MSIP Re-opener Application Stage 1 – Windyhill – Lambhill – Denny North 400kV Reinforcement (DLUP)		
Ofgem Scheme Reference/ Name of Scheme	SPT200406 / Windyhill – Lambhill – Denny North 400kV Reinforcement (DLUP)	
Investment Category	Wider Works	
Primary Investment Driver	Thermal Uprating	
Secondary Investment Driver	Asset Health	
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (c)	
Materiality Threshold exceeded (£3.5m)	Yes, as a single project due to the threshold for activity 3.14.6 (c)	
PCD primary Output	Installation of Windyhill 400kV Substation and uprating of the Denny North – Lambhill – Windyhill 275kV circuit to 400kV operation.	
Total Project Cost (£m)	94.396	
Funding Allowance (£m)	To be confirmed	Requested
Delivery Year	2029/30	
Reporting Table	Annual RRP – PCD Table	
PCD Modification Process	Special Condition 3.14, Appendix 1	

Issue Date	Issue No	Amendment Details
31st January 2024	1	First issue of document.

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1. Abbreviations / Terminology

Table 1: Table of Abbreviations

Abbreviation	Term
ACSR	Aluminium Conductor Steel Reinforced
AAAC	All Aluminium Alloy Conductor
AIS	Air Insulated Switchgear
AOD	Above Ordnance Datum
BEIS	Department for Business, Energy & Industrial Strategy
CEC	Connection Entry Capacity
CfD	Contract for Difference
CION	Connection and Infrastructure Options Note
EISD	Earliest In Service Date
EoL	End of Life
FES	Future Energy Scenario
FNC	Final Needs Case
GIS	Gas Insulated Switchgear
GSP	Grid Supply Point
HND	Holistic Network Design
HTLS	High Temperature Low Sag
HVDC	High Voltage, Direct Current
INC	Initial Needs Case
ITT	Invitation to Tender
Km	Kilometre
kV	Kilovolt
LC	Licence Condition
LOTI	Large Onshore Transmission Investment
LSpC	Licence Special Condition
MITS	Main Interconnected Transmission System
MSCDN	Mechanically Switched Capacitor with Damping Network
MSIP	Medium Sized Investment Project
MW	Megawatt
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NGET	National Grid Electricity Transmission
NGESO	National Grid Electricity System Operator
NOA	Network Options Assessment
OEM	Original Equipment Manufacturer
OHL	Overhead Line
OTNR	Offshore Transmission Network Review
OFTO	Offshore Transmission Owner
PCD	Price Control Deliverable
RIIO	Revenue = Incentives + Innovation + Outputs
SGT	Supergrid Transformer
SHET	Scottish Hydro Electric Transmission
SPA	Special Protection Area
SPT	SP Transmission
SPEN	SP Energy Networks
SSSI	Site of Special Scientific Interest

STC	System Operator – Transmission Owner Code
TEC	Transmission Entry Capacity
UK	United Kingdom
VDUM	Volume Driver Uncertainty Mechanism

2. Reference Documents

Table 2: Table of Reference Documents

Document Reference	Title
SPEN-RIIO-T2 Business Plan	SP Energy Networks RIIO T2 Business Plan 2021 - 2026

3. Introduction

This MSIP Re-opener application sets out SP Transmission's (SPT) plans to establish Windyhill 400kV Substation and uprate the Denny North – Lambhill – Windyhill 275kV circuit to 400kV operation. The purpose of the project is to facilitate increased power transfer into and through the SPT network from renewable developments across the north of Scotland. These works are programmed to commence in the RIIO-T2 period (April 2021 – March 2026) and complete in 2029/30, during the RIIO-T3 period.

In the period since the RIIO-T2 business plan was submitted, expected increases in onshore and offshore wind generation, supported by the 2022 and 2023 Future Energy Scenarios (FES), confirm the need to deliver significant additional transmission capacity through central and southern Scotland in the period to the end of the current decade and beyond.

To ensure the electricity transmission system enables a timely transition to Net Zero, in line with United Kingdom (UK) and Scottish Government targets of 2050 and 2045 respectively, asset intervention must be considered in the context of both current and future system requirements. It is vital that the risk of repeated intervention on strategic routes and assets (and therefore repeated system access for construction purposes) is minimised, in particular where the need for such intervention within the operational lifetime of the replacement asset may reasonably be foreseen.

Integrating load and non-load related drivers in an economic, efficient and co-ordinated manner, it is therefore proposed to proceed with a scope of works which will: (i) establish a new 400kV substation at Windyhill; (ii) uprate the existing Denny North – Lambhill – Windyhill 275kV circuit to 400kV operation; and (iii) modernise and maximise the capability of the existing XD overhead line route. Project timing is dictated by: (i) the need for additional boundary capability through central and southern Scotland; and (ii) existing asset condition on the Denny North - Lambhill (XD) overhead line route.

This project was recommended to proceed by National Grid Electricity System Operator (NGESO) as part of the Network Options Assessment (NOA) published January 2022, reference NOA7 code DLUP – "*Following WLTI and DENU, increase the operating voltage of the Windyhill to Lambhill to Denny 275 kV circuit by the establishment of a new 400 kV gas insulated substation at Windyhill, the installation of a new 400/275 kV transformer at Windyhill 400 kV substation, a new 400/275 kV transformer at Lambhill substation and transferring existing 275 kV circuit onto the existing Denny 400 kV substation".* It was identified by NGESO as 'Required for 2029' in the Offshore Transmission Network Review (OTNR) Holistic Network Design (HND)[1] and recommended to proceed in the associated NOA7 Refresh[2] published July 2022.

The Windyhill – Lambhill – Denny North 400kV Reinforcement will help to ensure the network is ready for the changes required by Net Zero targets, facilitating new generation in Scotland and reducing constraint costs. It supports the maximisation of transfer capability via existing transmission overhead line routes and is fully aligned with other planned reinforcement of north to south transfer capability across Boundaries B4 and B5, which has also been recommended to proceed by the NOA process (e.g. ref. NOA7 codes LWUP, DWUP, TKUP, BDUP, TGDC and DWNO). The project scope and delivery sequence will be closely aligned with these complimentary projects to ensure an economic, efficient and co-ordinated overall programme of works to relieve thermal bottlenecks in the SPT network and enable the increased connection and transfer of renewable energy.

[1] The Pathway to 2030 Holistic Network Design (ref. Appendix 1).
[2] Network Options Assessment 2021/22 Refresh, July 2022

As part of Windyhill – Lambhill – Denny North 400kV Reinforcement, the development of Windyhill 400kV Substation represents a significant new 400kV substation development, utilising Gas Insulated Switchgear (GIS), in the north-west of the SPT network. It is proposed that Windyhill 400kV Substation is constructed initially to provide:

- Four circuits to Devol Moor, Lambhill/ Denny North, Windyhill SGT4 and SGT5; and
- Future capability for the connection of up to a further ten circuits.

Subject to separate regulatory approval(s), it is proposed that two of these further ten bays form part of the initial contract award and site development (two bays for the future connection of 400/132kV inter-bus transformers to serve a future Windyhill B 132kV Substation and support new generation connections in the Windyhill transmission group), with space retained within the GIS building for the future population of up to eight bays (four at each end of the building), as required.

The proposed configuration of Windyhill 400kV Substation will help to ensure the network is ready for the changes required by Net Zero targets. While capable of expansion, this configuration and tendering approach will help to reduce the risk of future busbar system extension requiring lengthy network outages and disruptive reconfiguration.

To develop the most economic, efficient and co-ordinated programme of works, and to ensure the best value for consumers, non-load requirements on the impacted circuits will be completed in conjunction with the load aspects.[3]

It is proposed to replace the existing 1962 vintage twin Zebra ACSR (core only greased) overhead line conductor systems on XD route with a modern High Temperature Low Sag (HTLS) conductor system, maximising the capacity of the route. Condition based major refurbishment of this route would be required in the RIIO-T3 period in order to ensure the assets remain fit for purpose and the associated circuits can remain in service.

This MSIP Re-opener application is submitted in accordance with Licence Special Condition (LSpC) 3.14.6 and relates specifically to LSpC 3.14.6 activity (c):

"3.14.6 The licensee may apply to the Authority for a direction amending the outputs, delivery dates or associated allowances in Appendix1 in relation to one or more of the following activities:

(c) a Boundary Reinforcement Project that has received a NOA Proceed Signal in the most recent NOA"

The needs case for the uprating of the existing Denny North – Lambhill – Windyhill 275kV circuit to 400kV operation and the factors that have an impact on the timing and scope of works are discussed in the following sections. Full justification for the preferred investment option is presented, together with a detailed description of the proposed solution.

The estimated total project cost may be subject to change. As agreed with Ofgem, a second stage MSIP submission will be made at the right time relating to the associated amendments outputs, delivery dates and allowances to be detailed as Price Control Deliverables (PCDs) in LSpC 3.14 Appendix 1.

[3] To that end, all associated non-load costs have been included within the cost estimate detailed in Section 7.

3.1 Structure of Document

This MSIP Re-opener is structured as follows:

Section 4 – Background and Needs Case

This section outlines the background to the proposed works and details the key project drivers.

Section 5 – Assessment of Options

This section sets out the approach taken to considering the distinct options available to address the needs identified in Section 4. The results of an evaluation of the alternative options are presented and the reasoning behind the selection of the preferred option is summarised.

Section 6 – Proposed Works

This section provides a description of the proposed solution. It sets out the scope and other key supporting information.

Section 7 – Project Cost Estimate

This section summarises the estimated cost of the selected option.

Section 8 – Project Delivery

This section outlines the approach which will be taken to deliver the project.

3.2 Requirements Mapping Table

Table 3 maps the requirements set out within Chapter 3 of the RIIO-T2 Re-opener Guidance and Application Requirements Document[4] against specific sections within this document.

Table 3: Requirements Mapping Table

Section	Description	Relevant Section(s) in RIIO-T2 Re-opener Guidance and Application Requirements Document
3	Introduction	3.3, 3.4
4	Background and Needs Case	3.8, 3.9, 3.10, 3.11
5	Assessment of Options	3.13, 3.14, 3.21, 3.22
6	Proposed Works	3.14, 3.16
7	Project Cost Estimate	3.12, 3.19, 3.20
8	Project Delivery	3.15, 3.17

[4] RIIO-2 Re-opener Guidance and Application Requirements Document: Version 2

4. Background and Needs Case

4.1 Statutory and Licence Obligations on SP Transmission plc

SP Transmission plc (SPT) is licenced under section 6(1)(b) of the Electricity Act 1989 ("the 1989 Act") to transmit electricity. The licence is granted subject to certain standard and special conditions. Under section 9(2) of the 1989 Act, SPT is required to fulfil the following duty:-

- *To develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and*
- *To facilitate competition in the supply and generation of electricity.*

This statutory duty is reflected in SPT's transmission licence. In addition, SPT has the following obligations pursuant to its licence conditions (LCs):-

- To at all times have in force a System Operator-Transmission Owner Code (STC) which, amongst other things, provides for the co-ordination of the planning of the transmission system (LC B12);
- To at all times plan and develop its transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and in so doing take account of National Grid Electricity System Operator's (NGESO's) obligations to co-ordinate and direct the flow of electricity on, to and over the GB transmission system (LC D3);
- To make available those parts of its transmission system which are intended for the purposes of conveying, or affecting the flow of, electricity so that such parts are capable of doing so and are fit for those purposes (LC D2); and
- To offer to enter into an agreement with the system operator on notification of receipt of an application for connection, or for modification to an existing connection (LC D4A).

Section 38 and Schedule 9 of the 1989 Act also impose duties on SPT when formulating any relevant proposals. In response to statutory and licence obligations upon it, SPT therefore requires to ensure that the transmission system is developed and maintained in an economic, co-ordinated and efficient manner, in the interests of existing and future electricity consumers, balancing technical, economic and environmental factors.

4.2 Key Project Drivers - Load Related

In June 2019, the UK parliament passed legislation introducing a binding target to reach net zero greenhouse gas emissions by 2050. In Scotland, the Scottish Parliament has committed Scotland to becoming a net zero society by 2045. The timely connection of low carbon generation, such as onshore and offshore wind, will play a vital role in reaching these legislated net zero targets.

