MSIP Re-opener Application – Extension of LEO and OTS Schemes		
Ofgem Scheme Reference/ Name of Scheme	CMP (Constraint Management Pathfinder) – SPT200407 LEO (Line End Open) Modifications and SPT200202 OTS (Operational Tripping Scheme) Modifications	
Investment Category		
Primary Investment Driver	Constraints Management Pathfinder	
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (f) & (i)	
Materiality Threshold exceeded (£3.5m)	No	
PCD primary Output	Protection & Control Equipment	
Total Project Cost (£m)	£1.440m	
Funding Allowance (£m)	To be confirmed	Requested £1.440m
Delivery Year	2023/2024	
Reporting Table	Annual RRP – PCD Table	
PCD Modification Process	Special Condition 3.14, Appendix 1	

Issue Date	Issue No	Amendment Details
31st January 2023	1	First issue of document.

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1. Abbreviations / Terminology

Table 1: Table of Abbreviations

Abbreviation	Term
ACM	Asbestos Containing Material
AIS	Air Insulated Switchgear
ASACS	Anglo-Scottish Auto Close Scheme
BEIS	Department for Business, Energy & Industrial Strategy
CDM	Construction Design and Management
CEC	Connection Entry Capacity
CION	Connection and Infrastructure Options Note
CT	Current Transformer
ESO	Electricity System Operator
FRS	Fast Ramping Scheme
GSP	Grid Supply Point
GOOSE	Generic Object Oriented System Event
ICS	Interconnector Control Schemes
IED	Intelligent Electronic Device
ITT	Invitation to Tender
km	Kilometre
kV	Kilovolt
LC	Licence Condition
LSpC	Licence Special Condition
MSIP	Medium Sized Investment Project
MW	Megawatt
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NGESO	National Grid Electricity System Operator
NGET	National Grid Electricity Transmission
NOA	Network Options Assessment
OHL	Overhead Line
OTS	Operational Tripping Scheme
PCD	Price Control Deliverable
RIIO	Revenue = Incentives + Innovation + Outputs
SCADA	Supervisory Control and Data Acquisition
SCMS	Series Compensation Management Scheme
SGT	Supergrid Transformer
SIPS	System Integrity Protection Scheme
SPT	SP Transmission
SPEN	SP Energy Networks
SSEN-T	Scottish Hydro Electric Transmission
STC	System Operator – Transmission Owner Code
TSR	Torsional Stress Relays
VDUM	Volume Driver Uncertainty Mechanism
VT	Voltage Transformer
WETSS	Wishaw-Eccles-Torness-Smeaton Operational Intertrip Scheme
WRBS	Western HVDC Line Run-Back Scheme

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
16-1 App C - LEO revised	Planning Request NGET 20**/00**
16-1 Intertrip connection_Final	Planning Request SPT & SSEN 20**/00**

3. Introduction

This MSIP Re-opener application defines SP Transmission's (SPT) plans to develop the Anglo-Scottish Operational Intertrip (OTS) and Line End Open (LEO) components of the SPT-NGET Interconnector Control Schemes (ICS) System Integrity Protect Scheme (SIPS) in response to an STCP 16-1 Planning Request received from National Grid ESO in respect of their B6 Constraint Management Pathfinder initiative.

Under the terms of the SO-TO Code (the STC), SPT is obliged to respond to the Planning Request to notify the party making the request how it intends to accommodate the Request and to update its Transmission Investment Plan accordingly.

SPT received the planning request for the extension of the LEO scheme on 4th November 2021 and for the extension of the OTS on 7th December 2021.

From 2008, SPT has developed an innovative multi-layered set of SIPS (collectively known as the ICS) to provide the ESO with enhanced capability of the B6 boundary in operational timescales. The backbone of the ICS is the LEO scheme which collects plant and protection status information from 43 circuit ends along the routes crossing boundary B6 and the east-west 400kV circuits between Strathaven and Torness. These line status points are then transmitted to a central location at Strathaven 400kV substation and made available to the individual schemes within the ICS which use them in their scheme logic.

The OTS allows the B6 boundary to operate in excess of its planned transient stability limit by rapidly disconnecting generation in the event of programmable, pre-determined faults. The OTS scheme is therefore designed to operate at high speed with a typical operating time of 120-150ms from fault inception to generator tripping. Further, because of the importance of the scheme in maintaining transient stability, dependability is ensured by the use of duplicated systems and operating duplicate circuit-breaker trip coils.

Through the development of their B6 Constraint Management Pathfinder, NG ESO have determined that there is benefit in extending the LEO scheme towards the B7a boundary in NGET's licence area, adding a further 22 circuit ends, which requires SPT to install additional hardware and to modify the operation of the existing LEO scheme.

NG ESO have contracted with a number of parties who are not currently connected to the OTS and it is necessary for SPT to add signalling equipment to serve these generator sites, including those located in SSEN Transmission's area.

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 activities (f) and (i) iii. This is the first of several expected submissions related to these activities, and which together will exceed the Materiality Threshold in due course.

The needs case for the LEO Extension and the OTS Extension 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. This application also describes the interfaces with NGET and SSEN Transmission for the works required on their systems.

The costs presented in section 7 are market-tested and have a high degree of cost maturity and the project delivery plan is detailed in section 8.

3.1 Structure of Document

This MSIP Re-opener application 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 need identified in Section 4. The results of an evaluation of the alternative options are presented and the reasoning behind the selection of the preferred investment option is summarised.

Section 6 – Proposed Works

This section provides a description of the proposed solution. It sets out the project 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.

Section 9 – Conclusions and Recommendations

This section summarises the conclusions and includes recommendations to be taken.

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[1] 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
7	Project Cost Estimate	3.12, 3.19, 3.20
8	Project Delivery	3.15, 3.16, 3.17

[1] 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.

Section 2.4 of Part D of the STC makes provision for the ESO or transmission licensees to submit a Planning Request to change the recipient party's Transmission Investment Plans. SPT have an obligation under section 2.4.3 of Part D of the STC to notify the requester how it intends to accommodate the Planning Request and to update its Transmission Investment Plans accordingly.

SPT received planning requests from the ESO in respect of the extension of the LEO scheme on 12th November 2021 and for the OTS scheme on 7th December 2021.

4.2 Key Project Drivers

The ESO published the results of its B6 Constraint Management Pathfinder[2] in March 2022 which detailed the successful parties who will provide services which the ESO estimates will save consumers between £20m and £40m between October 2023 and September 2024. Of the 10 generation sites awarded contracts, 6 are not currently connected to the OTS (two of which are in SSEN Transmission's licence area). Therefore, works are required to add the necessary hardware at [redacted]

[2] Microsoft Word - Final Draft - B6 Constraint Management Pathfinder (2023-24) - Results Summary Letter.docx (nationalgrideso.com)

substation and the associated generation sites, and to modify the OTS scheme to integrate the new sites.

The ESO has identified that the actions to disconnect generators following certain system faults to enhance the operational capability of the B6 boundary also have a benefit for boundary B7a, with an effectiveness of 50% to 60%, and they have therefore proposed the extension of the LEO scheme to collect the plant and protection status from 22 circuit ends at 8 sites in the NGET licence area. These works will require the installation by NGET of signalling equipment at the relevant substations, SPT will provide the partner equipment at [redacted] substation and modify the LEO scheme to integrate the new line end status.

Full details of the need case for each scheme can be found in the respective Planning Requests in section 10.

4.3 Existing LEO and OTS Schemes - Background

4.3.1 Scheme Architecture

The NGET-SPT Interconnection Control Scheme consists of the following six sub-schemes which are based on the LEO sub-scheme:

- Operational Tripping Scheme (OTS)
- Anglo-Scottish Auto Close Scheme (ASACS)
- Series Compensation Management Scheme (SCMS)
- Fast Ramping Scheme (FRS)
- Western HVDC Line Run-Back Scheme (WRBS)
- Wishaw-Eccles-Torness-Smeaton Operational Intertrip Scheme (WETSS)

At the remote sites, plant position and protection trip status are hard-wired to duplicate LEO IEDs whose scheme logic checks the integrity of the inputs and transmits their status via SPT's operational telecoms networks to partner 'receive' IEDs at [redacted] using standard IEEE C37.94 intertripping channels. Each channel has multiple status messages which allows the status of individual circuit ends to be transmitted.

At [redacted] substation, each LEO receive IED publishes the received circuit-end status values as IEC61850 GOOSE messages. Because GOOSE messages are multi-cast, they are available to any IED which is configured to subscribe to them and they provide the controller IEDs performing the OTS logic (and that of the other five ICS sub-schemes) with access to the necessary status points.

[redacted] respectively and subscribe to the relevant GOOSE messages, executing the scheme logic based on their status (the scheme logic is shown in section 11.2). To enact the tripping of generators, selected by instruction from the ESO, the OTS controllers publish GOOSE messages to which OTS 'send' IEDs subscribe. This architecture is shown in section 11.1.

