MSIP Re-opener Application SPT-RI-204 Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme		
Ofgem Scheme Reference/ Name of Scheme	SPT200260 / SPT-RI-204 Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme	
Investment Category	Local Enabling (Entry)	
Primary Investment Driver	System Operability	
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 and Control Equipment	
Total Project Cost (£m)	1.089	
Funding Allowance (£m)	To be confirmed	Requested £1.089m
Delivery Year	2023/24	
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
ASACS	Anglo-Scottish Auto Close Scheme
BEIS	Department for Business, Energy & Industrial Strategy
CDM	Construction Design and Management
CT	Current Transformer
DAR	Delayed Auto-Reclose
ESO	Electricity System Operator
FRS	Fast Ramping Scheme
GOOSE	Generic Object Oriented System Event
GSP	Grid Supply Point
HMI	Human Machine Interface
ICS	Interconnector Control Schemes
IED	Intelligent Electronic Device
ITT	Invitation to Tender
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
OTS	Operational Tripping Scheme
PCD	Price Control Deliverable
RIIO	Revenue = Incentives + Innovation + Outputs
SCIS	Substation Control and Information System
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

3. Introduction

This MSIP Re-opener application defines SP Transmission's (SPT) project to develop the Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme (WETSS) component of the SPT-NGET Interconnector Control Schemes (ICS) System Integrity Protect Scheme (SIPS) in response to a draft STCP 16-1 Planning Request received from National Grid (ESO).

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 Planning Request and to update its Transmission Investment Plan accordingly.

SPT received a draft Planning Request from the ESO in respect of the need for an operational intertrip scheme in the East Lothian area, due to new offshore and onshore generation connections, on 9th July 2014. The required functionality of the scheme was subsequently formalised with the ESO via Transmission Owner Construction Agreements (TOCAs) and Transmission Owner Reinforcement Instruction SPT-RI-204. The timing of the WETSS delivery is aligned with the commissioning of the Neart na Gaoithe (NNG) Offshore Wind Farm (Transmission Entry Capacity of 448MW, effective from 1st June 2023).

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 Scotland - England (B6) transmission boundary in operational timescales. The backbone of the ICS is the Line End Open (LEO) scheme which collects plant and protection status information from circuit ends along the routes crossing boundary B6 and the east-west 400kV circuits between [redacted] and [redacted]. These line status points are then transmitted to a central location at [redacted] substation and made available to the individual schemes within the ICS which use them in their scheme logic.

In order to fulfil the new Category 2 and Category 4 Intertripping Scheme[1] requirements in the East Lothian area, it is necessary to modify the LEO scheme, to collect additional plant and protection status indications, and to establish a new ICS component to be known as the Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme (WETSS).

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 WETSS 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.

[1] As defined in the Grid Code.

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[2] 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

[2] 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

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 a draft Planning Request from the ESO in respect of the need for an operational intertrip scheme in the East Lothian area, due to new offshore and onshore generation connections, dated 20th June 2014. Existing generation in the area comprises onshore wind and nuclear generation. The required functionality of the scheme was subsequently formalised with the ESO via Transmission Owner Construction Agreements (TOCAs) in respect of the NNG Offshore Wind Farm and Fallago Rig 2 Onshore Wind Farm, and via Transmission Owner Reinforcement Instruction SPT-RI-204. Full details of the Planning Request can be found in Section 10.

In respect of the NNG Offshore Wind Farm, the operational intertrip scheme shall meet the Category 2 and Category 4 Intertripping Scheme requirements set out below, and shall provide the facilities to

open, post-fault, the Transmission Interface Point [redacted] at Crystal Rig 400kV Substation.

In respect of the Fallago Rig 2 Onshore Wind Farm, the operational intertrip scheme shall meet the Category 2 Intertripping Scheme requirements set out below, and shall provide the facilities to open, post-fault, the Transmission Interface Point [redacted] at Fallago 400kV Substation.