The UK Government announced in October 2020 its commitment to make the UK a world leader in green energy and boosted the UK Government's previous 30GW target for offshore wind to 40GW by 2030. The current Scottish Government ambition is 20GW of onshore wind and 11GW of offshore wind in Scotland by 2030. Further commitments, by the UK Government in October 2021, to decarbonise the power system by 2035, as well as British Energy Security Strategy[5] published April 2022 (which raises the UK Government ambition to 50GW of offshore wind by 2030), further support the requirement for investment in the existing electricity transmission system to enable the timely connection and integration of the required renewable generation sources.

[5] British energy security strategy - GOV.UK (www.gov.uk)

On 9th September 2021, the former Department for Business, Energy & Industrial Strategy (BEIS) announced a £265m[6] budget per year for the Contracts for Difference (CfD) Allocation Round 4, which launched on 13th December 2021 and concluded on 7th July 2022. For the first time since 2015, established technologies, including onshore wind, were able to bid. Given lowering technology costs and a favourable subsidy regime, this will support a considerable number of onshore renewables projects to successfully transition from project inception and development through to energisation[7]. The results of the CfD Allocation Round 5 were announced on 8th September 2023, with annual auction rounds expected thereafter.

4.2.1 Offshore Wind Connections - ScotWind

The results of the ScotWind leasing process, a programme managed by Crown Estate Scotland to lease areas of the seabed around Scotland for offshore wind farm development, were announced on the 17th January 2022[8]. In summary:

- 17 projects with a capacity totalling 24.8GW were selected out of a total of 74 applications, and have been offered option agreements which reserve the rights to specific areas of seabed.
- A total of just under £700m will be paid by the successful applicants in option fees and passed to the Scottish Government for public spending.
- Initial indications suggest a multi-billion pound supply chain investment in Scotland.
- Of the 17 projects selected in January 2022, 6 are in the ScotWind East region[9] with a combined capacity of 10.5GW and option fees totalling £324.5m, of which 3 are in the East 1 Zone, with a combined capacity of 6.7GW and option fees totalling £199.8m.

Since the announcement of the initial ScotWind leasing results in January 2022, an additional 2.7GW of offshore wind has been leased in an area East of Shetland, taking the total ScotWind generation to 27.6GW. The ScotWind results underline both the scale of development potential off the north and east coasts of Scotland and the commitment from industry to delivering the investments in energy infrastructure necessary to meet Net Zero targets. Off the north and east coasts of Scotland in particular, there is very high potential for offshore wind generation, in areas illustrated by the BEIS/ Ofgem Offshore Transmission Network Review[10] (OTNR) Generation Map[11].

ScotWind offshore developments are expected to contribute towards the Scottish Government ambition of 11GW of offshore wind by 2030 and make a significant contribution towards 2045 and 2050 Net Zero targets.

It is vital that the onshore transmission system is developed in a timely manner to enable the benefits of ScotWind to be realised and contribute to the Scottish Government's offshore wind ambition of 11GW by 2030.

4.2.2 Onshore Generation Connections

In December 2022 the Scottish Government published its Onshore Wind Policy Statement[12], setting out its ambition deploy 20GW of onshore wind capacity by 2030.

[6] Biggest ever renewable energy support scheme backed by additional £265 million - GOV.UK (www.gov.uk)
[7] BEIS - Electricity Generation Costs (2020)
[8] Crown Estate Scotland - ScotWind offshore wind leasing delivers major boost to Scotland's net zero aspirations
[9] Sectoral Marine Plan for Offshore Wind Energy
[10] Offshore Transmission Network Review
[11] OTNR - Generation Map
[12] Onshore wind: policy statement 2022 - gov.scot (www.gov.scot)

SPT is experiencing an unprecedented volume of applications for connection, which has consequential impacts on the scope of SPT's wider suite of HND related works. As set out by Ofgem in its Open Letter of 16th May 2023 on reform to the electricity connections process[13], ensuring new generation assets can connect when and where they are needed will be crucial in achieving Net Zero, delivering affordability for consumers and maintaining security of supply.

[redacted]

4.2.3 Future Energy Scenarios

Each year, NGESO produces a set of Future Energy Scenarios (FES) for use by the Transmission Owners (TO's) as network investment planning backgrounds. Through application of the criteria set out in the NETS SQSS, the FES provide an indication of the capacity requirements of the system based upon the potential future connection of generation and changing demand profiles.

The north to south power transfer requirements on all of the northern transmission system boundaries increase significantly over the coming years due to the connection of new renewable generation throughout Scotland as part of the energy transition to meet legislated Net Zero targets. This trend is clearly demonstrated by the transfer requirements on the boundary between the SHET and SPT areas (Boundary B4), and through the central belt of Scotland in the SPT area (Boundary B5).

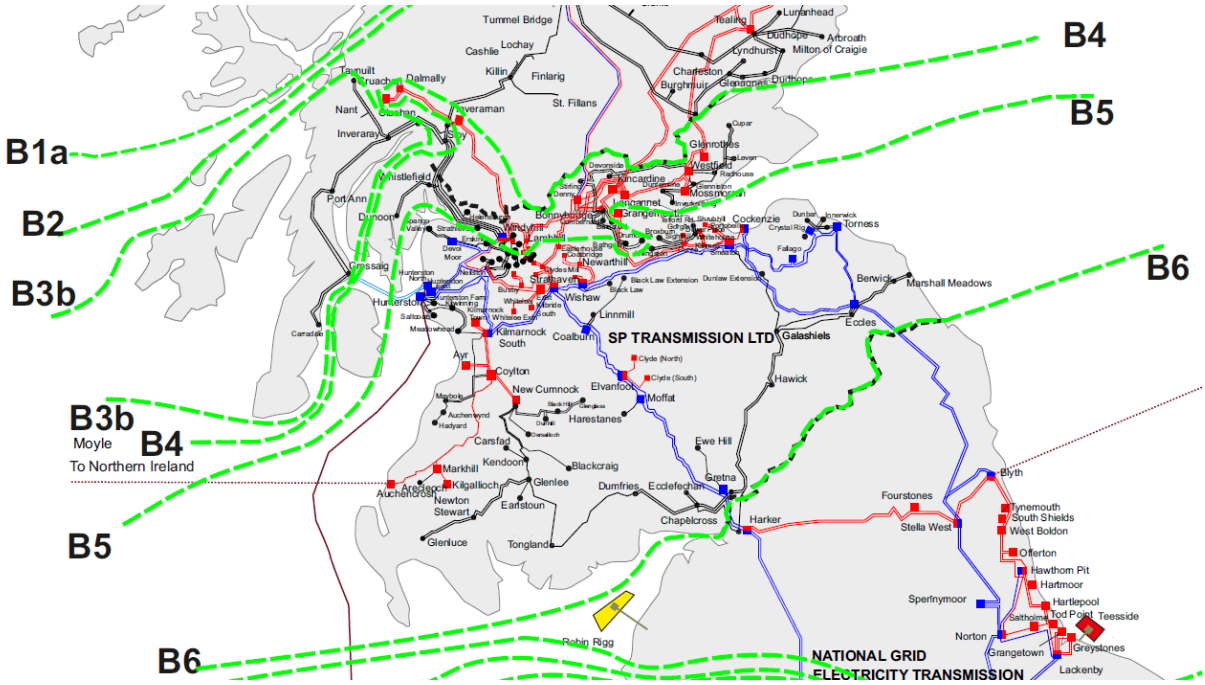

Figure 1: Network boundaries across SPT's network

Figure 2 indicates the 2022 FES and 2023 FES required transfer capability on the B4 boundary. Existing capability is already exceeded, broadly consistent with all Scotland and North England boundaries, driven by generation developments under the Connect and Manage regime, with the difference becoming extremely pronounced by the mid to late 2020s in all scenarios.

[13] Open letter on future reform to electricity connections process (ofgem.gov.uk)

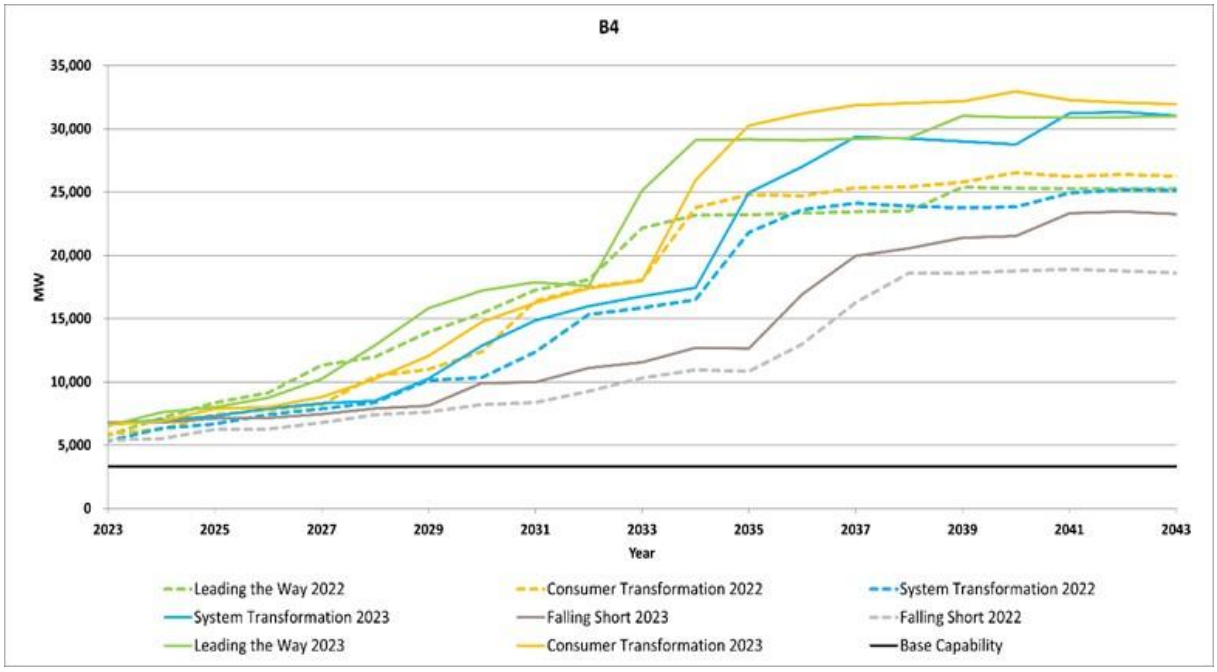

Figure 2: Required Transfer and Base Capability for boundary B4

The current capability of transmission network boundary B4 is approximately 3,400MW. Figure 2 above shows a required transfer of up to 17GW by 2030 and up to approximately 30GW by 2035.

Figure 3 indicates the 2022 FES and 2023 FES required transfer capability on the B5 boundary. The trends below are similar to those on the B4 boundary and are predominantly due to the connection of onshore and offshore wind across the north of Scotland. Generation connecting in the north of the SPT area and parts of SHE Transmission's Argyll and Kintyre area drive further increase in the required transfer capability on this boundary.

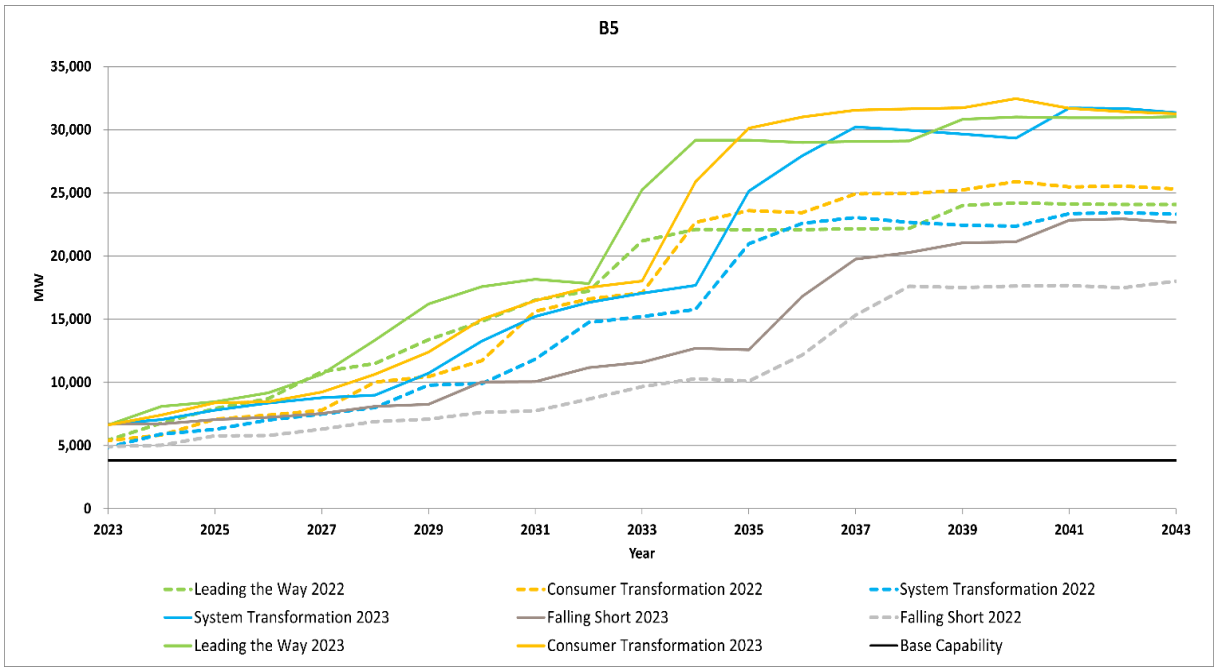

Figure 3: Required Transfers and Base Capability for boundary B5

The current capability of transmission network boundary B5 is approximately 3,900MW. Figure 3 above shows a required transfer of up to 17.6GW by 2030 and up to approximately 30GW by 2035.