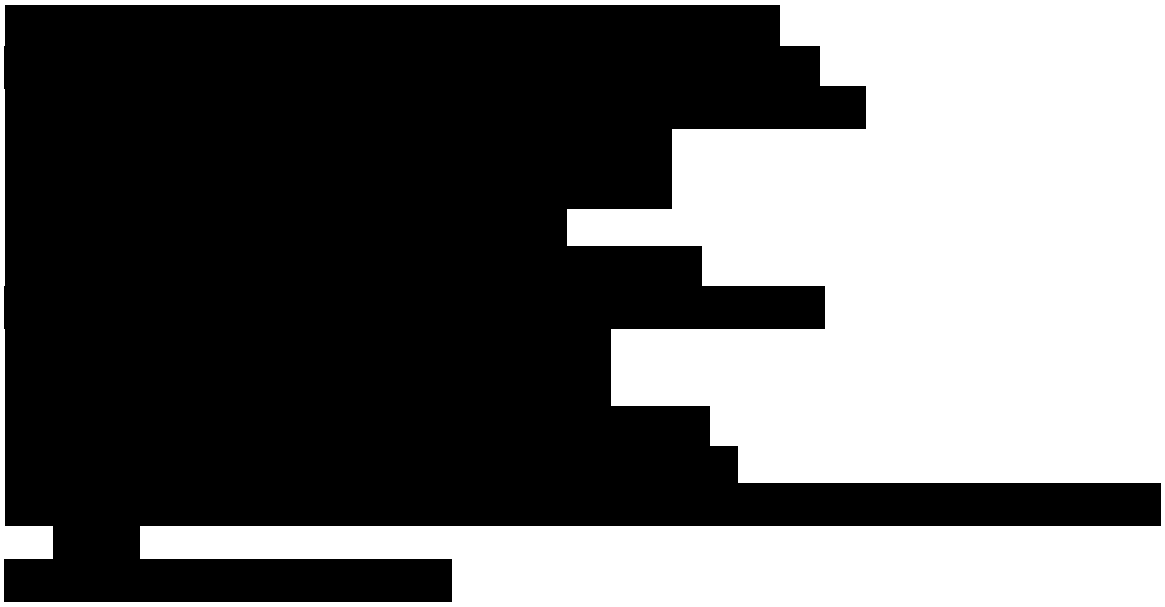
If selected to operate, the send IEDs transmit a trip command to their associated generator sites using standard IEEE C37.94 channels over SPT's operational telecoms network (interfacing with NGET's and

[redacted]

SSEN-T's telecoms networks). At the generator sites, the duplicate IEDs trip the selected generators by opening the designated TO-owned circuit-breakers.

4.3.2 LEO Signals

The following list contains the existing monitored circuit-ends for which an LEO signal is generated. An LEO condition is defined as the opening of the feeder circuit breaker or the operation of main protection/intertripping, opening of the bus coupler circuit breaker (where applicable) or operation of busbar protection which would cause the opening of the circuit breaker. The protection initiations are included to reduce the overall operating time of the scheme.



4.3.3 OTS Tripping Arrangements

The OTS is currently connected to the following generation sites and associated circuit-breakers:

- Griffin 132kV:
- Crystal Rig 400kV
- Whitelee 275kV
- Whitelee Extension 275kV
- Wishaw 275/132kV (Blacklaw)

Arming and selection of tripping is carried out by SPT under instruction from the ESO

4.3.4 OTS Operating Time

The scheme operating time is critical to maintain transient stability in the event of a system fault condition.

A typical timing table is shown in Table 4:

Tripping time to Whitelee 120ms

Table 4 - Typical Scheme Timing

	[redacted]		
	1st MP	2nd MP	3rd MP
Protection	35	20	20
TR	10	10	10
I/[redacted]	19		19
I/[redacted]	12		12
I/TRTR WLEE	10		10
CB @ WLEE	49		
	120		

The selection of the scheme IEDs, the use of IEC61850 GOOSE and the provision of duplicate systems is designed to achieve very high-speed operation and to maximise the security and dependability of the scheme.

4.4 Alignment with RIIO-T2 Strategic Goals

As described in our RIIO-T2 plan[5] 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 LEO and OTS, are summarised in Figure 1.

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

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

Providing operational enhancement of the B6 and B7a boundaries increases the volumes of predominantly renewable energy which can access the GB transmission system, contributing towards a reduced reliance on fossil fuel electricity generation sources.

[5] SP Energy Networks RIIO-T2 Business Plan

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

The ESO's estimates of the constraint savings as a result of these works are an order of magnitude greater than the capital cost which demonstrates value-for-money.

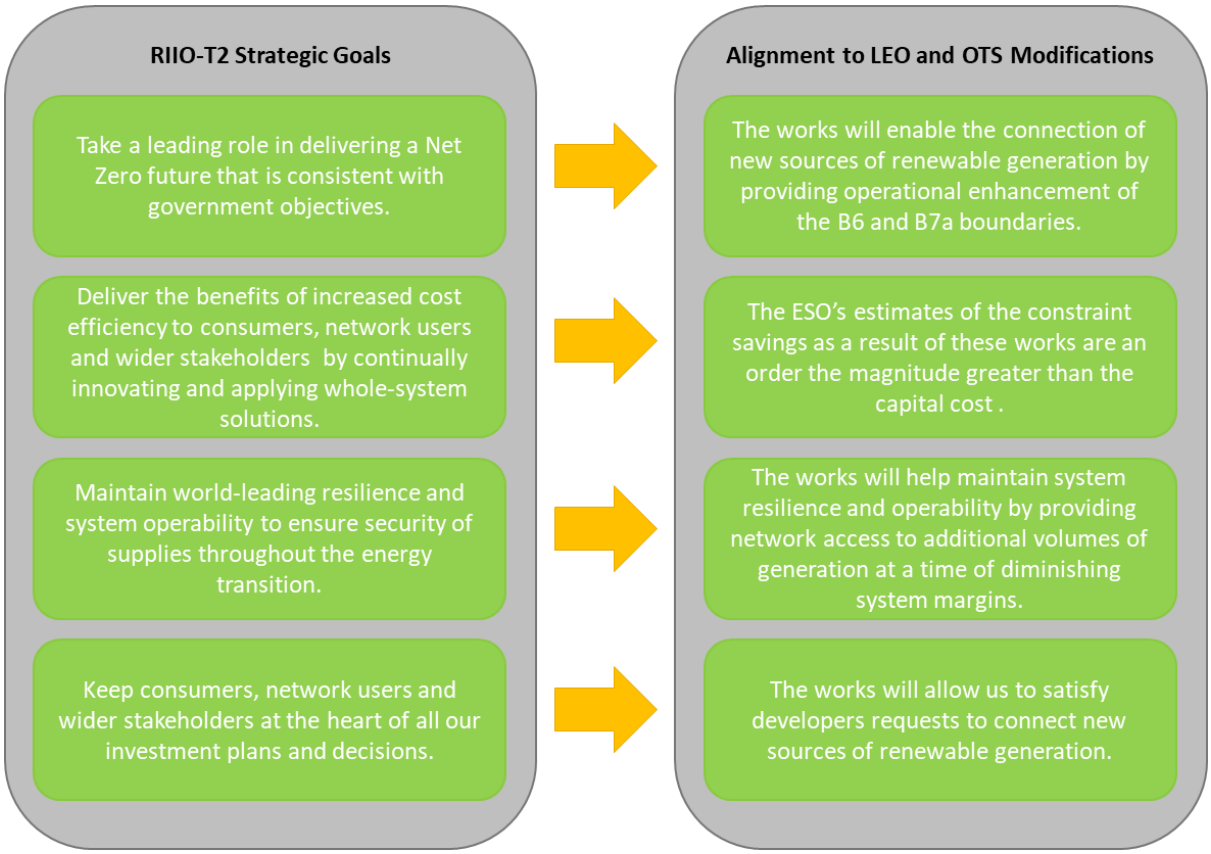


Figure 1: Alignment of LEO and OTS development with SPT RIIO-T2 Strategic Goals

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

The works will help maintain system resilience and operability by providing network access to additional volumes of generation at a time of diminishing system margins.

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

The development of the LEO and OTS schemes is consistent with SPT's obligations to maintain and operate an economic and efficient transmission system, and allow SPT to facilitate competition in generation, consistent with its statutory and licence responsibilities.

Key stakeholders have been consulted during the development of the proposed solution and we will continue to engage with stakeholders throughout the project development and delivery process. More detail on stakeholder engagement can be found in Section 8.4.

5. Assessment of Options

5.1 Overview of Options

The Planning Request from the ESO states that SPT is requested to extend the existing LEO scheme and to add additional intertrip links to the parties who were successful in the B6 Constraint Management Pathfinder. Therefore, there are two options available: the extension of the LEO and OTS schemes or to replace both schemes in their entirety.

