Highland Core Path
 - Reclassified Cycle Route
 - Rogard Drove Road (Heritage Trail)
 - A Road
 - B Road

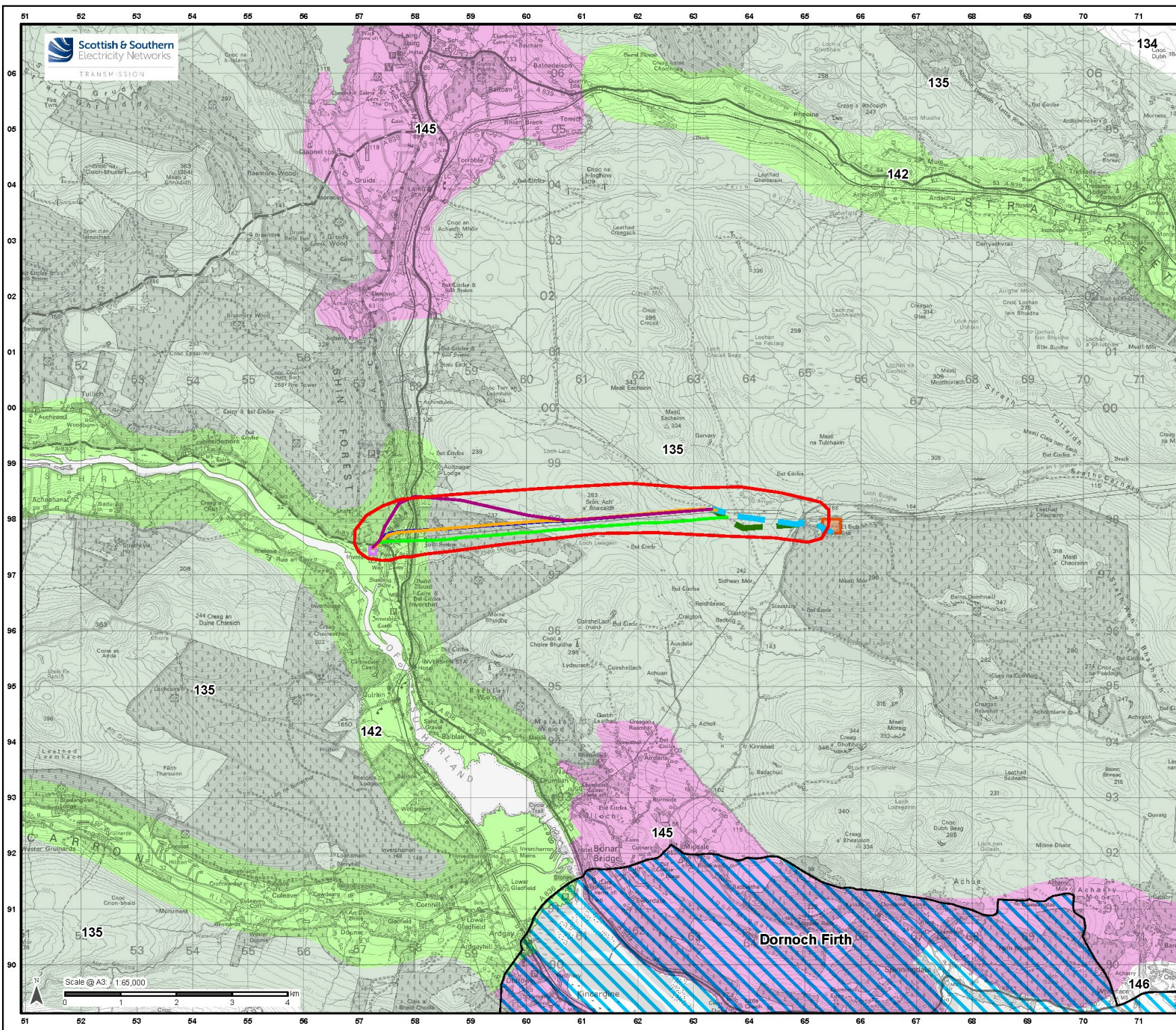


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Title:
Figure 4.5: Visual Receptors

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Drawing: 1620017309-RAM-MA-IA-00040_Fig4.5VisualReceptors_02