Figures 2 and 3 show that in the coming years the unconstrained boundary flows on B4 and B5 are set to increase significantly. In order to maintain an efficient and economic transmission system whilst economically integrating additional renewable generation, significant system reinforcement is required in an unprecedented timeframe.

4.2.4 Network Options Assessment (NOA)

The Network Options Assessment process (ref. Standard Licence Condition C27) demonstrates the need to make significant investment in the capability of the existing transmission system through Scotland and the north of England to accommodate significant growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical that the network is ready to accommodate the scale of projected renewable capacity growth, required to support legislated Net Zero targets, whilst also enabling significant constraint savings.

The 2021/22 NOA Report, published in January 2022[14], supports the proposal in this paper to progress the reinforcement of the network between Denny North and Windyhill via the uprating of an existing 275kV circuit to 400kV operation (ref. NOA7 code DLUP), giving the project a "Proceed" recommendation. This recommendation continued to be supported through the NOA Refresh, published in July 2022.

Furthermore, the 2021/22 NOA Report and associated NOA Refresh recommended that additional network investment projects across the B4 and B5 boundaries are also required as part of a wider strategy comprising a series of co-ordinated projects, enabled initially by the development of Kincardine North 400kV Substation (ref. NOA code LWUP) and aligned with and including this project (ref. NOA code DLUP), maximising transfer capability via existing transmission overhead line routes (ref. NOA codes DWUP, LCU2, TKUP and BDUP), while recognising the need for the construction of new overhead line and subsea HVDC cable systems e.g. the Denny to Wishaw 400kV Reinforcement and the second eastern HVDC link between the SPT and NGET areas (ref. NOA code TGDC). These related projects are the subject of separate regulatory submissions.

4.3 Alignment with RIIO-T2 Strategic Goals

As described in our RIIO-T2 plan[15] for the five-years to the end of March 2026, to mitigate the impacts of climate change and achieve a low-carbon energy system requires a level of focused effort and commitment never seen before. The mass electrification of transport and heat has only started and there is a huge amount required to build on the timely progress already made in the electricity sector.

Energy networks are critical to achieving the wider Net Zero emissions targets and with continued engagement with consumers, network users and our wider stakeholders, we've set a progressive plan in place to facilitate a Net Zero future. Our RIIO-T2 plan sets out four strategic goals – informed by our stakeholder priorities – that will keep us moving towards this sustainable future. These goals and their alignment with the development of the Windyhill - Lambhill - Denny North 400kV Reinforcement, are summarised in Figure 4.

Further detail regarding how this proposal aligns to our four Strategic Goals is outlined below:

[14] Network Options Assessment 2021/22, January 2022
[15] SP Energy Networks RIIO-T2 Business Plan

Take a leading role in delivering a Net Zero future that is consistent with government objectives.

The Windyhill - Lambhill - Denny North 400kV Reinforcement will enable increases in both transmission capacity and the amount of renewable generation connected to the GB electricity network, contributing towards a reduced reliance on fossil fuel electricity generation sources.

Deliver the benefits of increased cost-efficiency to network users and consumers by continually innovating and applying whole system solutions.

The Windyhill - Lambhill - Denny North 400kV Reinforcement is a significant 400kV development in the central belt of Scotland. Its primary purpose is to facilitate increased power transfer into and through the SPT network from renewable developments across north and central Scotland, while also facilitating new generation connections in the Windyhill 275/132kV transmission group.

In the delivery of the project, SPT will avoid the addition of SF_6 to SPT's inventory, as far as technology maturity permits. This is in accordance with SPT's RIIO-T2 Environmental Action Plan[16].

Maintain world-leading resilience and system operability to ensure security of supplies throughout the energy transition.

The works will enable additional transmission capacity as well as the capability to connect new sources of renewable generation, with demand for network capacity expected to increase significantly.

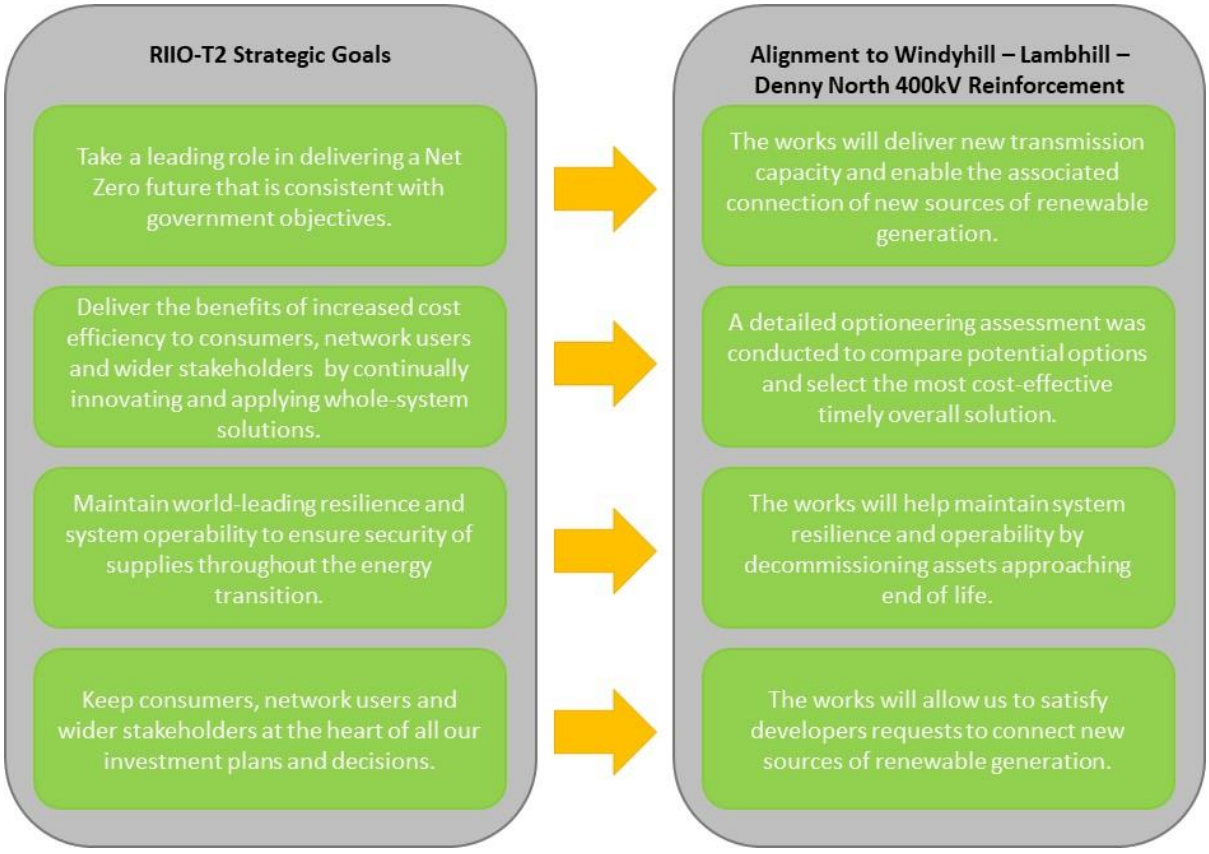

Figure 4: Alignment of the Windyhill – Lambhill – Denny North 400kV Reinforcement Proposal with SPT RIIO-T2 Strategic Goals

[16] https://www.spenergynetworks.co.uk/userfiles/file/RIIO-T2_Annex_7_Environmental_Action_Plan.pdf

Keep network users and consumers at the heart of all our investment plans and decisions.

The completion of the Windyhill - Lambhill - Denny North 400kV Reinforcement is required to maintain and operate an economic and efficient transmission system, and allow SPT to satisfy network users' requests for connection, consistent with our statutory and licence responsibilities.

Key stakeholders will be consulted during the development of the proposed solution and we will continue to engage with stakeholders throughout the project development and delivery process.

The completion of the Windyhill - Lambhill - Denny North 400kV Reinforcement will continue to align with our future strategic ambitions.

5. Assessment of Options

5.1 Existing System Configuration

Existing transmission assets in the central area are indicated in Figure 5 below (and Appendix A).

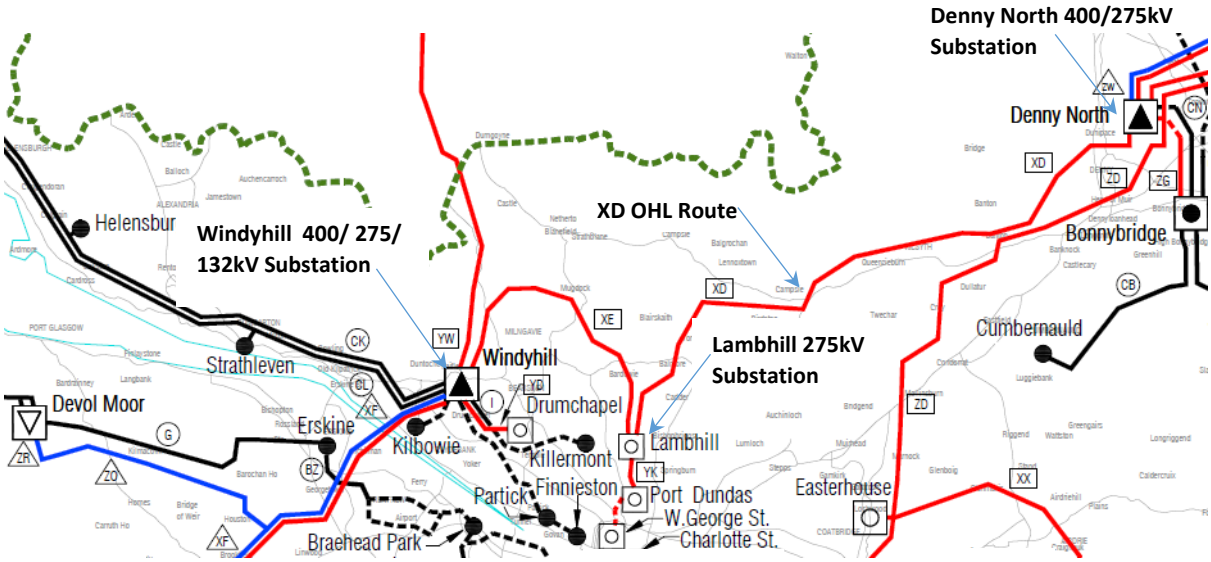

Figure 5 Geographic Indication of Transmission Configuration in North West Area[17]

Denny North 400/275/132kV Substation is connected to the Main Interconnected Transmission System (MITS) via five double circuit overhead line routes operating at 400kV, 275kV and 132kV. It is an outdoor substation utilising Air Insulated Switchgear (AIS) with 400kV and 275kV busbar systems configured in a double busbar arrangement.

As detailed Figure 6, Denny North 400/275/132kV Substation connects the following circuits:

- Melgarve 400kV
- Denny North Supergrid Transformer No.1 (SGT1), 400/275kV 1000MVA
- Braco West 275kV
- Lambhill/ Windyhill No.1 275kV
- Lambhill No.2 275kV
- Longannet No.1 275kV
- Longannet No.2 275kV
- Bonnybridge No.1 275kV
- Bonnybridge No.2 275kV
- Denny North Supergrid Transformer No.3 (SGT3), 275/132kV 240MVA
- Bonnybridge No.3 132kV

[17] Assets indicated in blue operate at 400kV, assets in red operate at 275kV and assets in black operate at 132kV.