5.1.1 Option 1 – Extension of the OTS and LEO Schemes

The existing LEO and OTS schemes entered service in 2008 and have been augmented and modified as required by the configuration of the primary system and in response to requests from the ESO. The schemes meet current and future performance requirements and is capable of being extended.

Extending the existing systems is the lowest cost option and results in the shortest scheme outage requirements.

5.1.2 Option 2 – Full Replacement of the OTS and LEO schemes

While Option 1 includes the replacement of some existing equipment (see section 6) to facilitate the extensions, it is not considered necessary to replace other parts of either the LEO or OTS schemes. As the complete replacement of the schemes would have a higher capital cost, incur longer scheme outages and provide no additional benefit compared to Option 1, this option was not pursued further.

5.2 Option Assessment

The Planning Requests received from the ESO proposed the extension of the LEO and OTS schemes and SPT consider it to be feasible to implement this proposal. As the existing functionality is to be maintained and applied to the new elements, the only alternative option is a full like-for-like replacement. It is not necessary to replace the schemes in their entirety to achieve the functionality required by the Planning Requests and as this approach would result in higher capital costs and increased scheme outage durations for no additional benefit, the proposed option is Option 1 – extension of the LEO and OTS schemes.

6. Proposed Works

6.1 Project Summary

The extension of the LEO and OTS schemes requires SPT to undertake works at the following sites which are detailed in subsequent sections:

- [redacted] substation
- Crystal Rig 400kV substation
- Elvanfoot 400kV substation
- Fallago 400kV substation
- Wishaw 275kV Substation

The OTS extension requires the new equipment to integrate Clyde North and Central Windfarms (via Elvanfoot) and Fallago Windfarm. The extension requires the modification of the existing equipment related to Crystal Rig and Wishaw to incorporate the Aikengall II & IIa Windfarms and the Wishaw Energy Storage Facility respectively. SSEN-T will connect the Corriemoillie and Dorenell generation sites to the OTS which will require SPT to install additional equipment.

NGET will undertake works at eight substations in their licence area to connect the additional 22 circuit ends to the LEO scheme. Note that the project cost estimate details in Section 7 of this MSIP Re-opener Application relate to SPT costs only, and do not include NGET costs associated with works in the north of England.

6.2 Works at [redacted] Substation

The extension of the LEO and OTS schemes requires the addition and replacement of IEDs, upgrades to the [redacted] system, SCADA and telecoms changes, auxiliary supplies works and civil works to accommodate the additional equipment.

6.2.1 Protection & Control Works – LEO Scheme

New duplicated LEO signalling equipment for [redacted] substations will be installed.

Modification of the existing [redacted] LEO signalling equipment is required to add the new LEO data for [redacted]

It is necessary to modify the existing [redacted] LEO signalling equipment to add the new LEO data for [redacted]

The requirements for the new LEO data are listed in the table 5 below:

Table 5 – Requirement for new LEO Data

Substation	LEO Data
[redacted]	

Substation	LEO Data
[redacted]	[redacted]

The ICS Local Area Network will be extended to incorporate the new LEO equipment as shown in section 11.1.

6.2.2 Protection and Control Works – OTS

The OTS scheme logic will be altered to incorporate the additional 22 circuit-ends. The existing logic (see section 11.2) is hosted on two separate sets of duplicate logic controller IEDs for the West Coast and East Coast B6 circuits respectively. These IEDs were installed in 2008 and 2009 respectively and are based on an obsolete platform. To accommodate the new functionality, these will be replaced with the current hardware platform. New IEDs will be installed to incorporate the new OTS scheme logic elements related to the new LEO data created by the OTS extension; this will create a third, North England, logic controller. The new scheme logic is shown in section 11.3.

New OTS signalling equipment will be installed to send commands to Elvanfoot, Fallago, [redacted] substations.

The existing Crystal Rig signalling equipment will be modified to incorporate the new OTS command signals for Aikengall II and IIa windfarms. Similarly, the Wishaw OTS equipment will be modified to include signals for Wishaw Energy Storage Facility.

[redacted]

6.2.4 SCADA and Telecoms

The [redacted] Substation Control and Information System (SCIS) will be modified to provide control, alarm and indication facilities for the new equipment.

New duplicate telecommunications services are required between [redacted] and the following remote sites:

[redacted]

These services will use interfaces complying with IEEE C37.94.

6.2.5 Auxiliary Supplies Works

A new duplicate 110V DC system comprising batteries and chargers are required to accommodate the standing load of the new LEO and OTS equipment which requires an extension of the substation LVAC board.

6.2.6 Civil Works

Works are required to extend cable trays and trenches to accommodate optical fibre and DC supply cables.

6.3 Works at Crystal Rig 400kV Substation

The existing OTS signalling equipment currently covers the OTS requirements for Crystal Rig II and III Windfarms. The equipment shall be modified to incorporate Aikengall II and IIa Windfarm by [redacted] and sending intertrips to Westerdod substation to [redacted] and further intertrip to the windfarm. Works are required to incorporate indications from the relevant circuit-breakers in the OTS. The SCIS will be modified to provide new control, alarm and indication facilities.

6.4 Works at Elvanfoot 400kV Substation

A new panel will be installed to provide the duplicate OTS signalling equipment. The OTS will operate into [redacted] to trip Clyde North and Clyde Central Windfarms and send intertrips to Clyde North 275kV substation. Intertrips received at Clyde North will [redacted], and send intertrip signals to the windfarm. Works are required to incorporate indications from [redacted] in the OTS.

6.5 Works at Fallago 400kV Substation

A new panel will be installed to provide the duplicate OTS signalling equipment. The OTS will operate into [redacted] and intertrip to the windfarm. Works are required to incorporate indications from [redacted]. The SCIS will be modified to provide new control, alarm and indication facilities.

6.6 Works at Wishaw 275kV Substation

The existing OTS signalling equipment currently covers the OTS requirements for Blacklaw Windfarm. The equipment shall be modified to incorporate Wishaw Energy Storage Facility by [redacted] and intertripping to Netherton Energy substations to [redacted] and further intertrip to Wishaw Energy Storage Facility. Works are required to incorporate indications from the relevant circuit-breakers in the OTS. The SCIS will be modified to provide new control, alarm and indication facilities.

6.7 Works at SSEN-T Substations

All works to install duplicate OTS equipment at these sites are the responsibility of SSEN-T. SSEN-T will install the equipment at [redacted] substations and arrange for CB indications at these sites and [redacted] substation to be incorporated into the OTS.

6.8 Works at NGET Substations

Works to install duplicate LEO equipment at the eight NGET sites listed in section 6.2.1 and to modify the existing equipment at [redacted] Substations are the responsibility of NGET. NGET will arrange for CB indications at these sites to be incorporated into the OTS

6.9 Environmental and Consents Works

Asbestos surveys were undertaken in advance of contract tendering to establish certainty around site installation. These surveys showed no asbestos is present in the areas where works will be carried out.

As all the construction work is within SPT's existing substation infrastructure at existing sites, there are no environmental planning requirements for these works. Likewise, as SPT own or already lease all of the existing land within which the construction will be carried out, there are no consents requirements for these works.

7. Project Cost Estimate

The cost estimates below include all contracts required for completion of the project.

7.1 Estimated Total Project Cost

Aligned with the format of the Re-Opener Pipeline Log, Table 6 details expected energisation year and our current view of potential direct capital expenditure in RIIO-T2.

Table 6: Estimated Incidence of Expenditure

		Potential direct capex value per year, £m, 18/19 price base								
Energisation Year	Pre-RIIO-T2: direct capex	Yr 21/22: direct capex	Yr 22/23: direct capex	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	RIIO-T2 Total: direct capex	Total: direct capex
2023		0.000	0.330	1.110	0.000	0.000			1.440	1.440

7.2 Detailed costs

Table 7 below provides a cost breakdown representing the latest view of Direct costs for the proposed investment:

Table 7: Direct Costs

Contract Name	Cost	Start	Finish	Comments
Surveys	[redacted]	May-22	Jul-22	Outturn value
EPC Contractor		Oct-22	Oct-23	Awarded value
SCIS/HMI Updates		Aug-22	Oct-23	Awarded value
Telecoms		Jul-22	Oct-23	Awarded value
LVAC Modifications		Oct-22	May-23	Awarded value
Battery Systems		Oct-22	May-23	Awarded value
Risk				
Total	**1.440**			

7.3 Procurement Strategy

SPT Procurement strategy follows a disaggregated model, within which contracts are disaggregated and tendered separately to maximise cost efficiencies. For this project, due to the nature of the work, an EPC contract was tendered for the main body of works. This contract was competitively tendered with multiple tendering rounds and a Best and Final Offer stage to maximise pricing competition. SPT also procured several items of equipment directly with manufacturers, utilising ongoing frameworks SPT have in place with various suppliers. These frameworks are tendered competitively to achieve the best market rates and are valid for a period of 2 years, giving cost certainty and best market rates.

