VOLUME 2: CHAPTER 4 – THE SITE SELECTION PROCESS AND ALTERNATIVES

Figures and Visualisations (Volume 3a and 3b of this EIA Report)

There are no figures or visualisations associated with this chapter.

Appendices (Volume 4 of this EIA Report)

There are no appendices associated with this chapter.

4. THE SITE SELECTION PROCESS AND ALTERNATIVES

4.1 Introduction

This chapter outlines the site selection process and consideration of reasonable alternatives studied by the Applicant, in accordance with Regulation 51989(2)(d) and schedule 4, paragraph 2 of the EIA Regulations. It discusses the main reasons for selecting the site for the Proposed Development, and the design and layout options that have been considered.

The need for the project and the work undertaken by SSEN Transmission to assess the strategic electricity transmission infrastructure requirements to identify the most appropriate, viable, and long term, enduring technical design solution is explained in **Chapter 2 – Project Need**.

The following stages are described in this Chapter, along with their respective outcomes:

- The approach to the site selection stages of the project;
- Design solutions considered;
- Site selection stage process and consultation responses; and
- Other considerations to avoid or reduce likely significant effects.

The Scoping Opinion received from THC in February 2024 (**Volume 4 Appendix 1.2**) also provided further advice on the consideration of alternatives. These are listed below and have been considered throughout Stage 1 and Stage 2 site selection, which is detailed in **Sections 4.4** and **4.5** of this chapter.

A statement is required that outlines the main development alternatives studied by the applicant and an indication of the main reasons for the final project choice. This is expected to highlight the following:

- the design chapter should clearly set out the design evolution of the scheme including constraints to the delivery of that scheme;
- the range of technologies that may have been considered – we note that the 'Project Background' statement within the Scoping Report advises that one turbine company has discontinued turbine models as justification for new applications however does not appear to advise that the applicant has attempted to source turbines of approved dimensions from any other source.
- locational criteria and economic parameters used in the initial site selection;
- options for access;
- design and locational options for all elements of the proposed development (including grid connection); and,
- the environmental effects of the different options examined.

4.2 Approach to the Site Selection Stages of the Project

SSEN Transmission has obligations under Section 9 of the 1989 Act to 'develop and maintain an efficient, co-ordinated and economical system of electricity transmission'.

As a transmission licence holder under the 1989 Act, when formulating relevant proposals, the Applicant has a statutory duty under paragraph 3 of Schedule 9 to the 1989 Act to:

- "*have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*"; and
- "*do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*".

Furthermore, the requirements of the Construction (Design and Management) Regulations 2015[1] (CDM Regulations) require that the project design aims to minimise hazards and reduces risks during construction.

[1] http://www.legislation.gov.uk/uksi/2015/51/contents/made (accessed 23/02/2022)

Taking account of these obligations, SSEN Transmission has considered technical, economic and environmental factors in evaluating the reasonable alternatives for the Proposed Development with the objective of identifying a proposed site for the Proposed Development, which is technically feasible and economically viable, and which causes the least disturbance to the environment and to the people who live, work, visit and enjoy recreation in proximity to it.

4.3 Design Solutions Considered

Chapter 2 – Project Need describes the strategic electricity transmission infrastructure requirements that were considered for the purposes of delivering the Proposed Development. The particular characteristics of the design solution have to take into account compliance with the Applicant's statutory and licence obligations, and the delivery strategy that is designed to ensure that the drivers for the project can be met.

Following identification of the preferred site, the project gave consideration to different design solutions that could mitigate any likely significant environmental effects and support provision of Net Gain for Biodiversity as required by the Environment Act 2021[2], including any off-site requirements.

Guidelines for site selection [for new high voltage overhead lines] have been established within the electricity supply industry. These guidelines are known as the 'Holford Rules[3]' and have been widely used throughout the UK since the 1960s. Whilst the Holford Rules principally apply to the development of overhead lines, they continue to inform best practice and also contain supplementary notes on the siting of substations.

The Holford Rules set out a hierarchical approach to routeing which advocates avoiding areas of high amenity value, minimise changes in direction, take advantage of topography and minimise visual interaction with other transmission infrastructure.