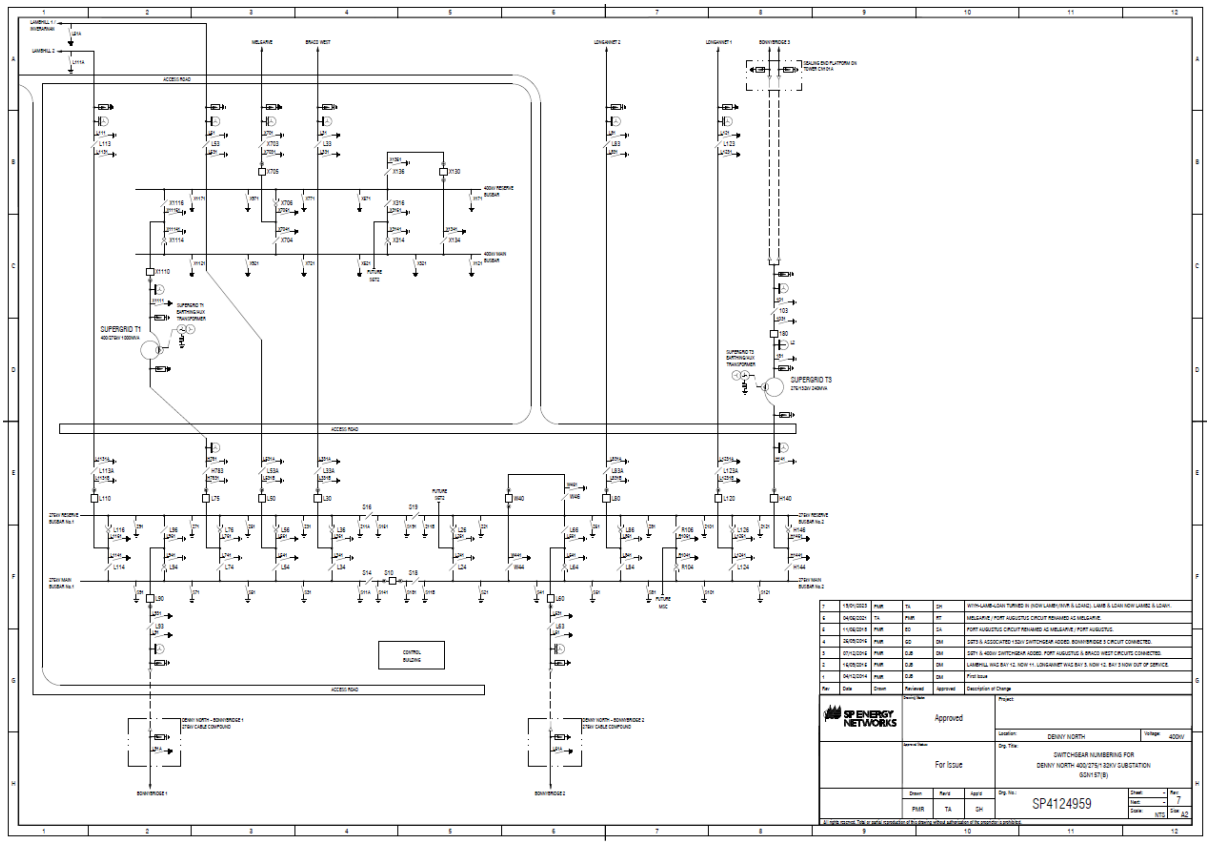

Figure 6 Existing Configuration – Denny North 400/275/132kV Substation

The configuration at Denny North 400/275kV Substation will be modified by the Kincardine North 400kV Substation project (NOA ref. LWUP)[18], with the existing Longannet No.1 and No.2 275kV circuits being uprated to 400kV operation and connected into an extension to the existing 400kV double busbar arrangement. It will also be modified by the Denny SGT2 project (NOA ref. DNEU), with the installation of a second 400/275kV 1000MVA inter-bus transformer.

Lambhill 275kV Substation is connected to the MITS via two double circuit overhead line routes operating at 275kV (XD and XE routes). It is an outdoor AIS double busbar substation which, as detailed Figure 7, connects the following circuits:

- Denny North 275kV
- Denny North/ Windyhill 275kV
- Windyhill 275kV
- Port Dundas/ West George Street No.1 275kV
- Port Dundas/ West George Street No.2 275kV

Lambhill 275kV Substation radially serves two Grid Supply Points (GSP's) in Glasgow city centre at Port Dundas and West George Street.

[18] Kincardine North 400kV Substation - MSIP Reopener

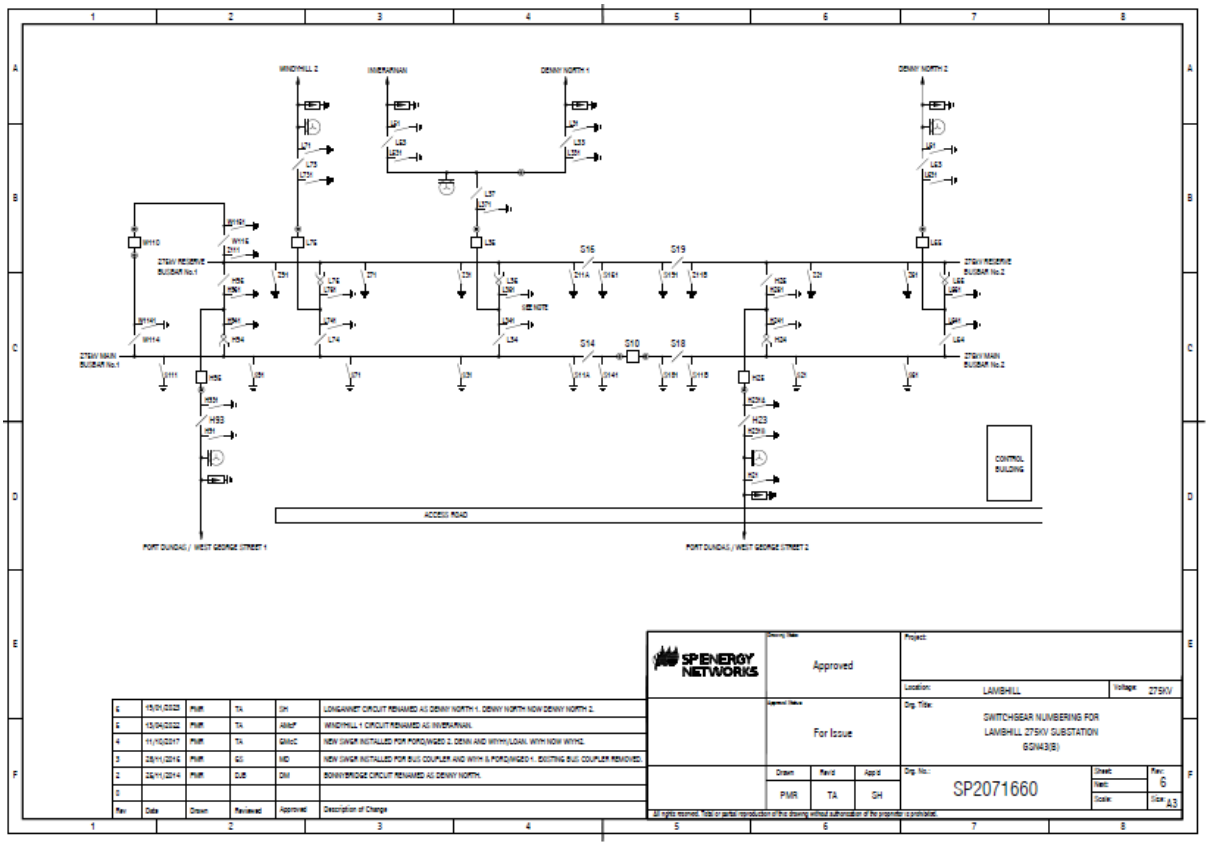

Figure 7 Existing Configuration – Lambhill 275kV Substation[19]

Windyhill 275kV Substation, located to the northwest of Glasgow, is presently an outdoor AIS substation, constructed in the 1960s and configured in a double busbar arrangement.

Windyhill 275kV Substation is connected to the MITS via three double circuit overhead line routes operating at 275kV: XF route to Neilston; XE route to Lambhill; and YW to Dalmally. With vital transmission circuits to Devol Moor and Neilston crossing Boundary B5, and circuits to Lambhill and Denny North, Windyhill 275kV Substation plays an important role in east – west and north – south power flows. The substation has connection to Cruachan Generating Station via the Dalmally and Inverarnan 275kV circuits and serves seven GSPs to the north and west of Glasgow.

Via a RIIO-T2 non-load related project (ref. SPNLT2033), Windyhill 275kV Substation is presently being replaced with modern GIS equipment, similarly configured in a double busbar arrangement.

As detailed Figure 8, Windyhill 275kV Substation connects the following circuits:

- Drumchapel No.1 275kV
- Drumchapel No.2 275kV
- Windyhill Supergrid Transformer No.1 (SGT1), 275/132kV 240MVA
- Windyhill Supergrid Transformer No.2 (SGT2), 275/132kV 240MVA
- Windyhill Supergrid Transformer No.3 (SGT3), 275/132kV 240MVA
- Windyhill MSCDN 1 150Mvar
- Lambhill No.1/ Denny North 275kV

[19] Note: Reference to Inverarnan reflects the current, temporary, running arrangement at Lambhill during construction works at Windyhill 275kV Substation. Circuit is normally Windyhill – Lambhill – Denny North 275kV.

- Lambhill No.2 275kV
- Inverarnan 275kV
- Dalmally 275kV
- Devol Moor 400kV (via Windyhill Supergrid Transformer No.4 (SGT4), 400/275kV 1000MVA)
- Neilston 275kV

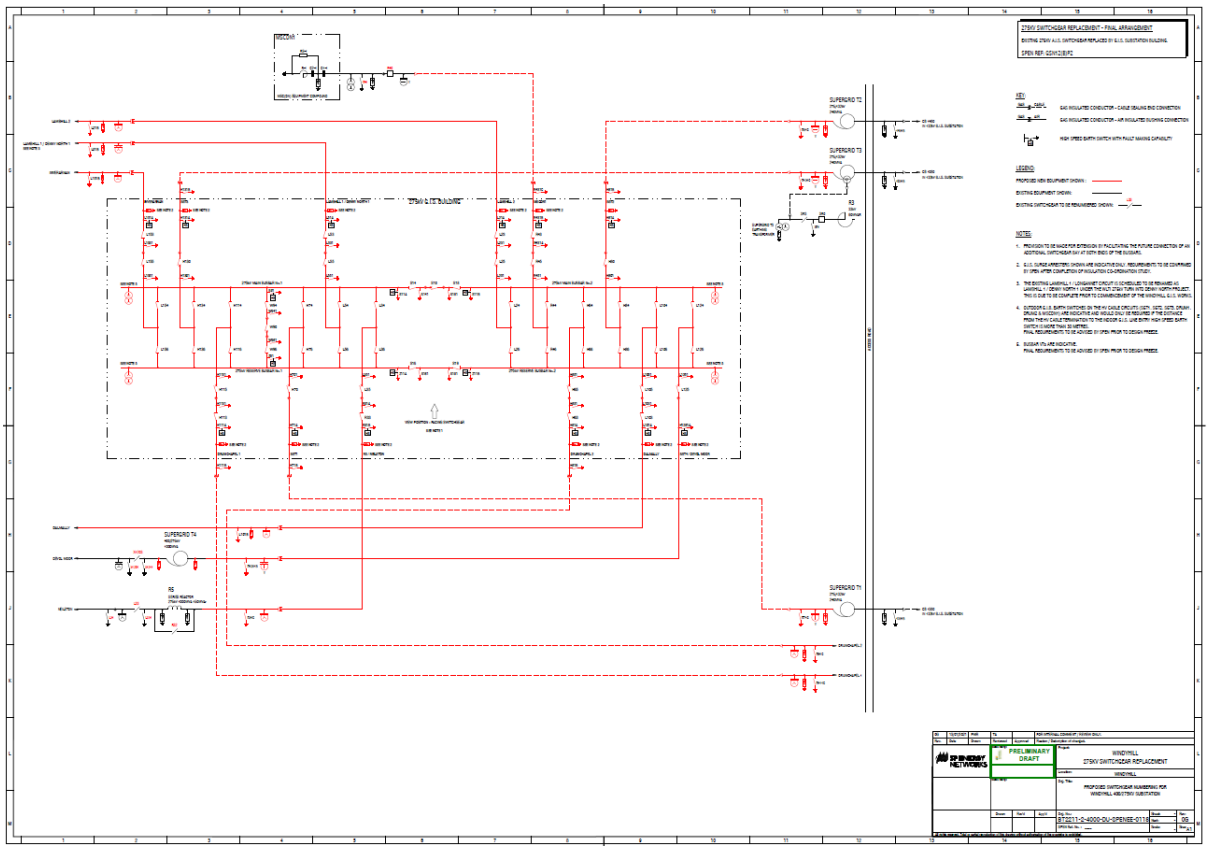

Figure 8 Configuration – Windyhill 400/275kV Substation[20]

[20] Note – Figure 8 indicates the Windyhill 275kV configuration upon completion of the ongoing construction works at Windyhill 275kV Substation as part of project ref. SPNLT2033.