Table 8 below provides a breakdown of the contracts and the strategy employed for each:

Table 8: Procurement Strategy

Contract	Units	Procurement Strategy
Surveys	As required	[redacted]
Telecoms	1	
SCIS/HMI Updates	1	
EPC Contractor	1	
LVAC Modifications	1	
Battery Systems	1	

7.4 Cost Maturity

Aligned with the classification outlined within the OFGEM LOTI Re-Opener Guidance Document published on 29th March 2021 the table below includes the assessment of cost firmness:

Table 9: Cost Firmness Assessment

Contract	Status of Costs	Cost Firmness as per OFGEM classification	Total Direct Cost (£m)	Total Cost (%)
Surveys	[redacted]			
EPC Contractor				
SCIS/HMI Updates				
Telecoms				
LVAC Modification				
Battery Systems				
Risk				
		TOTAL	**1.440**	**100%**

As it can be seen in Table 9, 100% of the total costs are either incurred already or have been contracted, giving high confidence in our cost submission.

7.5 Project Risk and Mitigation

Table 10 below provides a breakdown of the individual project risks followed by further detailed explanation regarding mitigation and likelihood.

Table 10: Risk Quantification

Risk	Description	Probability	Value (£m)
[redacted]			

[redacted]

7.6 Total Allowance Request

SPT requests that the following allowance is provided through the MSIP Re-opener mechanism to deliver the works described within Section 6. These allowances will be subject to the Opex escalator mechanism:

Table 11: Requested Direct Allowances

	Direct allowance requested per year, £m, 18/19 price base					
	Yr 21/22:	Yr 22/23:	Yr 23/24:	Yr 24/25:	Yr 25/26:	Total (£k)
Direct Allowances Requested		0.330	1.110			**1.440**

7.7 Regulatory Outputs

As the output of the project is the enablement of commercial services to be employed by the ESO, it is proposed that the associated Price Control Deliverable is defined as follows:

Table 12: Price Control Deliverable

OSR	Scheme Name	Output	Allowance* (Oncosted)	Delivery Date
SPT200407 SPT200202	CMP (Constraint Management Pathfinder) – LEO (Line End Open) Modifications and OTS (Operational Tripping Scheme) Modifications	Completion of the extension of the LEO and OTS systems.	£1.633m	31st December 2023

*Include Indirect costs calculated using the Opex Escalator uplift (13.4%) on Direct costs.

8. Project 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 this project. We have assigned a dedicated Project Manager to this project 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 been applied to the planning phase of this project and that will continue for the reporting and the application of processes and controls throughout the project lifecycle. Table 12 below summarises the key project milestones within the delivery schedule.

Table 12: Project Milestones

Milestone	Project Phase	Estimated Completion Date
1	Issue Main ITT	Complete
2	Main Contract Awarded	Complete
3	Commence Main Site works	August 2023
4	Complete Site works	October 2023

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

This project is a cross boundary scheme which means that NGET and SSEN need to carry out works within their licence area, ongoing interface meetings, technical discussions and combined testing will be key to ensuring the project is delivered on time. These meetings have already commenced and will continue throughout the project up to completion.

8.2 Alignment with other projects

For these extensions there is no alignment with other projects and these projects do not impact any other works we are carrying out on the network at this time.

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 (that is noted in Section 6.5 above).

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 (monthly)
- Environmental Inspections (monthly, with weekly review by third party Environmental Clerk of Works)
- Safety Assessments & Contractor Safety Inspection (daily, with full time Site Manager)
- Project Management Tours (monthly)

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.

8.4 Stakeholder Engagement

SPT is committed to delivering optimal solutions in all the projects we undertake. A key part of this is engaging with relevant stakeholders throughout the project development and delivery process. Stakeholders can include customers, regulatory bodies and other statutory consultees, national and local government, landowners, community groups, and local residents and their representatives (e.g., MPs, MSPs and councillors).

Community impacts associated with construction activities are considered at project initiation by completion of a Community Communications Plan, which details the stakeholders relevant to the project, the communication channels that will be used to engage with them, the information that will be provided to and sought from them, and the timescales over which this will happen. It considers any sensitivities that may require increased stakeholder consultation and details specific events that will be held with stakeholders during the development of the project.

As part of this project, SPT are already engaging regularly with NGESO, NGET and SSEN on a monthly basis to discuss progress and interfaces. It is envisaged this will progress into more detail design once contractors are appointed by all parties.

There will also be engagement with the connecting parties mentioned in section 6.1 once design is complete and dates for works at specific sites are confirmed.

9. Conclusion and Recommendations

This MSIP re-opener application demonstrates the need to extend the LEO and OTS schemes to accommodate the ESO's B6 Constraint Management Pathfinder contracts and presents a robust cost submission founded on awarded contracts. The project to extend the LEO and OTS schemes has been initiated in response to planning requests received from the ESO in November and December 2021.

The ESO's estimate of avoided constraint costs is an order of magnitude greater than the cost of the works, demonstrating clear consumer benefit.

We respectfully request Ofgem's agreement to the following:

- The option being progressed addresses a clear customer need and represents value to GB consumers, therefore, the works should proceed based on the preferred solution (Option 1).
- By virtue of being founded on market-tested costs, the proposed allowance value represents the real efficient cost of the works and should be fully funded.
- [redacted]