SSEN Transmission has developed its own guidance[4] based on the principles set out in the Holford Rules, but broadening the basis for routeing decisions to reflect contemporary practice, and to provide a framework to ensure environmental, technical and economic considerations are identified and appraised at each stage of the site selection process. The site selection process for the Proposed Development has been completed in compliance with SSEN Transmission's guidance document.

The principal site selection stages undertaken have been:

- Stage 1: Initial Site Screening; and
- Stage 2: Detailed Site Selection.

This is an iterative process and involves an increasing level of detail and resolution, bringing cost, technical and environmental considerations together in a way which seeks to achieve the best balance at each of the two stages.

In accordance with the steps outlined in the aforementioned guidance, the following principles have been considered during the site selection (where practicable) stages of the Proposed Development;

- Respect areas of high amenity value and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area;
- Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas;
- Use space effectively to limit the area required for development, minimising the effects on existing land use and rights of way;
- Alternative designs of substations may also be considered, e.g. 'enclosed', rather than 'open', where additional cost can be justified;
- Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints; and

[2] The Environment Act 2021, UK Government, Accessed June 2024 at: https://www.legislation.gov.uk/ukpga/2021/30/contents
[3] The Holford Rules https://www.nationalgrid.com/sites/default/files/documents/13795-The%20Holford%20Rules.pdf (accessed 08/02/2024)
[4] Substation Site Selection procedures for Voltages at or above 132kV (document reference: PR-NET-ENV-502), June 2024.

- When siting substations take account of the effects of line connections that will need to be made.

4.4 Site Selection (Combined Stage 1 and Stage 2)

The selection stage of the project involved the identification of site options, and an appraisal of the environmental, technical and economic constraints of these site options, prior to arriving at a preferred site for the purposes of consultation and a proposed site to take forward to the EIA and Consenting Stage (Stage 3).

Site location options were identified for the project following desk-based review and site walkovers, giving due consideration to the principles set out in the Holford Rules and SSEN Transmission guidance, as set out in **Section 4.3** above.

Initially, 16 indicative site options (refer to **Volume 3 Figure 1.2**) were identified and appraised using SSEN Transmission 'Suitability Multi-Criteria Analysis' (MCA), desk based study, Geographic Information System (GIS) tool, site walkover and field reconnaissance.

Identification and appraisal of site options involved systematic consideration against the topic areas noted below:

- Natural Heritage
  - Designations;
  - Protected Species;
  - Habitats;
  - Ornithology; and
  - Hydrology / Geology.
- Cultural Heritage:
  - Designations; and
  - Cultural Heritage Assets.
- Proximity to Dwellings:
  - Residential Properties
- Landscape and Visual:
  - Designations;
  - Landscape Character; and
  - Visual Amenity.
- Land Use:
  - Agriculture;
  - Forestry; and
  - Recreation.
- Planning
  - Policy; and
  - Proposals
- Technical
  - Connectivity;
  - Footprint Requirements;
  - Hazards;
  - Ground Conditions;
  - Environmental Conditions;
  - Construction Access; and
  - Operation and Maintenance.
- Cost

- Capital; and
- Operational.

4.5 Summary of Site Selection (Stage 2)

The following part of this Chapter summarises the site options appraised during Stage 2 (Detailed Site Selection) of the site selection process[5].

Stage 2 sought to identify the main environmental and technical constraints, together with a preferred Site Option. Confirmation of the preferred site (i.e. which was taken to consultation), a summary of consultation responses, and confirmation of the proposed site (i.e. following consultation and taken to Stage 3: EIA and Consenting) is provided below.

4.5.1 Description of Sites

Three shortlisted sites (Site Options 7, 11 and 12) were assessed.

Site Option 7 is located 1.2 km southwest of the existing Spittal substation, partially within an area of coniferous woodland, and in close proximity to Achanarras Quarry SSSI and Conservation Review area.

Site Option 11 is adjacent to the existing Spittal Substation, running parallel to the A9, slightly north of Spittal, 90 m north of St Magnus Church and Burial Ground, Scheduled Monument.