4.2.1 Category 2 Intertrip Requirement

The Grid Code[3] defines a Category 2 Intertripping Scheme as *"A System to Generator Operational Intertripping Scheme which is: -*

*(i) required to alleviate an overload on a circuit which connects the **Group** containing the **User's** Connection Site to the **National Electricity Transmission System**; and*

*(ii) installed in accordance with the requirements of the planning criteria of the **Security and Quality of Supply Standard** in order that measures can be taken to permit maintenance access for each transmission circuit and for such measures to be economically justified,*

*and the operation of which results in a reduction in **Active Power** on the overloaded circuits which connect the **User's Connection Site** to the rest of the **National Electricity Transmission System** which is equal to the reduction in **Active Power** from the **Connection Site** (once any system losses or third party system effects are discounted)."*

In order that measures can be taken to permit maintenance access for specific transmission circuits below, and for such measures being economically justified, it is necessary to have the facilities to disconnect the NNG Offshore Transmission System and Fallago 2 Onshore Wind Farm at the Transmission Interface Points for the outage, trip and overload condition combination detailed in Table 4 (noting the local generation mix, post-fault action is considered more economic than pre-fault generation curtailment).

Table 4: Category 2 Intertrip Functionality

Condition	System Maintenance (or Unplanned Outage) Condition	Trip Condition	Overload Condition	Action
[redacted]				

[3] The Grid Code

It is noteworthy that the likelihood of Condition 2 above requiring scheme operation will be relieved upon the completion of the planned conductor replacement on the Strathaven – Wishaw – Smeaton 400kV XH and XJ overhead line routes (reference SPT's RIIO-T2 MSIP Re-opener Application – Stage 1: SPT-RI-130 XH and XJ Route OHL Uprating Works).

4.2.2 Category 4 Intertrip Requirement

The Grid Code defines a Category 4 Intertripping Scheme as *"A System to Generator Operational Intertripping Scheme installed to enable the disconnection of the Connection Site from the National Electricity Transmission System in a controlled and efficient manner in order to facilitate the timely restoration of the National Electricity Transmission System."*

In order to prevent the risk of high transient overvoltage following a delayed auto-reclose (DAR) sequence on the Onshore Transmission System, it is necessary to have the facilities to disconnect the NNG Offshore Transmission System at the Transmission Interface Points for the outage and trip condition combination detailed in Table 5 below, thereby facilitating the timely restoration of the National Electricity Transmission System in a controlled and efficient manner.

Table 5: Category 4 Intertrip Functionality

Condition	System Maintenance (or Unplanned Outage) Condition	Trip Condition	Overload Condition	Action
[redacted]				

The Wishaw – Eccles –Torness – Smeaton Operational Intertrip Scheme (WETSS) has been specified so as to integrate the various Category 2 and Category 4 Intertripping Scheme requirements above, into a single, efficient and co-ordinated scheme.

4.3 ICS Schemes - Background

4.3.1 Scheme Architecture

Prior to the partial commissioning of the Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme (WETSS) in October 2022, the NGET-SPT Interconnection Control Scheme consisted of the following five 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)

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 scheme logic with access to the necessary status points.

In the case of the Operational Tripping Scheme (OTS), for example, to enact the tripping of generators selected by instruction from the ESO, the OTS controllers publish GOOSE messages to which OTS 'send' IEDs subscribe. 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 SSEN-T's telecoms networks). At the generator sites, the duplicate IEDs trip the selected generators by opening the designated Transmission Owner owned circuit-breakers.

4.3.2 LEO Signals

The following list contains the monitored circuit-ends for which an LEO signal is generated, prior to the delivery of WETSS. 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.

[redacted]

[redacted]

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

4.3.3 ICS Operating Time

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[4] 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 Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme, 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 transmission system in East Lothian supports increasing the volume of predominantly renewable energy which can access the GB transmission system, supports economic system operation and contributes 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 development of WETSS supports economic system operation in an efficient and co-ordinated manner.