Legend

 Proposed Route

Substation

 Shin

 Loch Buidhe

Overhead Line Alignment

— A1

— A2

— B

— C

Underground Cable Alignment

— 1

— 4

Landscape Designations

 National Scenic Area

Landscape Character Type

 145) Farmed and Forested Slopes with Crofting

 135) Rounded Hills - Caithness & Sutherland

 142) Strath - Caithness & Sutherland



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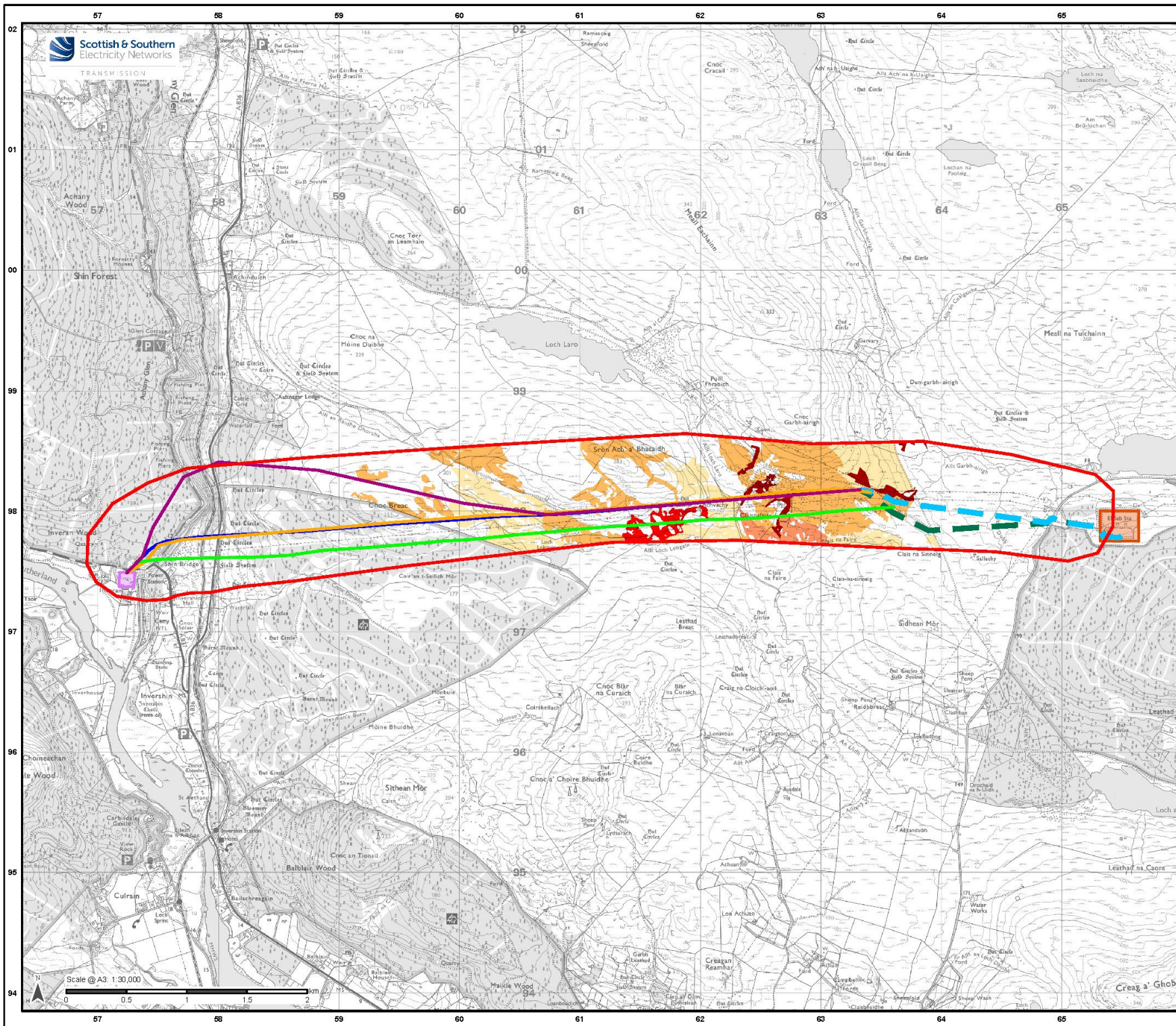
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Figure 4.6: Landscape Designations

Drawn by: AMYM

Date: 30/07/2025

Drawing: 1620017309-RAM-MA-JA-00041_Fig4.6LandscapeDes_02



Legend

Proposed Route

Substation

Shin

Loch Buidhe

Overhead Line Alignment

A1

A2

B

C

Underground Cable Alignment

1

4

National Vegetation Classification (NVC) and Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) Area

High

High (mosaic)

High-moderate mosaic

Moderate

Moderate (mosaic)