Site Option 12 is situated 0.6 km to the northeast of the existing substation on the opposite side of the A9. The site is predominantly grassland, with drainage ditches and patches of conifer plantation also found on site.

4.5.2 Environmental summary

The environmental preferred site is Site Option 11. Site Option 7 has the potential for more significant landscape and visual impact. Site Options 11 and 12 are closely balanced, with Site Option 12 having potential for a higher impact on landscape and visual receptors and Site Option 11 the greater potential for impact on cultural heritage due to the St Magnus Hospital and Church Scheduled Monument adjacent to the southern site boundary. Of these two constraints, landscape and visual is considered likely to be more significant and as a result, Site Option 11 was marginally preferred.

4.5.3 Engineering summary

The engineering preferred site is Site Option 12 from connection, future expansion and connectivity aspects. Site Option 11 is also closely balanced from road access aspect but future expansion would be challenging. Site Option 7 is more challenging compared to Site Options 11 and 12 due to existing forestry requiring felling forest cutting and peatland possibility. The preferred option is Site Option 12.

4.5.4 Cost summary

The preferred site from a costing point of view would be Site Option 12. In general, the cost of the site construction across the three identified sites is similar. The main variable being driven by the distance from the existing 275 kV Spittal substation, the further the new site is from Spittal substation the more cost that is required for the excavation and material purchase for the connection between the two sites. The other factor is the civil works required. Site Option 11 would require substantial excavation works to produce a level platform. Site Option 7 consists mainly of commercial forestry with pockets of peat and this would be required to be excavated and relocated to another location. Site Option 12 will require civil works for the platform however it is a reduced requirement compared to the other two proposed options and in conjunction with the reduced cable length. Site 12 would result in reduced cost impact when compared.

[5] SSEN Transmission (2024) New Spittal Area 400kV substation and HVDC converter station (Banniskirk Hub). Available online, June 2024: https://www.ssen-transmission.co.uk/projects/project-map/banniskirk/

4.5.5 Preferred Site

The Stage 2 appraisal determined that overall Site Option 12 was the preferred option. Site Option 12 was considered to provide good corridor availability for the proposed OHL connection to Loch Buidhe, and a good situation for developing Site access from the A9 trunk road.

As the project progressed and the design developed the layout was amended to relocate the converter station to the south of the AC substation to suit the design requirements associated with the connection between the AC and DC sites, the proximity of assets to the operational quarry, engineering, and environmental constraints. The constraints include:

1. The proximity to Banniskirk Quarry had the potential to create challenges during operation of the AC substation and DC converter station due to vibration and dust generation from blasting and quarrying operations. It was therefore advised by our Operations team that the site should be located a minimum of 600 m from the quarry to eliminate any risk to network reliability. This is based on the proximity of other operational assets on our network to operational quarries including Blackhillock and Beauly.
2. Banniskirk Quarry is designated as a Site of Special Scientific Interest (SSSI) due to the presence of fossils. There was a significant risk that the early consultation layout would directly impact on the SSSI designation due to the proximity to the quarry. Moving the DC converter station to the West eliminates this risk.
3. It was identified there are significant areas of made ground and stockpiled waste material from Banniskirk Quarry within the footprint of the DC converter station in the early consultation layout. There is a high risk of contaminants being found in these types of material which can be difficult to dispose of safely and sustainably. Moving the DC converter station further West reduces the risk of encountering potential contaminants and helps to ensure favourable ground conditions for design and construction.
4. The electrical layout of the AC substation was not confirmed until after the early consultation. Once confirmed, it was identified that the required connection with the DC converter station would cross several other connections to the substation which had the potential to significantly reduce network reliability due to the number of outages required to maintain and operate safely. It was therefore decided to relocate the AC substation to the North of the DC converter station because this eliminated all crossings without increasing the plan area of the substation.

4.5.6 Consultation Responses

During consultations at Site Selection Stage, responses received form statutory and non-statutory consultees provided general support for the preferred Site Option 12 identified above. Environmental sensitivities were highlighted in consultation responses, particularly in relation to impacts on peat and hydrology. Comments from the local community largely concerned dwellings adjacent to the Proposed Development.