5.2 Planned System Configuration – HND/ NOA Projects

Following the ESO's publication of the HND and NOA7 Refresh on 7th July 2022, the following projects were highlighted for progression within SPT's network area.

Table 4 Status within HND – Required for 2030 Targets

NOA7R Code	Description	NOA7 EISD
DNEU	Installation of a new 400/275kV 1000MVA Supergrid transformer (SGT2) at Denny North 400kV substation.	2025
DWUP	Establish a 400kV single circuit corridor south from Kincardine North, on existing overhead line (OHL) routes, to Wishaw substation or Clyde's Mill substation.	2026
E2DC	Establish a High Voltage Direct Current (HVDC) subsea link from a new Branxton 400kV Substation (near Torness) to Hawthorn Pit in the northeast of England. Branxton will facilitate the connection of offshore renewable developments as well as the reinforcement of capacity between Scotland and England.	2027
LWUP	Establish a new 400kV substation north of Kincardine and connect to Denny North at 400kV, integrating load and non-load related investment drivers and enabling significant reinforcement of transfer capacity through central Scotland.	2027
VSRE	Replace existing OHL conductor on the strategic east-west Strathaven - Smeaton (XH/XJ route) corridor with modern high temperature low sag (HTLS) conductor.	2027
DWNO	Establish a new 400kV OHL from Bonnybridge substation to an existing OHL north of Glenmavis, together with associated substation works, conductor replacement and voltage uprating on existing OHL routes.	2028
EHRE	Replace existing OHL conductor on the southern (Elvanfoot - Harker) section of the strategic north-south Strathaven - Harker (ZV route) corridor with modern high temperature low sag (HTLS) conductor.	2028
BDUP	Uprate the Beauly - Denny OHL route to double circuit 400kV operation.	2029
***DLUP*[21]**	***Establish a new 400kV substation at Windyhill and a 400kV single circuit corridor, on existing overhead line routes, between Windyhill, Lambhill and Denny North.***	***2029***
VERE	Replace existing OHL conductor on the northern (Strathaven - Elvanfoot) section of the strategic north-south Strathaven - Harker (ZV route) corridor with high temperature low sag (HTLS) conductor.	2030
TGDC	Creation of a second new High Voltage Direct Current (HVDC) Eastern subsea link from the SPT area, to south of the Humber estuary, in the northeast of England, together with associated onshore works.	2031
TKUP	Establish new 400kV substations at Mossmorran, Westfield and Glenrothes to establish a 400kV double circuit corridor, on existing overhead line routes, between Kincardine North and the SSEN Transmission Tealing substation. Scope includes further works within the SSEN-T area.	2032

Table 5 Status within NOA7 – Proceed

NOA7R Code	Description	NOA7 EISD
CMNC	Creation of a new 400kV double circuit OHL route and associated substation infrastructure from southeast Scotland to the northwest of England.	2033
WCNC	Creation of a new 400kV double circuit OHL route and associated substation infrastructure from southwest Scotland to the northwest of England.	2036
TLNO	Creation of a new 400kV double circuit OHL route and associated substation infrastructure from east central Scotland to the northeast of England.	2037

[21] This project.

Table 6 Status within NOA7 – Hold

NOA7R Code	Description	NOA7 EISD
LCU2	Establish a 400kV single circuit corridor south from Kincardine North, on existing OHL routes, towards the Strathaven - Smeaton (XH/XJ route) corridor, west of Edinburgh and Currie/ Smeaton substations.	2031

Table 7 Status within NOA7 – Do Not Start

NOA7R Code	Description	NOA7 EISD
CVUP	Establish a 400kV single circuit corridor south from Clyde's Mill to Strathaven on existing OHL routes, with associated substation development at Clyde's Mill, Strathaven and near East Kilbride.	2031

As described in our response to Ofgem's consultation on Accelerating Onshore Electricity Transmission Investment, dated 6th September 2022, due to the rapidly changing energy landscape, projects recommended to 'hold' or 'do not start' in one NOA may already be 'late' when assessed against the requirements of the next iteration of the ESO's FES. With work concluding on the HND Follow Up Exercise, to ensure an additional circa 17GW of ScotWind generation can be accommodated on the network, we anticipate one specific project in SPT's area currently with a 'hold' signal (LCU2) and one specific project currently with a 'do not start' signal (CVUP), will change to 'proceed', informed by FES 2023 and the HND Follow Up Exercise.

There is also a need to deliver non-load related asset replacement on associated overhead line routes within the RIIO-T3 period. For this reason, we are continuing to review and refine the scope and timing of these works with a view to continuing to integrate load and non-load related drivers in an economic, efficient and co-ordinated manner minimising system access requirement.

5.3 Overview of Options

This section provides a description of the options considered to integrate load and non-load related drivers in an economic, efficient and co-ordinated manner, facilitating increased power transfer into and through the SPT network from renewable developments across the north of Scotland, and details the key considerations.

These works form part of a wider suite of reinforcement works designed to increase power transfer into and through the SPT network from renewable developments across the north of Scotland in an economic, efficient and co-ordinated manner.

Table 8 below presents a summary of the options considered.

Table 8: Options Summary

	Option	Outcome of Initial Review	Reason for Rejection
1	Do Nothing or Delay	Rejected	A 'Do Nothing' or 'Delay' option is not credible in relation to this project and would be inconsistent with SPT's various statutory duties and licence obligations. Timely progression of the uprating of transfer capability through the SP Transmission system is crucial to ensure continued security and reliability of supply, while alleviating constraints on the GB transmission system, enabling growth in renewable electricity and support the transition to Net Zero emissions in the most economic way.
2	New 400kV GIS Substation at Windyhill	Proposed for Further Consideration	-
3	New 400kV AIS Substation at Windyhill.	Proposed for Further Consideration	-

Options 2 and 3 provide feasible solutions. These options are discussed in further detail in the following sections.

5.3.1 Base System Configuration

Figure 9 indicates the planned configuration of the system upon completion of works forming part of the Kincardine North 400kV Substation MSIP project (ref. LWUP) and Kincardine – Wishaw (Clyde's Mill) 400kV Reinforcement MSIP project (ref. DWUP).

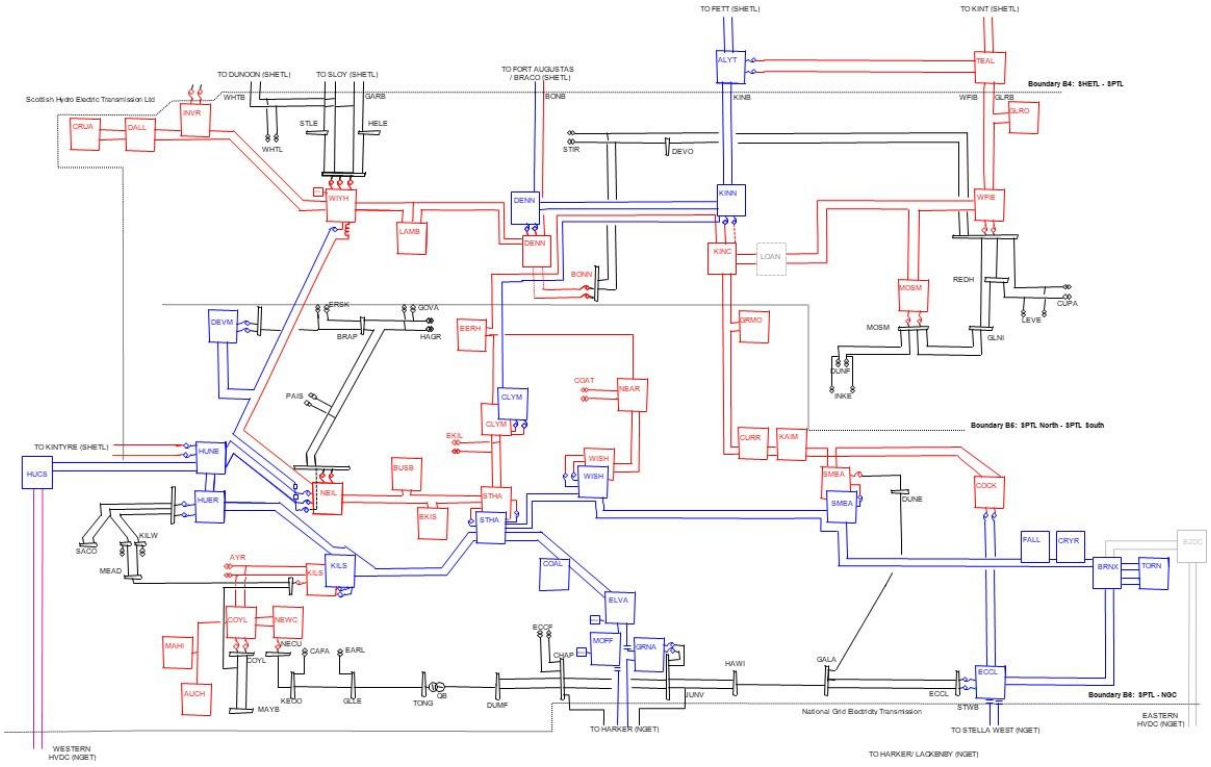

Figure 9: Single Line Diagram post Kincardine North 400kV Substation (ref. NOA code LWUP) and post Kincardine – Wishaw (Clyde's Mill) 400kV Reinforcement (re. NOA code DWUP)

5.3.2 Works Common to Options 2 and 3

In order to facilitate the uprating of the Denny North – Lambhill – Windyhill 275kV circuit to 400kV operation, Options 2 and 3 each involve the following:

Denny North - The installation at Denny North 400kV Substation of one bay of 400kV double busbar Air Insulated Switchgear (AIS). This will enable the termination of the northern side of XD route in the 400kV busbar system at Denny North.

XD Route - For circuit thermal rating purposes, and recognising non-load related asset condition requirements, the existing 1962 vintage twin Zebra ACSR (core only greased) OHL conductor system on the 32km L2 specification XD route between Denny North and Lambhill, will be replaced with a modern High Temperature Low Sag (HTLS) conductor system, maximising the capacity of the route. Condition based major refurbishment of this route would be required in the RIIO-T3 period in order to ensure the assets remain fit for purpose and the associated circuits can remain in service. The northern side of XD route shall be uprated to 400kV operation.

Lambhill - The installation at Lambhill 275kV Substation of one new 400/275kV 1000MVA inter-bus transformer. This unit shall replace the infeed to Lambhill 275kV Substation presently provided by the existing Denny North – Lambhill – Windyhill 275kV circuit. The new 400/275kV 1000MVA inter-bus transformer shall be controlled by a dedicated 400kV AIS circuit breaker with Point on Wave control.

XE Route - The northern side of the 18km XE route between Lambhill and Windyhill shall be uprated to 400kV operation. XE route is already insulated for 400kV operation. Clearances associated with the existing twin Totara AAAC conductor system on XE route shall be verified as suitable for operation at 90°C. Any necessary clearance related works shall be undertaken to ensure this capability.