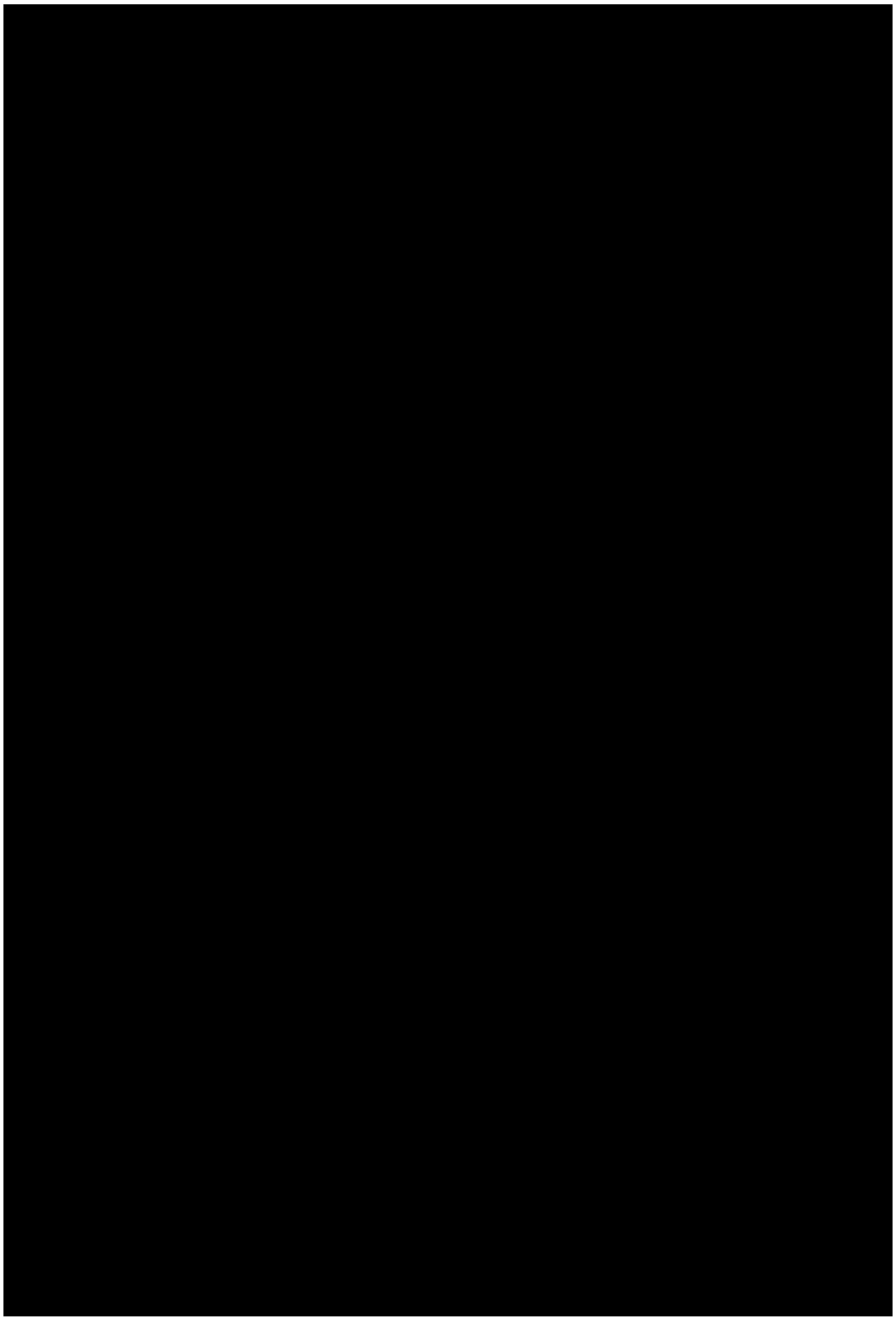
10. Appendix 1 – Planning Requests

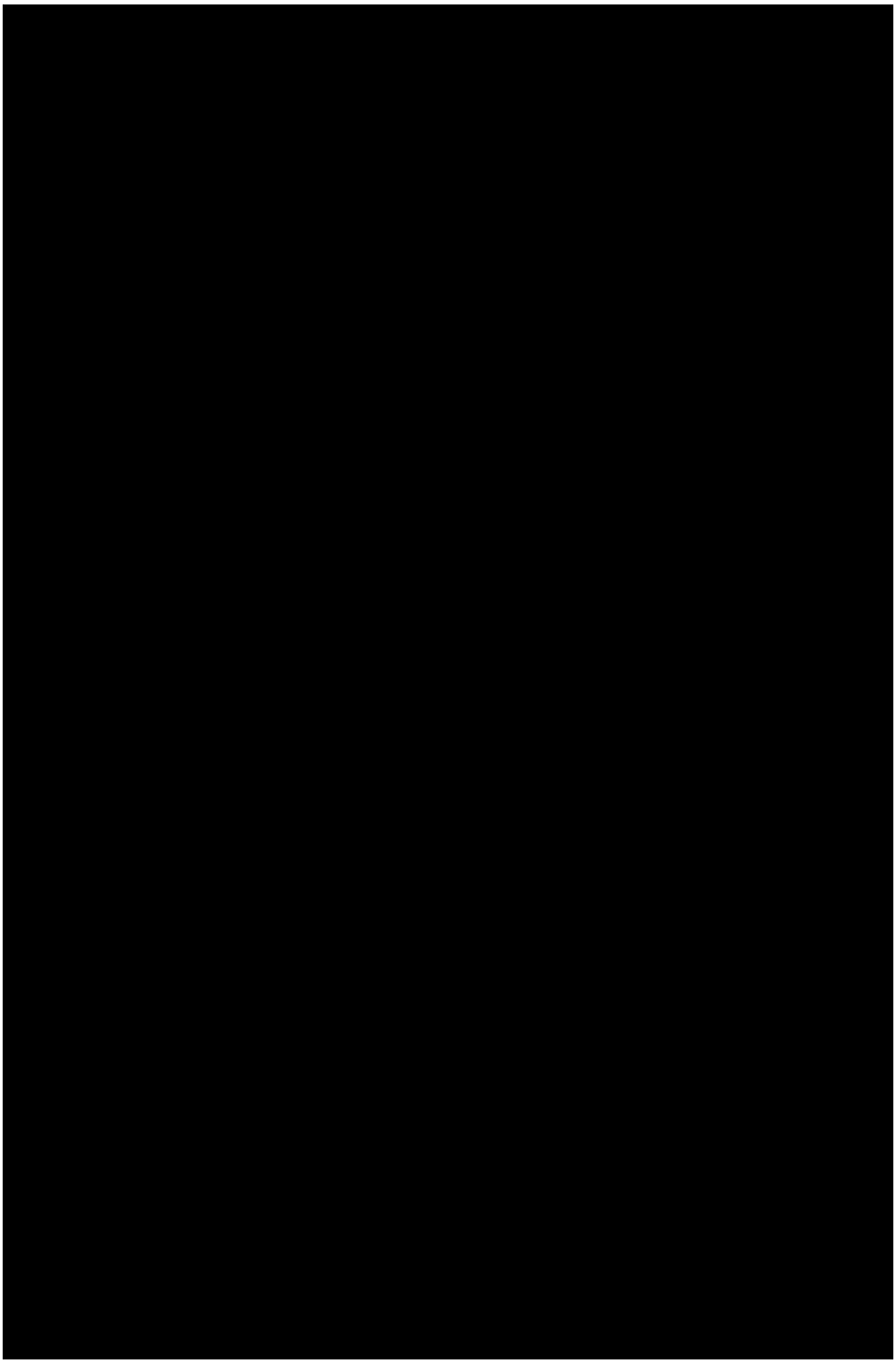
10.1 LEO Scheme Modification Planning Request:

STCP 16-1 Investment Planning

Issue 004 - xx/04/2011

[redacted]