4.5.7 Proposed Site

Following review of consultation responses, SSEN Transmission determined that, subject to further consideration of environmental constraints and sensitivities at the site selection stage, the preferred site is taken forward as the proposed site.

4.6 Reporting of Site Selection Stage and Consultation

The appraisal of site options was set out in greater detail in the Consultation Document[6], published in February 2023. The Consultation Document provided a summary of project need, the site option process that had been undertaken and a description of the site options appraised. The Consultation Document sought comments from stakeholders and members of the public on the site selection studies undertaken, and the rationale for, and approach to, the selection of the preferred site.

The consultation events took place on the dates and locations listed below:

- 20th February (2.30 – 7pm) Halkirk – Ross Institute;

[6] Spittal – Loch Buidhe – Beauly 400kV Reinforcement, Overhead Line Routeing and Site Selection Consultation Booklet, February & March 2023

- 6th March (5 – 7 pm) Online Consultation Event.

Comments received from stakeholders in response to the Consultation Document or following consultation events, were documented in the Report on Consultation[7] (December 2023). The Report on Consultation confirmed that preferred Site Option 12 would be taken forward as the Proposed substation site to the EIA and Consenting Stage.

4.7 Further Consideration of Alternatives during the EIA Process and mitigation design

The work that was undertaken during the site selection stages of the project enabled a rigorous consideration of site location options and the consideration of different detailed design solutions available for the project. To further refine the design process leading up to the planning submission, a number of preliminary design workshops were held to identify the best site layout options for mitigating environmental effects and reducing the need for post- assessment applied mitigation. Options considered during this process included:

- Analysis of zones of theoretical visibility to determine where screening, either in the form of tree planting or earthwork bunds, would bring the most effective visual screening to the nearby visual receptors without constraining the proposed infrastructure;
- BNG modelling, based on the existing habitats present on Site that require replacement and/ or enhancement, to identify the best locations for achieving a 10% BNG;
- Landscape design input to identify the opportunities for the best use of overburden in creating earthwork bunds for screening purposes; and,
- Identification of opportunities for rerouting and re- naturalising watercourses on Site affected by the Proposed Development.

These exercises fed into the design process and are embedded environmental mitigation measures. This design was taken to another public consultation event at Halkirk on 3rd June 2024 (an initial PAC event was held on the 11th March), represented to the public with a 3D flythrough model that included the above landscape screening and planting. A summary of the feedback from this event is provided below (**Table 4.1**).

Table 4.1: Summary PAC Responses

Theme and Feedback	Response
Holistic overview Requests were received for information on all developments indicating the full extent of developer proposals in the area.	A list of projects that hold contracts for Transmission Entry Capacity (TEC) with National Grid, the Electricity System Owner is available from their website: nationalgrideso.com/data-portal/transmission-entry-capacity-tec-register. We know that residents are keen to understand the full extent of renewable developments being proposed in the area. Applications to connect to the transmission network in our license area are made to National Grid ESO and undergo a lengthy process of assessment before we begin to develop a network connection for those developments. We aim to be transparent about the renewable developments looking to connect to our network but are not permitted to disclose any details of these developments until they are in the public domain.
Lighting Concerns over the extent of lighting required during construction and operation were raised, and the potential for it to disrupt residents.	Construction work is likely to be during daytime periods only. Any out of hours working would be agreed in advance with The Highland Council. The access roads would not be lit under normal operation. A light would also be provided permanently at access gates. During operation lighting would be installed at the substation but would only be used in the event of a fault during the hours of darkness; during the over-run of planned works; or when sensor activated as security lighting for nighttime access.