The resulting system configuration between Windyhill, Lambhill and Denny North is indicated schematically in Figure 10 below:

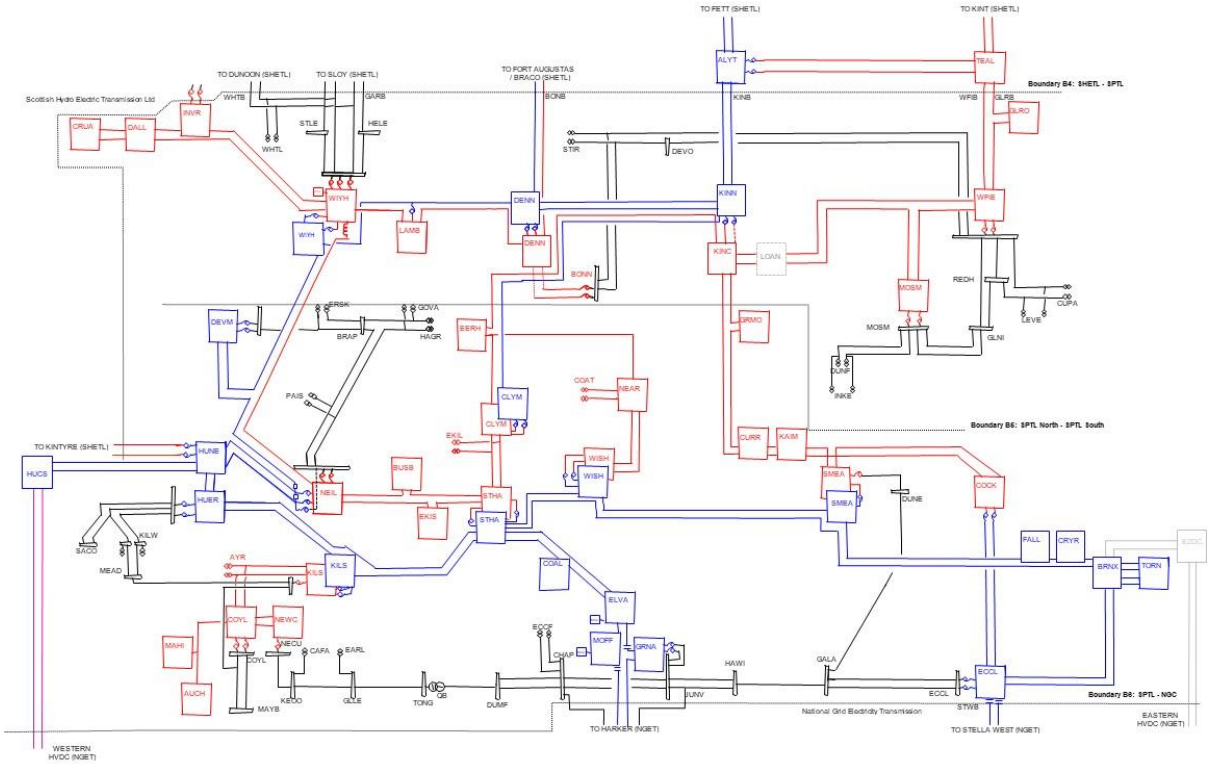

Figure 10: As Figure 9 with Windyhill – Lambhill – Denny North 400kV Reinforcement (ref. NOA code DLUP)

5.3.3 Option 2: New 400kV GIS Substation at Windyhill

This option involves establishing new 10-bay Windyhill 400kV GIS Substation within the existing Windyhill 275kV Substation compound, thereby avoiding the requirement to purchase land, establish a new substation civil platform and divert the existing overhead line entries on XF, YW and XE routes. The new 400kV GIS substation will initially connect the following circuits:

- Devol Moor 400kV
- Denny North – Lambhill 400kV
- Windyhill SGT4 (circuit breaker to be equipped with Point on Wave control)
- Windyhill SGT5 (circuit breaker to be equipped with Point on Wave control)

The substation will be equipped with two bus section circuit breakers and two bus coupler circuit breakers, providing security and operational flexibility and helping to minimise future outage requirements. The detailed design of the site will incorporate provision for the termination of up to a further ten circuits:

- Subject to separate regulatory approval, it is proposed that two of these ten bays form part of the initial GIS contract award and site development (these two bays to facilitate the future installation of 2 x 400/132kV transformers to support new connections activity in the wider Windyhill transmission group – ref. SPT-RI-3314).
- It is proposed that space is retained within the GIS building for four future feeder bays at each end of the GIS.

One new 400/275kV 1000MVA inter-bus transformer will be installed at Windyhill 400/275kV Substation (SGT5), replacing the infeed to Windyhill 275kV Substation presently provided by the existing Denny North – Lambhill – Windyhill 275kV circuit.

The proposed configuration is indicated schematically in Figure 11.

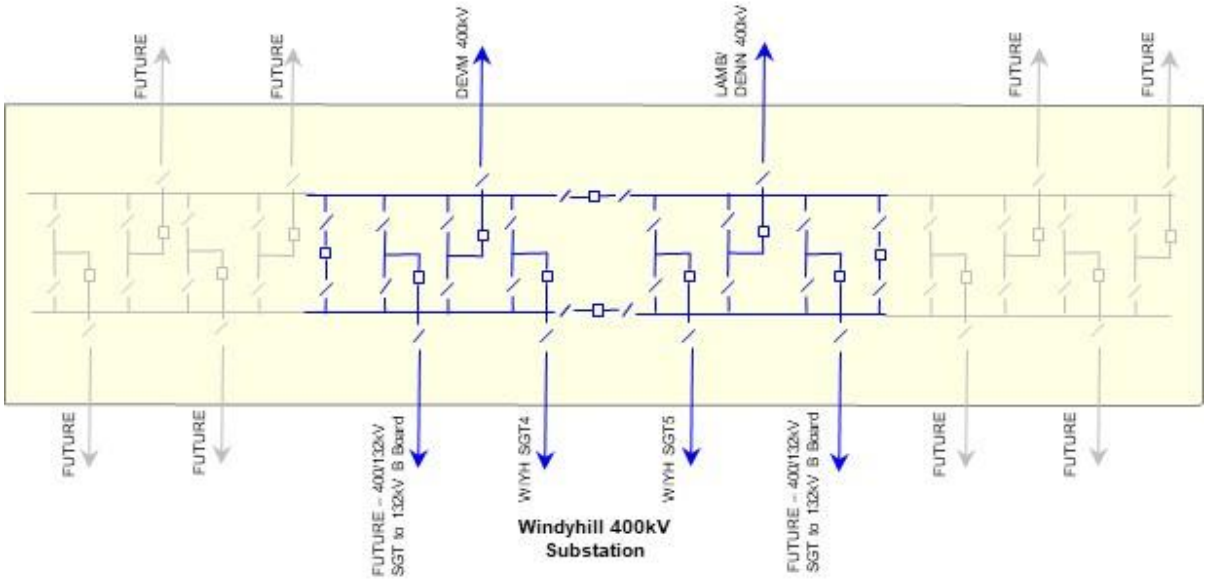

Figure 11: Single Line Diagram, Option 2

5.3.4 Option 3: New 400kV AIS Substation at Windyhill

This option involves establishing new 7-bay Windyhill 400kV AIS Substation to the north of the existing Windyhill 275kV Substation compound. This option requires land purchase, significant earthworks in order to establish the new substation civil platform, and the diversion of the existing overhead line entries on XF, YW and XE routes. A new terminal tower will be required on YW route (to Dalmally) adjacent to new 275kV cable sealing end compounds, facilitating new line rated cable sections on the Dalmally and Inverarnan 275kV circuit line entries to Windyhill 275kV Substation.

The two 275kV circuits and Inverarnan will require the establishment of new line rated cable sections, together with the establishment of new cable sealing end compounds and a new terminal tower.

The new 400kV AIS substation would initially connect the following circuits:

- Devol Moor 400kV
- Denny North – Lambhill 400kV
- Windyhill SGT4 (circuit breaker to be equipped with Point on Wave control)
- Windyhill SGT5 (circuit breaker to be equipped with Point on Wave control)

The substation would be equipped with one bus section circuit breaker only, due space constraints, limiting security and operational flexibility. The detailed design of the site would incorporate provision for the termination of up to a further four circuits:

- Subject to separate regulatory approval, it is proposed that two of these four bays form part of the initial AIS contract award and site development (these two bays to facilitate the future installation of 2 x 400/132kV transformers to support new connections activity in the wider Windyhill transmission group – ref. SPT-RI-3314).
- It is proposed that space is retained within the AIS compound for two future feeder bays.

One new 400/275kV 1000MVA inter-bus transformer will be installed at Windyhill 400/275kV Substation (SGT5), replacing the infeed to Windyhill 275kV Substation presently provided by the existing Denny North – Lambhill – Windyhill 275kV circuit.

The proposed configuration is indicated schematically in Figure 12.

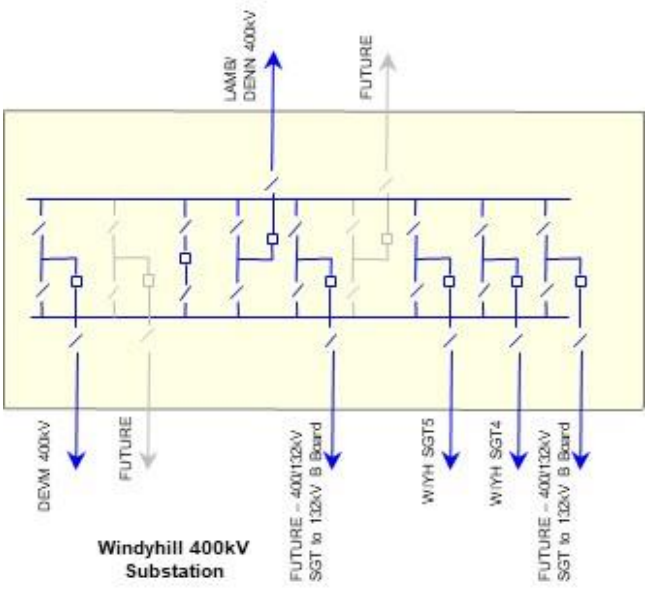

Figure 12: Single Line Diagram, Option 3

5.4 Option Assessment

As described in our RIIO-T2 Business Plan Annex 8[22], while most engineering justification papers have a CBA aligned with the RIIO-T2 CBA model, projects in the following categories do not:

- Live projects rolling over from RIIO-T1, since they have already initiated, with decisions made during the previous price control.
- Customer connection projects, as the proposed approach is based on agreement with the connecting party as they will bear a sizeable proportion of the costs incurred.
- TO Reinforcements associated with new connections, where the options considered are evaluated purely based on the lowest cost solution, which meets the project objectives, as the benefits are all comparable.
- Projects justified through the Network Options Assessment Process as these are subject to an extensive and rigorous CBA process by the Electricity System Operator who can consider market options, and different options which may be offered by Transmission Owners.

Projects in the four categories above have an associated document (this MSIP Re-opener application in respect of the Windyhill – Lambhill - Denny North 400kV Reinforcement) explaining the feasible options and the reasoning behind the selection of the preferred investment option.

The short-listed options considered to facilitate a 400kV single circuit connection east from Windyhill to Denny North, utilising existing OHL routes, as part of a wider suite of reinforcement works designed to increase power transfer into and through the SPT network from renewable developments across the north of Scotland in an economic, efficient and co-ordinated manner, are described in Section 5.3 while Table 9 summarises the key benefits and disadvantage of each option.

Both Option 2 and Option 3 both enable an uplift in operational transfer capability of up to 1GW on boundary B5.

Option 3 involves a higher capital cost than Option 2, due primarily to the extent of the civil works associated with the construction the new 400kV substation platform outside the existing 400/275kV compound at Windyhill and associated overhead line deviations, both of which are avoided with Option 2. Option 3 also involves increased consenting and programme risks as compared to Option 2.

There is no market based alternative to the preferred investment option.

Table 9: Option Benefits, Drawbacks and Selection Outcome

	Option	Est. Capital Cost[23]	Key Advantage	Key Disadvantage	Option Outcome
2	New 400kV GIS Substation at Windyhill	£94.396m	Lower capital cost relative to Option 3. Delivers B5 boundary capability as per Option 3.	-	**Proposed**
3	New 400kV AIS Substation at Windyhill.	£137.516m	-	Higher capital cost relative to Option 2. Increased consenting and programme risks relative to Option 2. Reduced operational flexibility and scope for future development.	Rejected

[22] Annex 8 - Cost Benefit Analysis Methodology (spenergynetworks.co.uk)

[23] All values are estimated Direct capital costs in 2018/19 values.

6. Proposed Works

This Section 6 describes the scope of works to be undertaken as part of the Windyhill – Lambhill - Denny North 400kV Reinforcement.