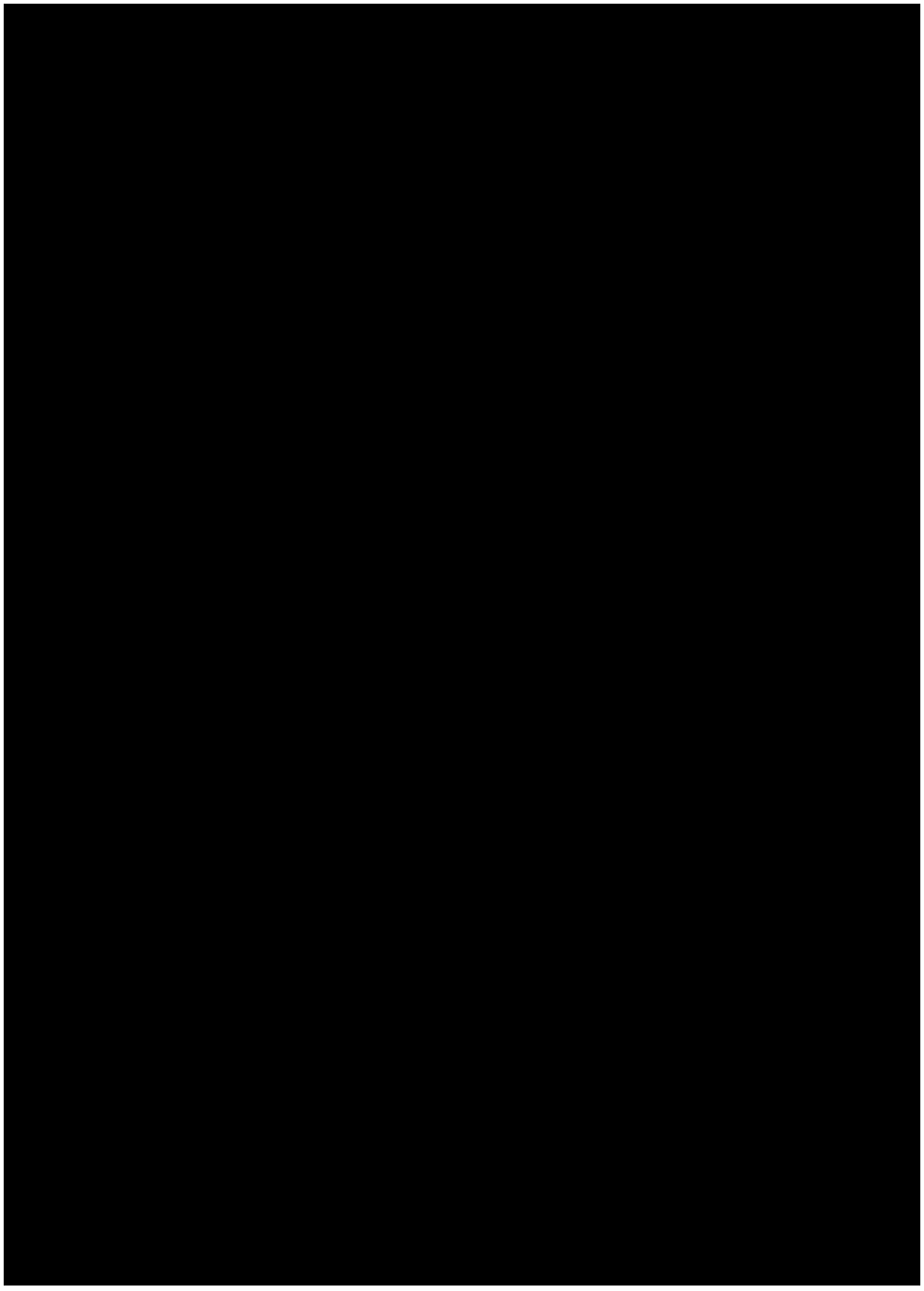


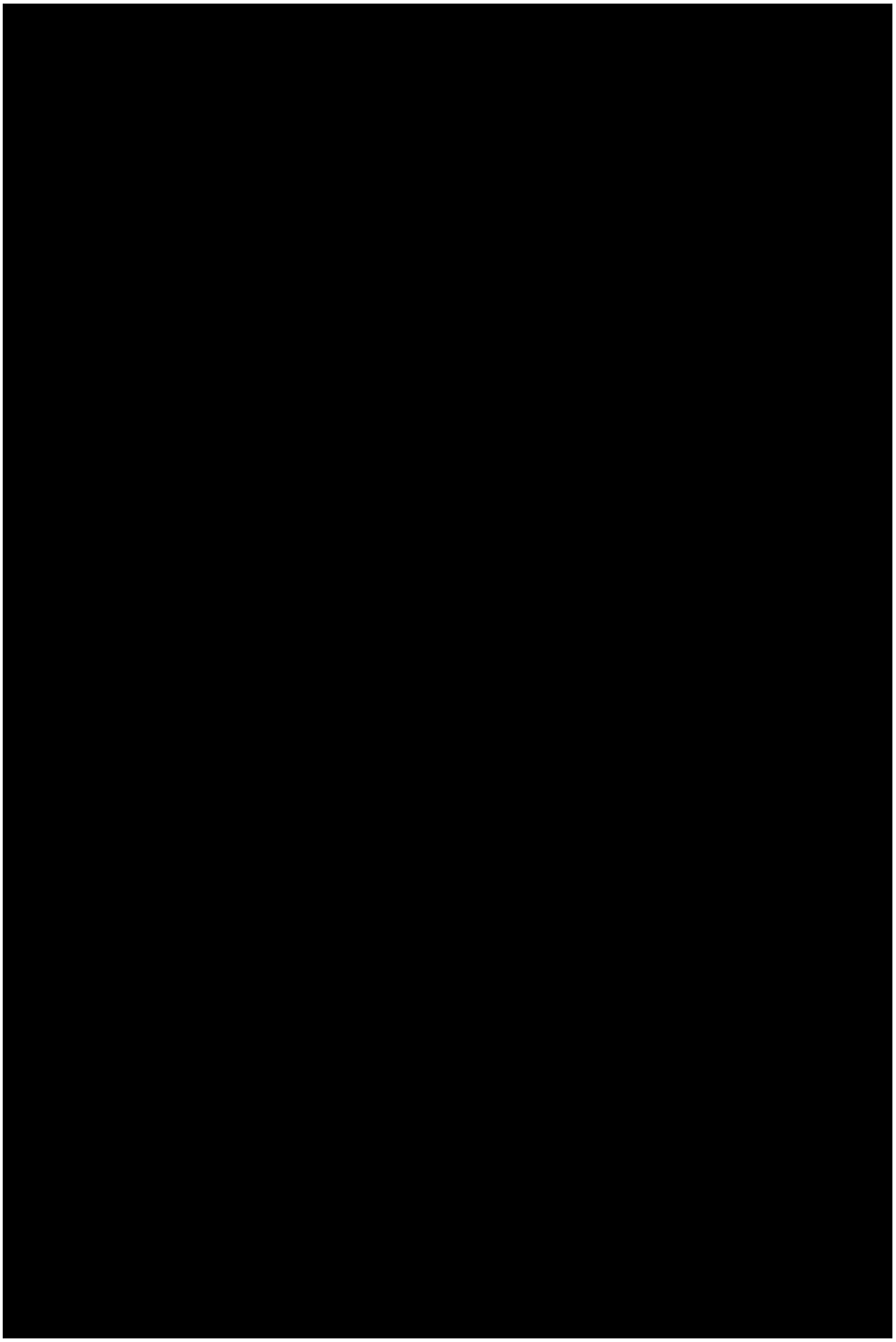


10.2 OTS Scheme Modification Planning Request:

STCP 16-1 Investment Planning

Issue 004 - xx/04/2011



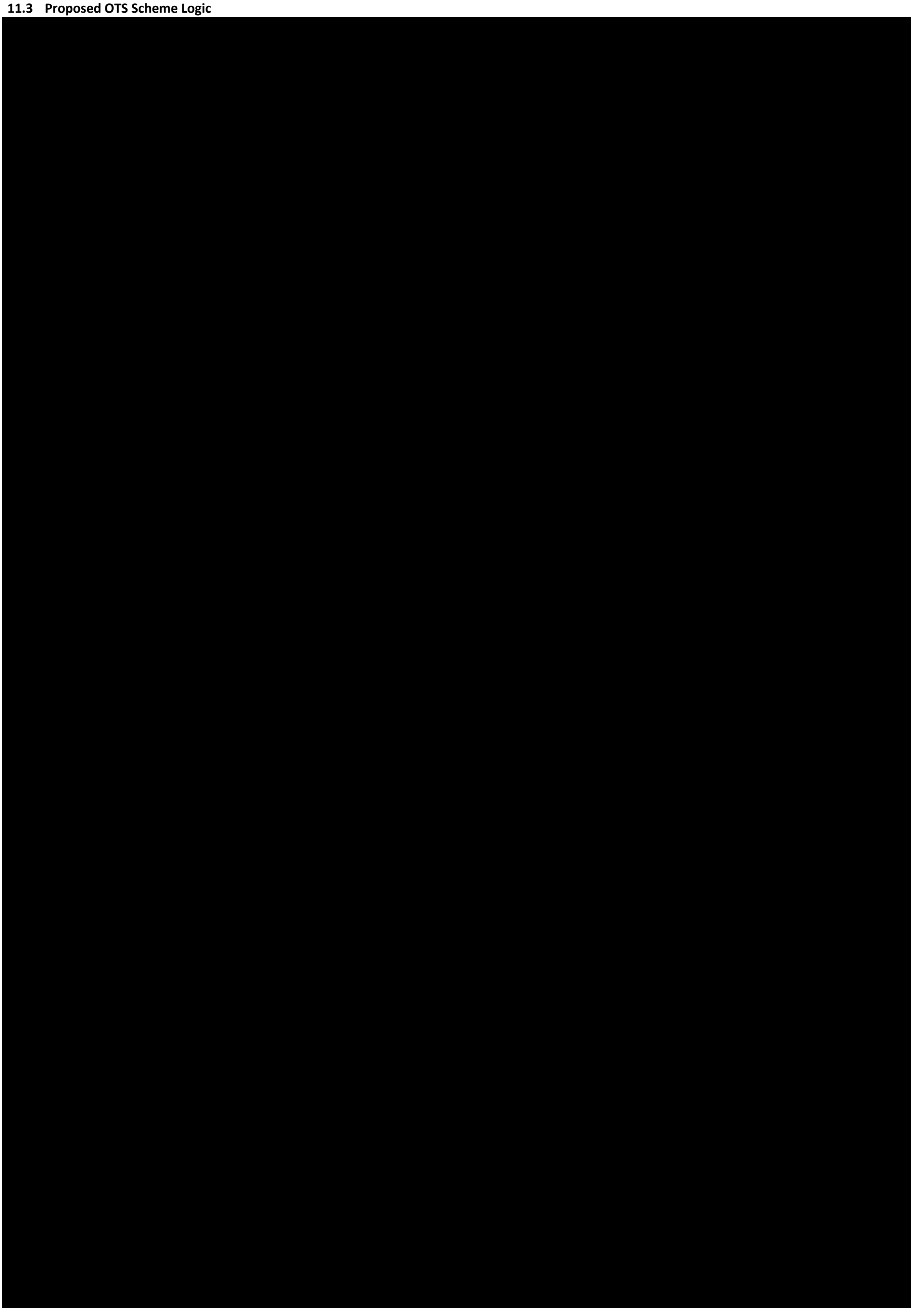


11. Appendix 2 – Diagrams

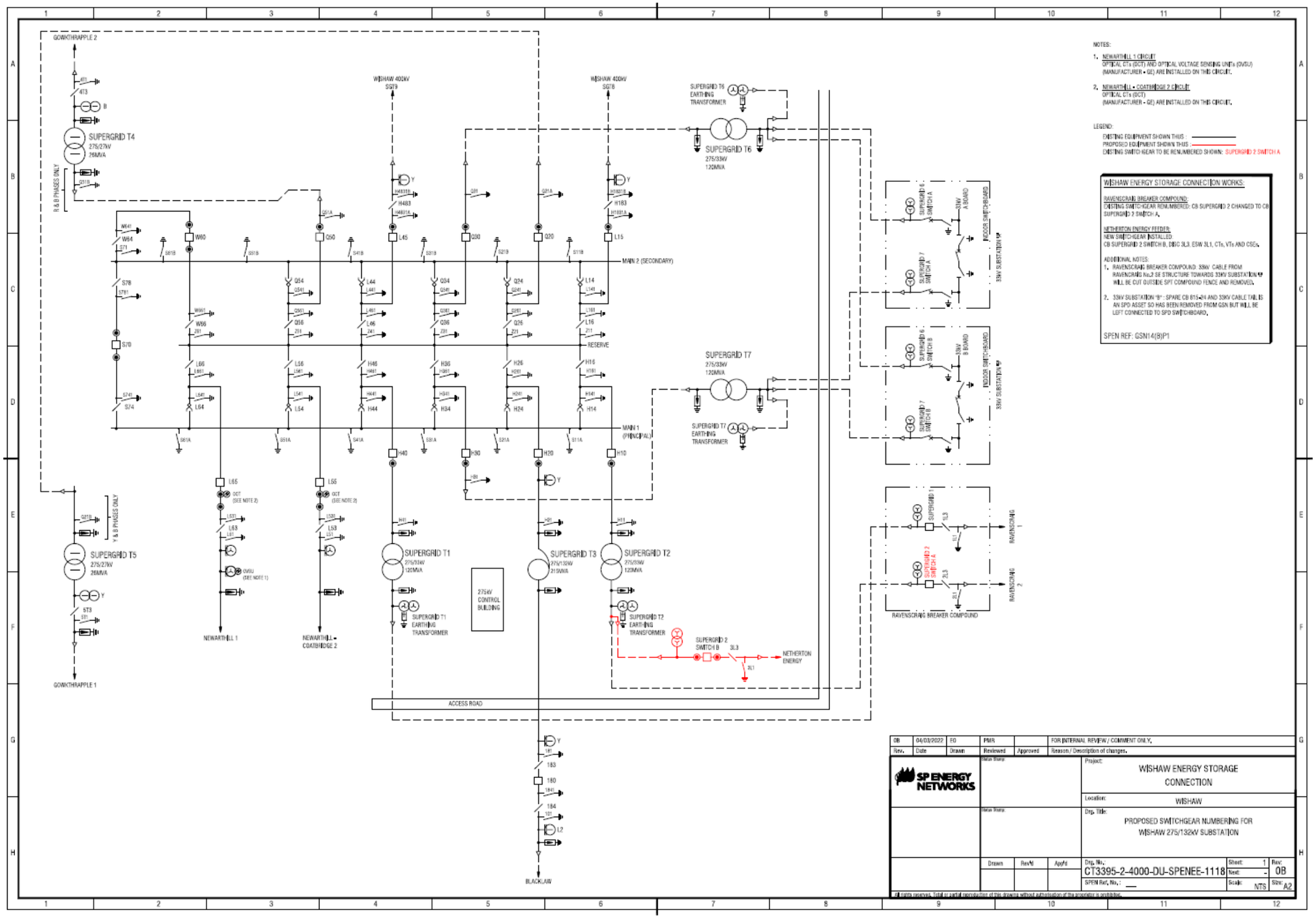
11.1 System Architecture

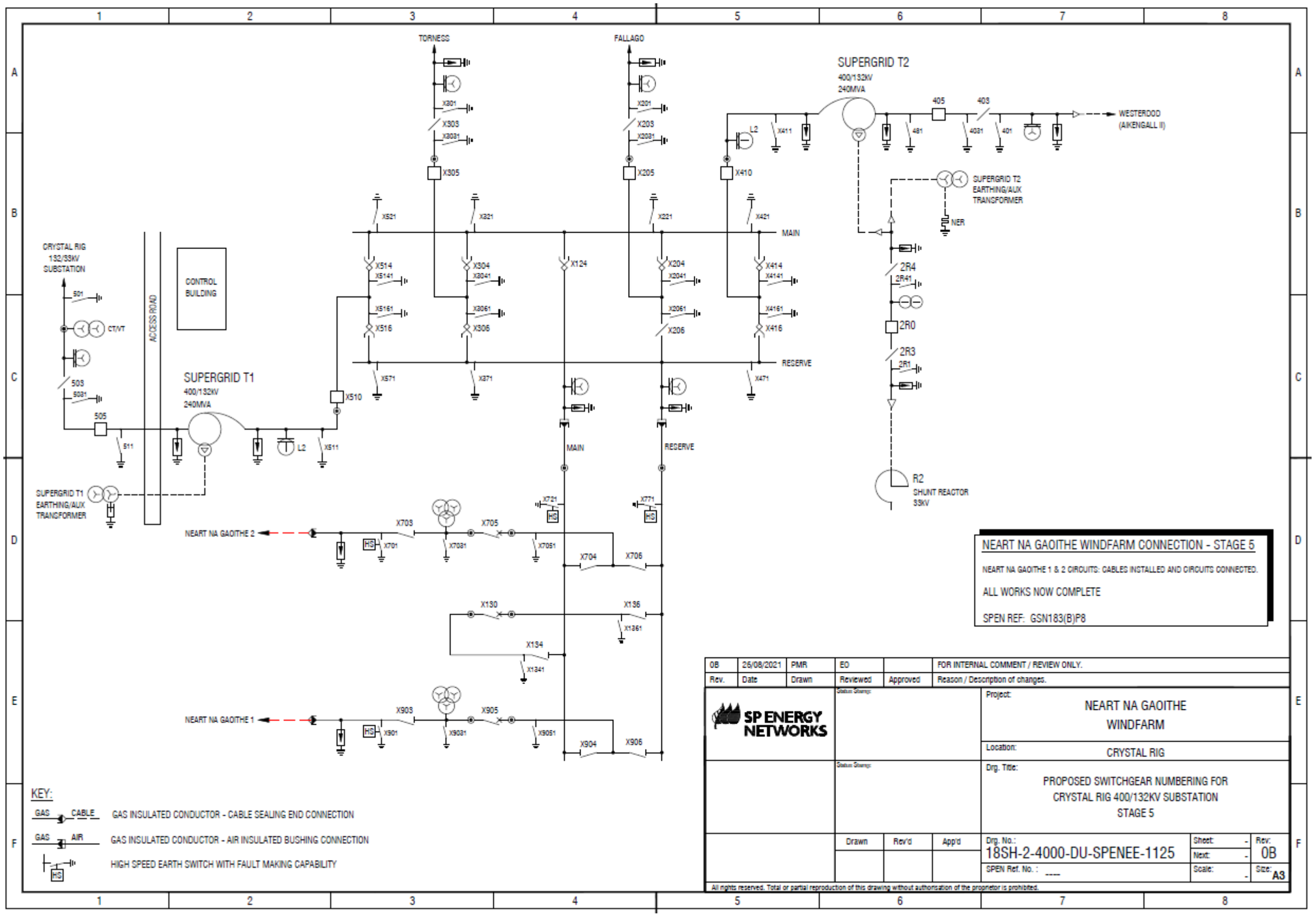
11.2 Existing OTS Scheme Logic

11.3 Proposed OTS Scheme Logic



11.4 Substation GSN Drawings

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FALLAGO
SUPERGRID T2
400/132kV
240MVA
WESTERDOD
(AIKENGALL II)
SUPERGRID T2
EARTHING/AUX
TRANSFORMER
NER
MAIN
RESERVE
2R4
2R0
2R3
R2
SHUNT REACTOR
33kV
CRYSTAL RIG
132/33kV
SUBSTATION
CONTROL
BUILDING
ACCESS ROAD
SUPERGRID T1
400/132kV
240MVA
SUPERGRID T1
EARTHING/AUX
TRANSFORMER
NEART NA GAOITHE 2
NEART NA GAOITHE 1
MAIN
RESERVE
NEART NA GAOITHE WINDFARM CONNECTION - STAGE 5
NEART NA GAOITHE 1 & 2 CIRCUITS: CABLES INSTALLED AND CIRCUITS CONNECTED.
ALL WORKS NOW COMPLETE