[7] SSEN Transmission (2023) Report on Consultation – New Spittal Area 400kV Substation and HVDC Converter Station

Noise and dust From construction / road traffic was raised as a concern	We recognise that noise impacts during construction and operation of our assets can be a concern to residents. A Noise Impact Assessment is currently being prepared to support our planning application, which will assess the potential impact from construction and operational noise and, where necessary propose appropriate mitigation measures that will be agreed with The Highland Council as the planning authority. The proposed development would be required to meet noise limits set by The Highland Council. Appropriate mitigation would be implemented to ensure these limits are met at all noise sensitive receptors. The Environmental Impact Assessment (EIA) which will include details on the background noise monitoring will be publicly available when the application is submitted to The Highland Council. A Construction Environmental Management Plan (CEMP) will be produced that will detail the mitigation and management measures required to minimise environmental impact from the construction phase of the development. The CEMP forms a framework within which the measures will be implemented throughout the project.
Concerns about property value and requests for compensation	We understand that there are concerns about the potential impact of our proposed developments on properties within the vicinity of our proposed overhead line alignments and substations sites. Throughout the development of the Banniskirk Hub we have engaged with property owners and listened to their concerns on this topic. We will look to mitigate impacts on residential properties as far as possible and these impacts will be assessed as part of the Environmental Impact Assessments that will accompany our applications for consent. We have conducted extensive surveys at identified receptors, including selected residential properties so that we are able to model potential impacts on the wider area. Concerns in relation to impacts on property are being noted by our team however, as a regulated business, we are obliged to follow a statutory legal framework under the Electricity Act 1989 and Land Compensation Act 1961. If you are entitled to compensation under the legal framework we will assess any claim on a case-by-case basis under the direction of this legal framework.
Wildlife Migrating birds and loss of habitat.	Environmental Impact Assessment (EIA) survey work is currently underway to establish the full extent of all habitats and protected species present on site. Where sensitive habitats and species are present, we will seek to avoid them wherever possible, but where unavoidable, suitable mitigation measures will be identified and agreed in consultation with The Highland Council and NatureScot. Where mitigation measures are agreed, these will be passed onto the contractor in the form of a Commitments Register, supported by our own Species Protection Plans and General Environmental Protection Plans, to ensure that the measures are implemented as required. These measures will also form part of the Construction Environmental Management Plan (CEMP) for the project.
Environmental screening Requests were received for more information regarding	The landscape strategy for the development is currently being finalised and will be informed by the Landscape and Visual Impact Assessment (LVIA) undertaken as part of the EIA. The current proposals deliver boundary screening in the form of landscape bunds and mature landscape planting that seeks to mitigate the visual impact of the

how the site will be screened from peoples' views.	development and soften its appearance within the local environment. In addition, the colour of buildings located within the development has been selected to mitigate visual impact.
Impact on internet Potential impact on internet signal.	We will establish new infrastructure required to provide internet connectivity to the hub site for both construction and operational purposes. In terms of existing internet signal for surrounding residents, it is not expected that the proposed development will have any adverse impact. If any local stakeholder has any internet signal or connectivity issues when the construction commences, we will endeavour to do whatever possible to limit any adverse effects.
Roads Concerns raised regarding safety, volume of traffic and improvement planning.	A Construction Traffic Management Plan is currently in development and will be included in the Planning Application. This will detail expected traffic volumes and will be utilised during detailed design to optimise vehicle routes to and from the site. Any deterioration or damage to the existing road network during the construction period would be repaired and maintained by our chosen Principal Contractor for the hub site. We will liaise with The Highland Council as the planning authority to ensure any traffic management and traffic calming measures are implemented for the duration of the works, and all permanent works required are installed. The proposed access to the site is shown on the site layout contained within this booklet, this may be subject to change pending the Planning determination. A construction noise assessment is currently being undertaken by a specialist consultant and will be submitted as part of the Environmental Impact Assessment (EIA). This study will define current noise levels and any impacts the development may have on local receptors, and will include options for noise mitigation which will be incorporated into the overall design and construction phase planning for the development.

We also held a pre-application meeting with THC and took onboard feedback from PAC1, we took onboard feedback and amended the design to:

- remove the second permanent access point onto the A9;
- Moving the platform circa 65 m further from the A9 by siting the platforms and buildings as far as practical from the A9 and reducing the platform size; and
- further revision to the mounding in response to Landscape Officer feedback.