This project will establish the following circuits: Devol Moor – Windyhill 400kV; Windyhill – Lambhill – Longannet 400kV; Windyhill SGT4 and Windyhill SGT5.

6.1 Overhead Line Works

Overhead line works as part of the Windyhill - Lambhill - Denny North 400kV Reinforcement will include the following:

6.1.1 Denny North – Lambhill (XD) Route

The northern side of XD route between Denny North and Lambhill will be uprated to 400kV operation.

The existing 1962 vintage twin Zebra ACSR (core only greased) conductor system on the 32km XD route between Denny North and Lambhill shall be replaced with a modern equivalent conductor system delivering a continuous rating not less than that achieved by a twin 'Drake' HTLS conductor system, so as not to restrict the 3150A capability on the Denny North - Lambhill 275kV circuit, and deliver a post-fault rating not less than 4000A on the Denny North - Lambhill 400kV section of the Denny North - Lambhill - Windhill 400kV circuit. While subject to detailed engineering, a High Temperature Low Sag (HTLS) conductor system is expected to be the most economic and efficient solution for this application (on L2 type towers). Insulators shall be replaced, however replacement of the (2004 vintage) earthwire is not proposed to form part of this major refurbishment.

Noise Surveys shall be undertaken to obtain a background reference noise level at various times at sensitive locations.

6.1.2 Lambhill – Windyhill (XE) Route

The northern side of the 18km XE route between Windyhill and Lambhill will be uprated to 400kV operation. Both sides of XE route are already insulated for 400kV operation.

Clearances associated with the existing twin Totara AAAC conductor system on XE route shall be verified as suitable for operation at 90°C on both sides of the route i.e. 400kV on the northern side, 275kV on the southern side. Any necessary clearance related works shall be undertaken to ensure this capability. Where required, relevant land consents and planning permissions shall be sought for these clearance infringement mitigation works.

Noise Surveys shall be undertaken to obtain a background reference noise level at various times at sensitive locations.

6.1.3 Consents

Appropriate consents and land agreements will be required to facilitate operation of the existing XD and XE routes at 400kV, together with all necessary works to ensure acceptable clearances when operating at the higher voltage level.

6.2 Substation Works

Substation works as part of the Windyhill – Lambhill – Denny North 400kV Reinforcement will include the following:

6.2.1 Substation Works at Denny North 400/275kV Substation

At Denny North 400kV Substation, one bay of 400kV double busbar Air Insulated Switchgear (AIS) will be installed in order to facilitate the termination of the northern side of XD route in the 400kV busbar system and establish a Denny North – Lambhill – Windyhill 400kV circuit. The Denny North site was originally designed to accommodate this development.

Figure 13 provides an indication of the proposed configuration of Denny North 400/275/132kV Substation.

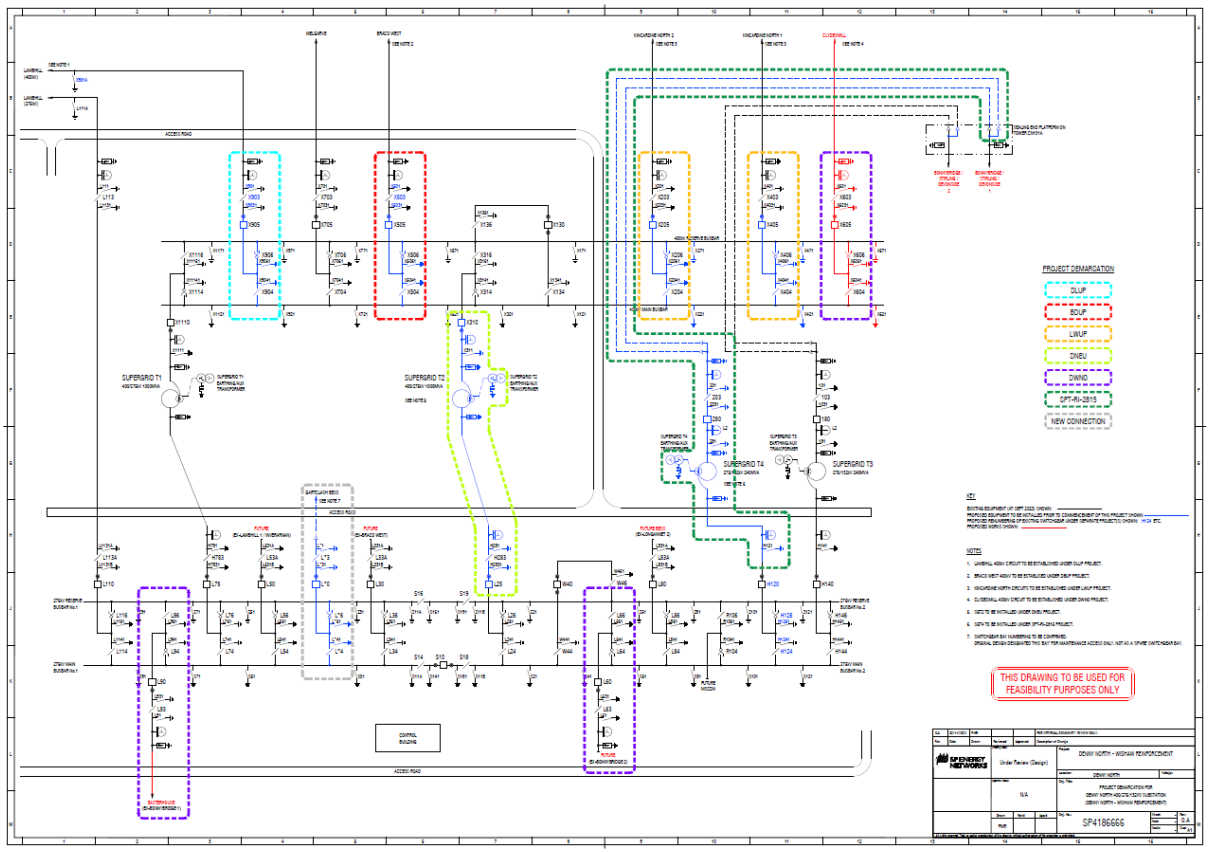

Figure 13: Denny North 400/275/132kV Proposed Configuration

6.2.2 Substation Works at Lambhill 275kV Substation

The project shall involve the installation of one new 400/275kV 1000MVA inter-bus transformer at Lambhill 275kV Substation. This unit shall replace the infeed to Lambhill 275kV Substation presently provided by the existing Denny North – Lambhill – Windyhill 275kV circuit.

The new 400/275kV 1000MVA inter-bus transformer shall be controlled by a dedicated 400kV AIS circuit breaker, equipped with Point on Wave control.

Space shall be retained within the wider site design for a future tertiary connected 33kV 60MVAr shunt reactor, R1, to be connected to the tertiary winding of the new Lambhill SGT1. At this time, the installation of this unit does not form part of this project.

Figure 14 provides an indication of the proposed configuration of Lambhill 400/132kV Substation.

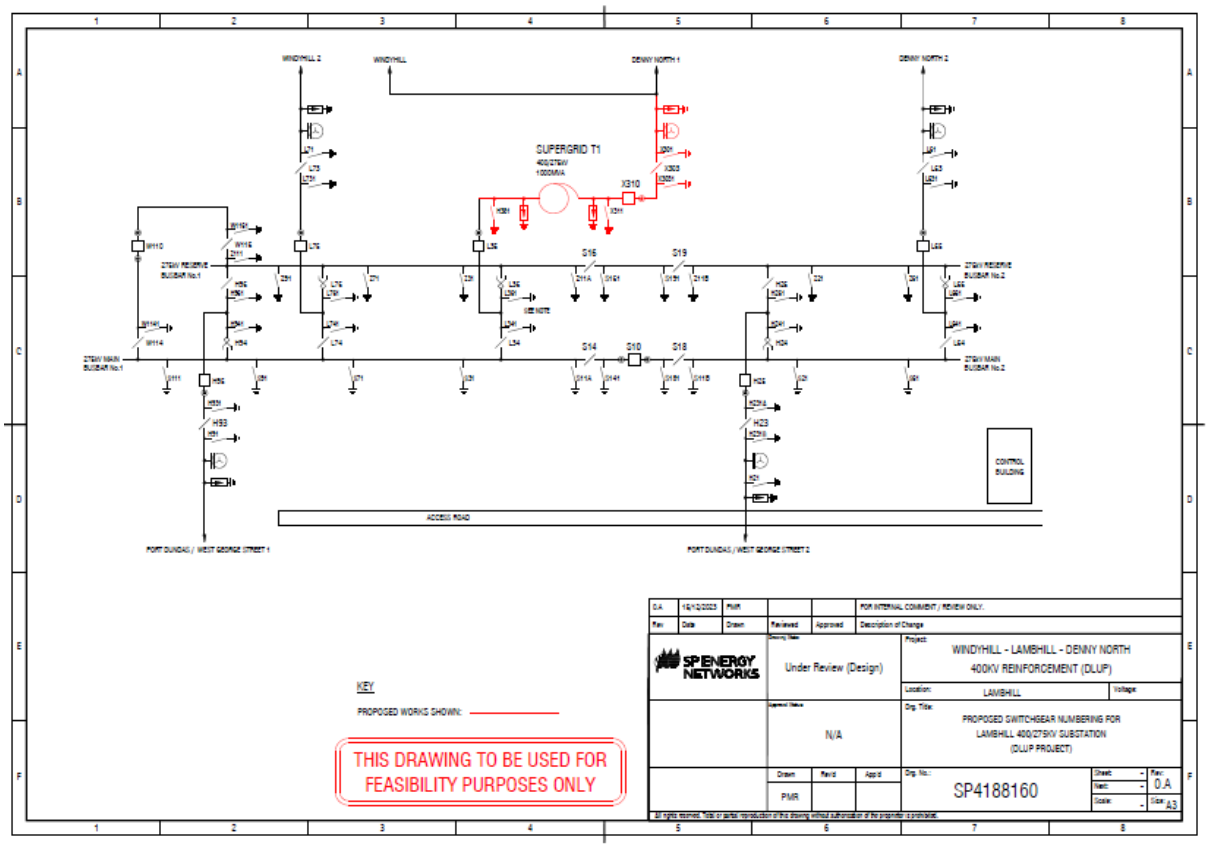

Figure 14: Lambhill 400/275kV Proposed Configuration

6.2.3 Substation Works at Windyhill 400kV Substation

The project shall involve the installation of one new 400/275kV 1000MVA inter-bus transformer at Windyhill 400/275kV Substation. This unit shall replace the infeed to Windyhill 275kV Substation presently provided by the existing Denny North – Lambhill – Windyhill 275kV circuit.

A new Windyhill 400kV GIS Substation shall be established within the existing Windyhill 275kV Substation compound. It will initially connect the following circuits:

- Devol Moor 400kV
- Denny North – Lambhill 400kV
- Windyhill SGT4 (circuit breaker to be equipped with Point on Wave control)
- Windyhill SGT5 (circuit breaker to be equipped with Point on Wave control)

The substation will be equipped with two bus section circuit breakers and two bus coupler circuit breakers, providing security and operational flexibility.

The detailed design of the site will incorporate provision for the termination of up to a further ten circuits:

- Subject to separate regulatory approval, it is proposed that two of these ten bays form part of the initial GIS contract award and site development (these two bays to facilitate the future installation of 2 x 400/132kV transformers to support new connections activity in the wider Windyhill transmission group – ref. SPT-RI-3314).

- It is proposed that space is retained within the GIS building for four future feeder bays at each end of the GIS.

Space shall be retained within the wider site design for the future connection of reactive compensation equipment - the installation of such equipment does not form part of this project.

Figure 15 provides an indication of the proposed configuration of Windyhill 400kV Substation.