[4] SP Energy Networks RIIO-T2 Business Plan

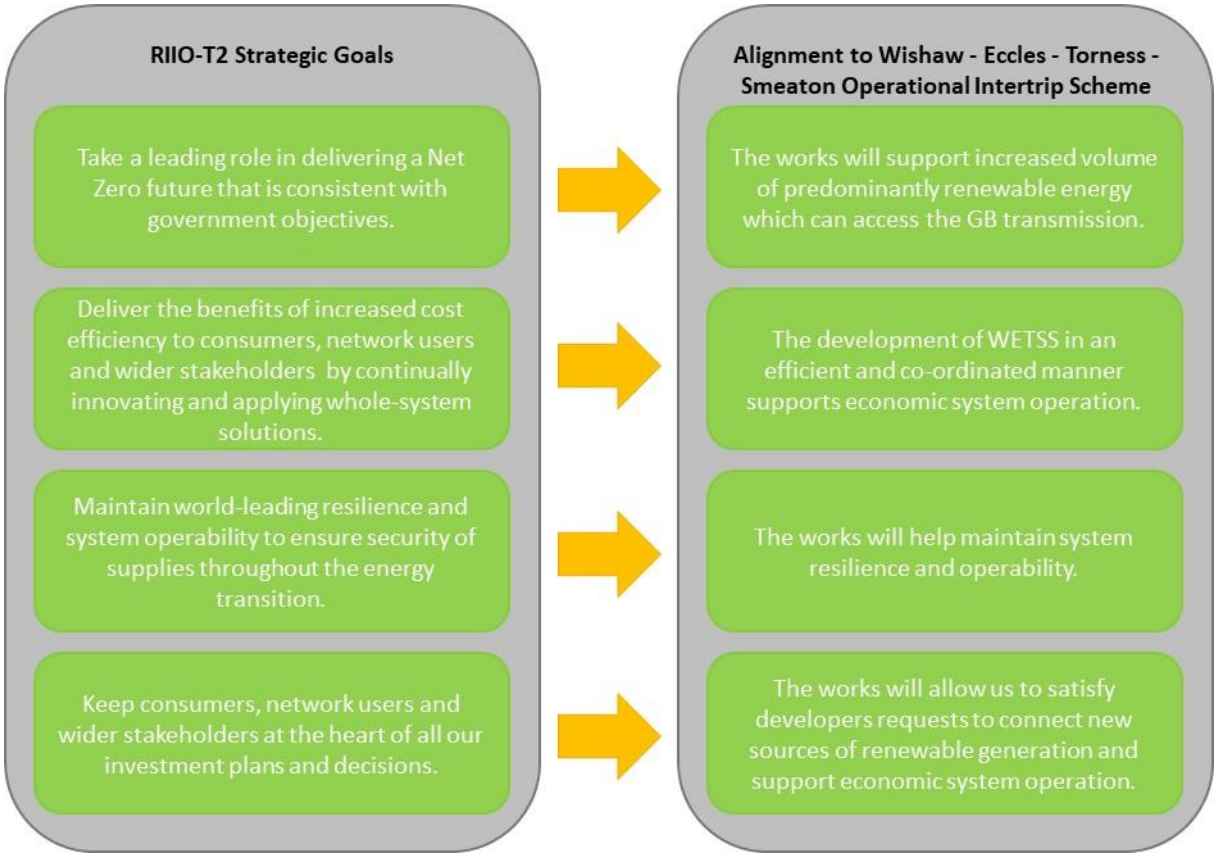


Figure 1: Alignment of Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme development with SPT RIIO-T2 Strategic Goals

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, and provide 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 Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme 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

Two alternative options are available: the extension of the LEO and ICS schemes, or the development of a new standalone operational intertrip scheme, independent of the existing ICS scheme.

5.1.1 Option 1 – Extension of the Existing ICS Schemes

The existing ICS schemes, including the LEO scheme, entered service in 2008 and have been augmented and modified in the period since, as required by the configuration of the primary system and in response to requests from the ESO. The ICS schemes meet current and future performance requirements and are capable of being extended.

Extending the existing ICS schemes to incorporate the WETSS component, and modify the LEO scheme as required, is the lowest cost option and results in the shortest scheme outage requirements.