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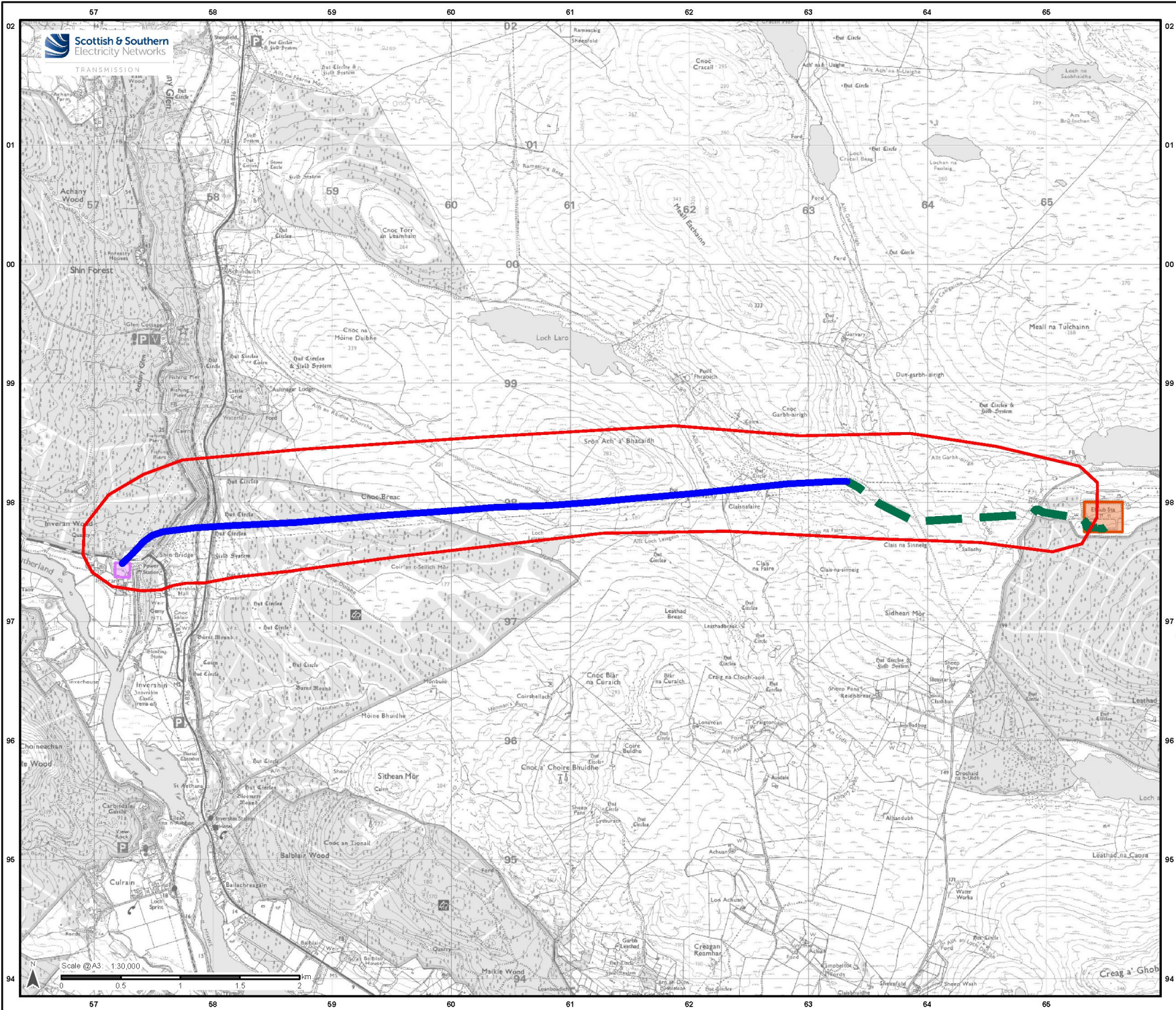
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Figure 4.7: NVC and Potential GWDTE Types

Drawn by: AMYM

Date: 30/07/2025

Drawing: 1620017309-RAM-MA-IA-00045_Fig4.7NVC&GWDTE_02



Legend

 Proposed Route

Substation

 Shin

 Loch Buidhe

Overhead Lines Alignment

 A1 - Preferred Alignment

Underground Cable Alignment

 4 - Preferred Alignment



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Title:
Figure 4.8: Preferred Alignment

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Drawing: 1620017309-RAM-MA-IA-00048_Fig4.8PreferredAlignment_02