SPEN REF: GSN183(B)P8
KEY:
GAS CABLE GAS INSULATED CONDUCTOR - CABLE SEALING END CONNECTION
GAS AIR GAS INSULATED CONDUCTOR - AIR INSULATED BUSHING CONNECTION
HS HIGH SPEED EARTH SWITCH WITH FAULT MAKING CAPABILITY
0B 26/08/2021 PMR EO FOR INTERNAL COMMENT / REVIEW ONLY.
Rev. Date Drawn Reviewed Approved Reason / Description of changes.
SP ENERGY NETWORKS
Project: NEART NA GAOITHE WINDFARM
Location: CRYSTAL RIG
Drg. Title: PROPOSED SWITCHGEAR NUMBERING FOR CRYSTAL RIG 400/132KV SUBSTATION STAGE 5
Drg. No.: 18SH-2-4000-DU-SPENEE-1125
Sheet: - Rev: 0B
SPEN Ref. No. : ----
Scale: - Size: A3
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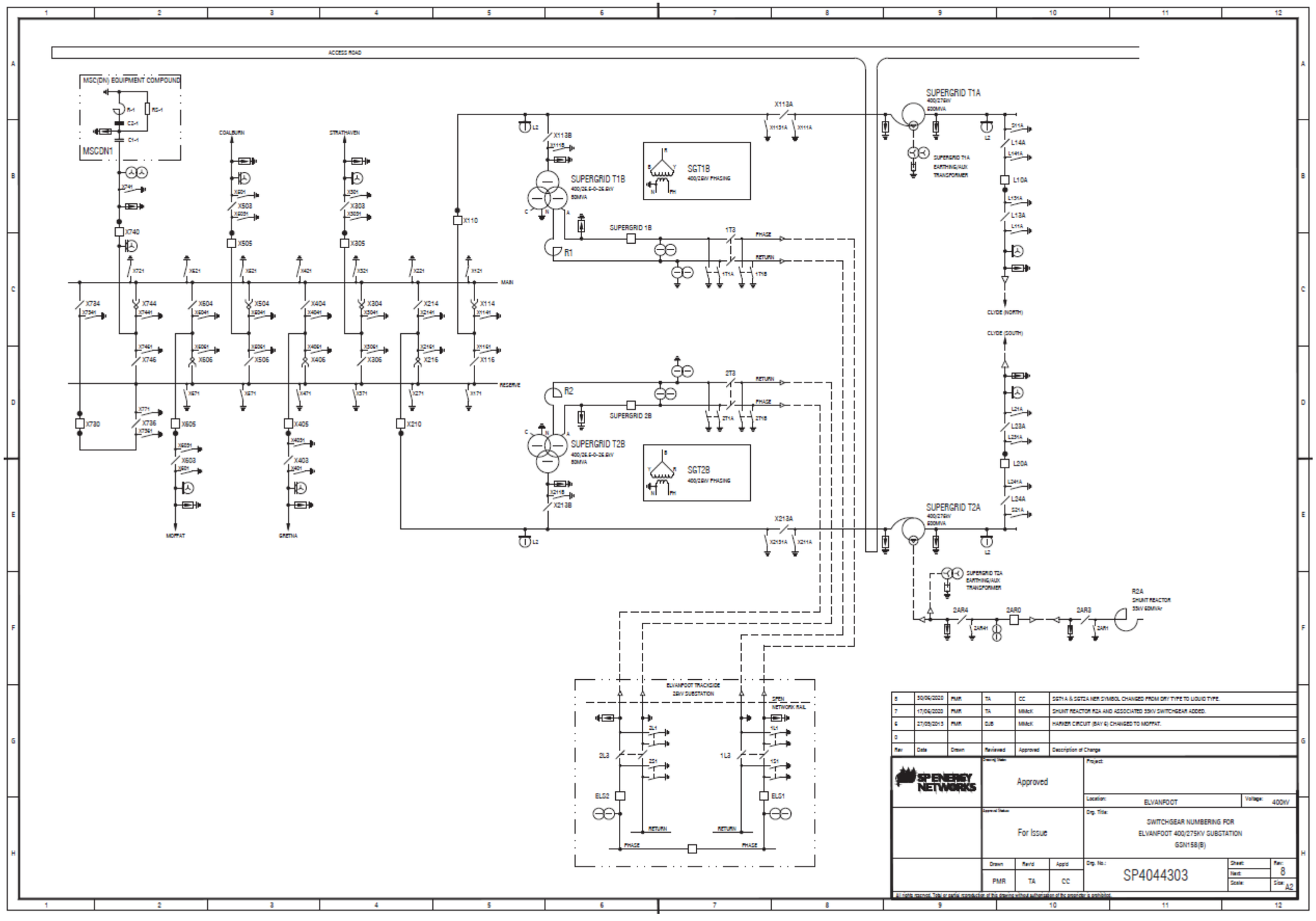


Rev	Date	Drawn	Reviewed	Approved	Description of Change
8	30/06/2020	PMR	TA	CC	SGT1A & SGT2A NEW SYMBOL CHANGED FROM DRY TYPE TO LIQUID TYPE.
7	17/06/2020	PMR	TA	Millick	SHUNT REACTOR R2A AND ASSOCIATED 33kV SWITCHGEAR ADDED.
6	27/08/2015	PMR	DJB	Millick	HARKER CIRCUIT (BAY 6) CHANGED TO MOFFAT.