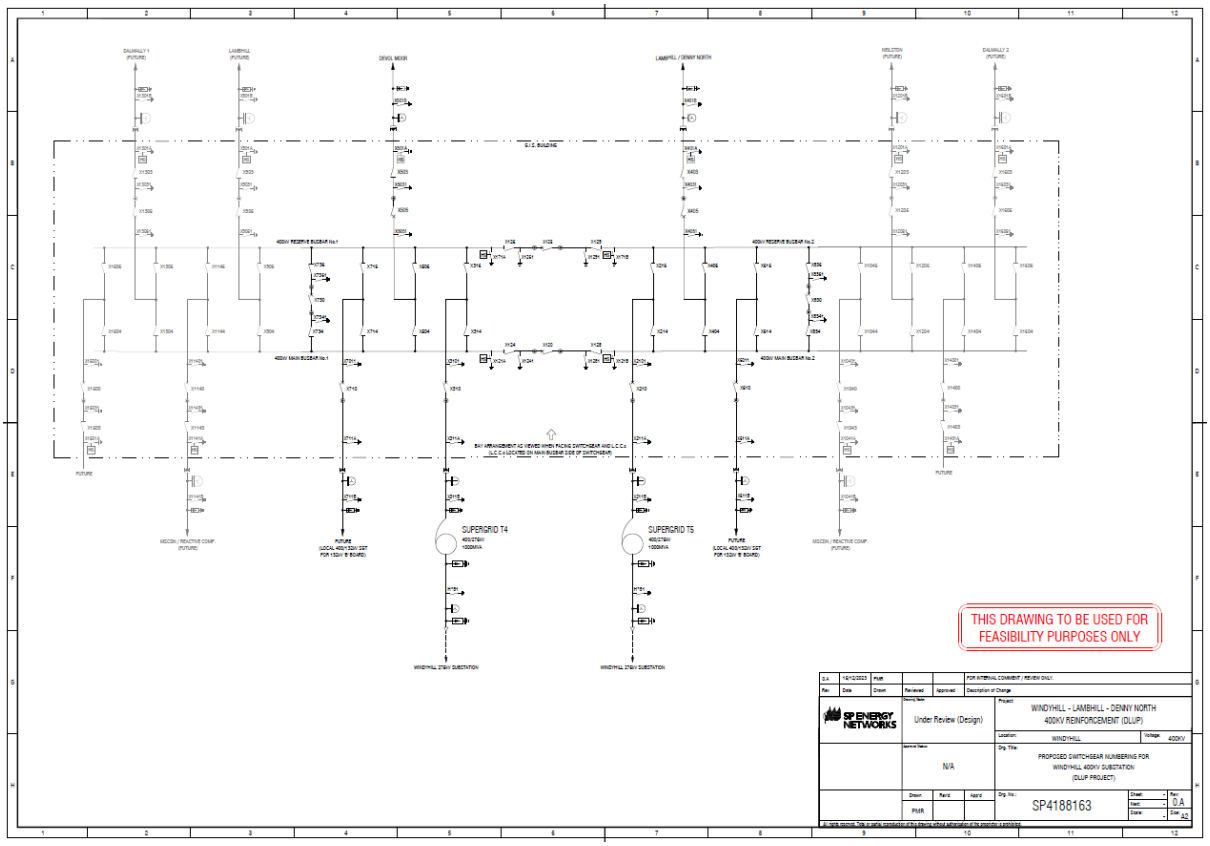

Figure 15: Windyhill 400kV Substation Proposed Configuration

6.2.4 Substation Works at Remote Ends

Works will be required at various remote end substation sites in order to deliver the primary system configuration above. These sites include Devol Moor 400kV Substation and Windyhill 275kV Substation.

6.3 Civil Engineering Works/ Other

The primary civil engineering works forming part of the DLUP project will comprise:

- The design and construction of the GIS building at Windyhill;
- The design and construction of all foundations and structures necessary to support the equipment within the scope of this project.

6.4 Environmental and Consent Related Works

SPT will take a co-ordinated approach to all aspects of these works, both OHL and substations, in view of the need to deliver an overall and integrated solution which recognises potential interaction and cumulative impacts.

As part of the overhead line scope of works, the northern side of XE and XD routes between Windyhill, Lambhill and Denny North substations will be uprated to 400kV operation, requiring Section 37 consent.

The approach to consenting substation works at Windyhill and Lambhill shall be coordinated alongside with wider OHL consenting approach.

6.5 Stakeholder Engagement

SPT's Stakeholder Engagement Plan for the Windyhill – Lambhill – Denny North 400kV Reinforcement will be closely aligned to our wider Stakeholder Engagement commitments as outlined in our RIIO-T2 business plan. It will centre around timely engagement with a wide range of stakeholders, including those involved in land and planning consents, to achieve mutually acceptable outcomes. We recognise that stakeholders' influence and interest in the project will vary as the project develops and that stakeholders' opinions may change over time.

7. Project Cost Estimate

As agreed with Ofgem, a further (Stage 2) MSIP submission will be made at the right time relating to the associated amendments to the outputs, delivery date and allowances to be detailed in LSpC 3.14 Appendix 1. The detail in this section is therefore indicative pending that further submission.

7.1 Estimate Total Project Costs

Aligned with the format of the Re-Opener Pipeline Log, Table 10 details the expected energisation year and the current view of potential direct capital expenditure.

Table 10: Estimated Incidence of Expenditure

	Potential direct capex value per year, £m, 18/19 price base								
Energisation Year	Yr. 23/24: direct capex	Yr. 24/25: direct capex	Yr. 25/26: direct capex	Yr. 26/27 (T3): direct capex	Yr. 27/28 (T3): direct capex	Yr. 28/29 (T3): direct capex	Yr. 29/30 (T3): direct capex	RIIO-T2 Total: direct capex	Total: direct capex
2029/30	0.065	0.261	6.153	13.087	30.908	32.226	11.696	6.479	94.396

7.2 Regulatory Outputs

The initial indicative primary asset outputs are identified in Table 11 below:

Table 11: Regulatory Outputs Table (Volumes)

Asset Category	Asset Sub-Category Primary	Voltage	Forecast Additions/ Activity	Forecast Disposals
Denny North 400/275kV Substation:				
Circuit Breaker	CB (Air Insulated Busbar) (OD)	400 kV	1	0
Circuit Breaker	CB (Air Insulated Busbar) (OD)	275 kV	0	1*
Other switchgear	Disconnector (AIS) (OD)	400 kV	3	0
Other switchgear	Disconnector (AIS) (OD)	275 kV	0	3*
Lambhill 275kV Substation:				
Circuit Breaker	CB (Air Insulated Busbar) (OD)	400 kV	1	0
Other switchgear	Disconnector (AIS) (OD)	400 kV	1	0
Wound Plant	Transformer	400kV>=500MVA	1	0
Windyhill 400kV Substation:				
Circuit Breaker	CB (Gas Insulated Busbar) (ID)	400 kV	10	0
Wound Plant	Transformer	400kV>=500MVA	1	0
XD OHL:				
Overhead Tower Line	OHL (Tower Line) HTLS Conductor	400 kV	32.024 km	0
Overhead Line Fittings	Fittings	400 kV	102 each	0
Overhead Tower Line	Tower	400 kV	102 each	0
Overhead Tower Line	OHL (Tower Line) HTLS Conductor	275 kV	32.089 km	0
Overhead Tower Line	OHL (Tower Line) Conductor	275 kV	-	64.113 km
Overhead Line Fittings	Fittings	275 kV	102 each	204 each

** Assets to remain in situ for future re-energisation.*

Note that as part of this Stage 1 submission the table above is indicative of primary asset additions and disposals only and will be further developed at Stage 2 e.g. the uprating of overhead line assets from 275kV to 400kV operation, such as on XE route, is not indicated above.

8. Delivery

We have applied our project management approach to ensure that this project work is delivered safely, and in line with the agreed time, cost and quality commitments. We have a proven track record of delivering essential transmission network upgrade projects and will draw upon this knowledge and experience to effectively manage these works. We have assigned a dedicated Project Manager to the works at every stage who will be responsible for overall delivery of the scope and is the primary point of contact for all stakeholders.

8.1 Delivery Schedule

A standard approach has applied to the planning phase of these works and that will continue for the reporting and the application of processes and controls throughout the lifecycle. Table 12 summarises the key milestones within the delivery schedule.

Table 12: Key Milestone

Milestone	Phase	Estimated Completion Date
1	GIS Invitation(s) to Tender Issued	June 2024
2	Award OHL Contract	Feb 2025
3	Award GIS	April 2025
4	Award S/S Contract (Design long-leads /Construct)	April 2025 / Nov 26
5	Planning Application Submission (Overhead Line)	Dec 2026
6	Works Start on Site (Sub-station)	Feb 2027
7	Planning Decision Received (Overhead Line)	Nov 2027
8	Works Start on Site (OHL)	April 2028
9	Completion of Works	December 2029

Regular meetings with the Project and Construction Management Teams shall be undertaken to assess the ongoing effectiveness of the Project Management interfaces.

The Project Manager will facilitate internal Project Team Meetings, in which project progress and deliverables will be reviewed and any arising risks or issues will be discussed and addressed.

8.2 Risk and Mitigation

A Risk Register has been generated collaboratively during the initial design stages to identify any risks, which if realised, could result in deviation from the delivery plan. Mitigation strategies have also been developed to manage the risks identified and these will be implemented by the Project Manager. The risk register shall remain a live document and will be updated regularly. Currently, the top scheme risks are:

8.3 Quality Management

SPT adopts a "life cycle" approach to Quality Management in major project delivery. Our Management Systems are certified to ISO 9001, ISO 14001 and ISO 45001. Various areas applicable to these standards ensure a quality product is delivered. The significant areas detailed below:

8.3.1 Quality Requirements During Project Development

Any risk or opportunity that may affect the quality of the product are detailed in the Project Risk Register. The suppliers of main equipment may also receive a Factory Acceptance Test Inspection when the asset is being built.

8.3.2 Quality Requirements in Tenders

Each contract that SPT issues has a standard format. Specifically in relation to quality, this will include a Contractors' Quality Performance Requirement (CQPR). This CQPR represents a specification that details roles and responsibilities for all parties during the works, frequency and format of reporting. It will also specify the document management process to be adhered to during the delivery of the project. In addition to the CQPR, each project has a contract specific Quality Management Plan, detailing the inspection and testing regime for works as well as the records to be maintained.

8.3.3 Monitoring and Measuring During Project Delivery

SPT Projects undertake regular inspections on projects and contractors to monitor and measure compliance with SPT Environmental, Quality and Health and Safety requirements, as detailed in the contract specifications for the work. All inspections are visual, with the person undertaking the inspection ensuring that evidence of the inspection and any actions raised are documented.

The following inspections are completed:

- Quality Inspections

Environmental Inspections Safety Assessments & Contractor Safety Inspection Project Management Tours The scope of audits and Inspections is to determine compliance with:

- Procedures & Guides
- Planned arrangements for ISO 9001, 14001 & 18001
- Legal and other requirements.

8.3.4 Post Energisation

SPT Projects and SPT Operations carry out a Defect Liability Period Inspection within the Contract Defect Liability Period with the aim of identifying any defects and rectifying them with the contractors.

9. Conclusion and Recommendations

This MSIP Re-opener application demonstrates the need to establish the Windyhill – Lambhill – Denny North 400kV Reinforcement, with works commencing in the RIIO-T2 period (April 2021 – March 2026) and completing in the RIIO-T3 period. This project will enable the timely and co-ordinated increase in power transfer into and through the SPT network from renewable developments across the north of Scotland.

The development of the Windyhill – Lambhill – Denny North 400kV Reinforcement:

- Will help to ensure the network is ready for the changes required by Net Zero targets, facilitating new generation in Scotland and reducing constraint costs;
- Is aligned with other planned reinforcement of north to south transfer capability across Boundaries B4 and B5, which has also been recommended to proceed by the NOA process (e.g. ref. NOA7 codes LWUP, DWUP, TKUP, BDUP, TGDC and DWNO); and
- Supports the maximisation of transfer capability via the increased utilisation of existing transmission overhead line routes, helping to relieve thermal bottlenecks in the SPT network and enable the increased connection and transfer of renewable energy.

The main conclusions of this submission are:

- The timely connection of low carbon generation, including onshore and offshore wind, will play a vital role in reaching legislated net zero targets, and is aligned with SPT's RIIO-T2 strategic goals.
- It is necessary to make significant investment in the capability of the existing transmission system through Scotland and the north of England to accommodate growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical to allow the network to keep pace with projected growth to support legislated Net Zero targets whilst also enabling significant constraint savings.
- An MSIP Re-opener application is required in respect of these works.

We, respectfully, request Ofgem's agreement to the following:

- The option being progressed addresses a clear customer need and represents value to UK consumers, therefore, the works should proceed based on the preferred solution (Option 2).
- Efficient expenditure is fully funded, as necessary to maintain programme timelines and mitigate project delivery risk e.g. order long-lead equipment, prior to the second stage MSIP submission and assessment.

Appendix A - SP Transmission System, Geographic Overview