0					

SP ENERGY NETWORKS

Approved

For Issue

Project:

Location: ELVANFOOT

Voltage: 400kV

Dig. Title:
SWITCHGEAR NUMBERING FOR
ELVANFOOT 400/275KV SUBSTATION
GSN158(B)

Drawn	Revd	Appd
PMR	TA	CC

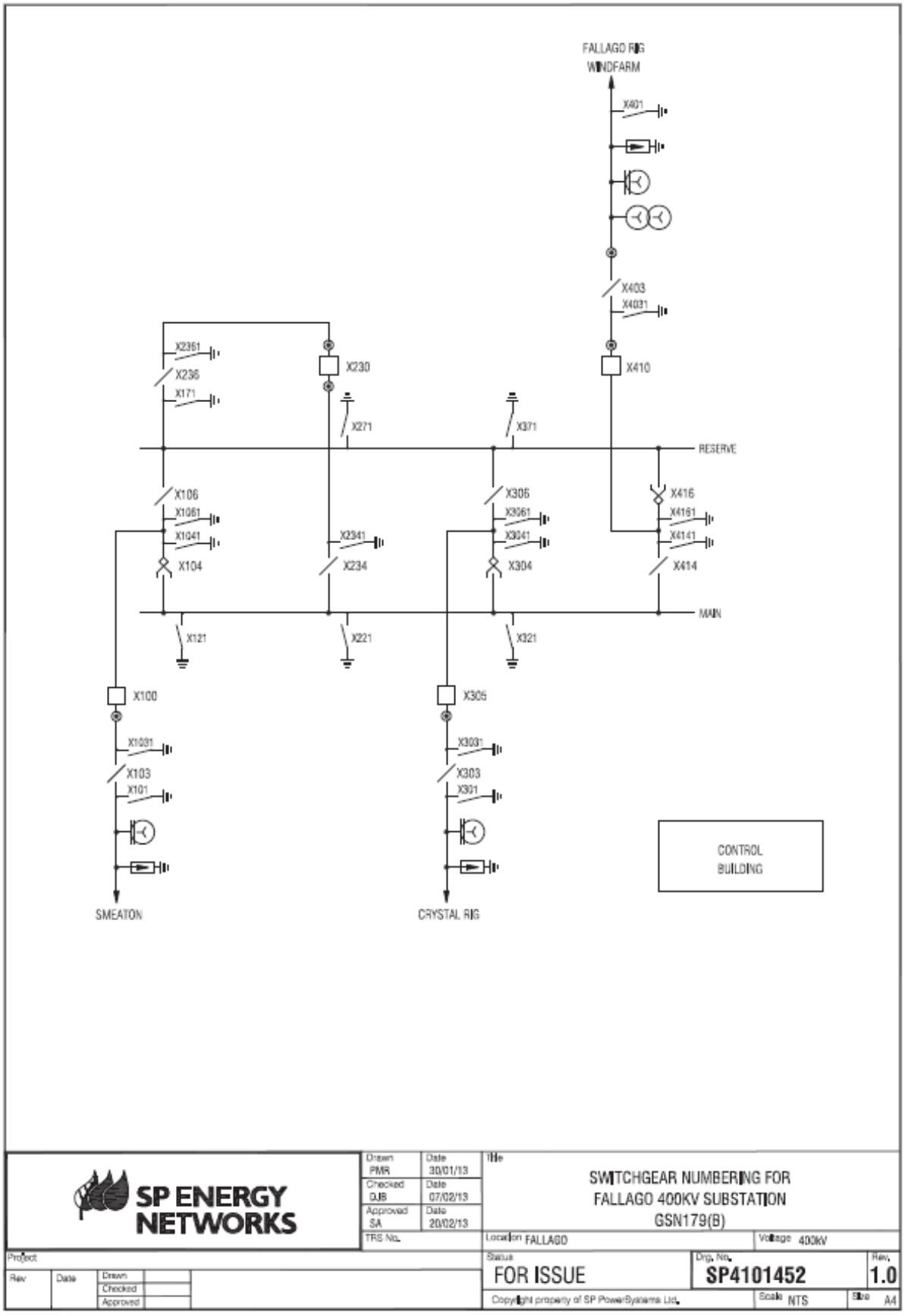
Drg. No.: SP4044303

Sheet:

Rev: 8

Scale:

Size: A2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WINDFARM
X401
X403
X4031
X410
X2361
X236
X171
X230
X271
X371
RESERVE
X106
X1061
X1041
X104
X2341
X234
X306
X3061
X3041
X304
X416
X4161
X4141
X414
MAIN
X121
X221
X321
X100
X1031
X103
X101
X305
X3031
X303
X301
CONTROL
BUILDING
SMEATON
CRYSTAL RIG
SP ENERGY NETWORKS
Drawn PMR Date 30/01/13
Checked DJB Date 07/02/13
Approved SA Date 20/02/13
TRS No.
Title
SWITCHGEAR NUMBERING FOR
FALLAGO 400KV SUBSTATION
GSN179(B)
Location FALLAGO
Voltage 400kV
Project
Rev
Date
Drawn
Checked
Approved
Status
FOR ISSUE
Drg. No.
SP4101452
Rev.
1.0
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Scale NTS
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