5.1.2 Option 2 – New Operational Intertrip, Independent of Existing ICS Schemes

The ICS LEO scheme already monitors a number of circuit-ends for which an LEO signal is required in order to fulfil the Category 2 and Category 4 Intertripping Scheme requirements described in Section 4.2 above.

While Option 1 includes the provision of some existing equipment (see Section 6) to facilitate the extension of the LEO scheme to new (previously unmonitored) circuit ends, it is not considered necessary to replace other parts of either the LEO or associated ICS schemes.

As the development of a completely new, standalone, operational intertrip scheme independent of the existing ICS schemes would have a higher capital cost and provide no additional benefit compared to Option 1, this option was not pursued further.

5.2 Option Assessment

It is unnecessary to develop a completely new, standalone, operational intertrip scheme independent of the existing ICS schemes. As this approach would result in higher capital costs for no additional benefit, the proposed option is Option 1 – modification and extension of the LEO scheme as required, and development of WETSS as a sub-scheme within the wider ICS.

6. Proposed Works

6.1 Project Summary

Protection and control works are required to install the Wishaw - Eccles - Torness - Smeaton Operational Intertrip Scheme (WETSS). WETSS will be based on the existing Interconnection Control Schemes (ICS) located at [redacted] Substation. The ICS consist of following sub-systems:

- Anglo-Scottish Operational Intertrip Scheme (OTS)
- Anglo Scottish Auto Close Scheme (ASACS)
- Fast Ramping Scheme (FRS)
- Series Compensation Management Scheme (SCMS)
- Line End Opening Systems (LEO) – Common to all sub-systems.

The ICS shall be extended to incorporate the WETSS, with new controllers and signalling equipment. The LEO system shall also be extended, with new LEO equipment at [redacted]. The SCMS shall be modified to cater for the changes in the [redacted] LEO data.

The extension of the LEO Scheme and the installation of the WETSS requires SPT to undertake works at the following sites, which are detailed in subsequent sections:

- [redacted] substation
- Crystal Rig 400kV substation
- Fallago 400kV substation
- Eccles 400kV Substation
- Wishaw 400kV Substation
- Torness 400kV Substation

6.2 Works at [redacted] Substation

The extension of the LEO scheme and installation of the WETSS requires the addition 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 and Control Works – WETS Scheme

The ICS shall be extended to incorporate the WETSS. The ICS have employed IEC61850 based communication systems. Duplicated WETSS Controllers shall be installed. Local and remote Scheme In/Out switching facilities are required. Common controls for duplicated equipment shall be achieved using the master-follower scheme via GOOSE (Generic Object Oriented System Event) messages.

The scheme shall operate in such a way that the logic is checked by the automatic function to determine if the selection of any state would result in sending the WETSS command signal. Upon such detection, the change of state shall be inhibited and an alarm shall be initiated.

On operation of the protection function, the controller shall send WETSS command signals to the remote ends - [redacted] Substation and [redacted] Substation.

Duplicated WETSS signalling (send) equipment for remote substations [redacted] shall be installed. Local and remote Scheme In/Out switching facilities are required. Test facility for each signalling channel is required. New WETSS alarms, control and indications shall be provided using IEC61850 communication where applicable.

The completion of tripping of all transmission interface point circuit breakers by WETSS shall be within 200ms of fault inception.

6.2.2 Protection and Control Works – LEO Scheme

New duplicated LEO signalling equipment for Torness 400kV Substation [redacted] and Wishaw 400kV Substation [redacted] shall be installed.

The requirements for the new LEO data are listed in the table 6 below:

Table 6 – Requirement for new LEO Data

Substation	LEO Data
[redacted]	

The ICS Local Area Networks shall be modified to incorporate the new WETSS and LEO equipment.

Modification to the existing Smeaton LEO signalling equipment is required to cater for the new LEO data (for the [redacted]) and the changes in LEO data (for the [redacted]). Modification to the existing [redacted] LEO signalling equipment is required to cater for the new LEO data (for the [redacted] circuits).

[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 Civil Works

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

6.3 Remote End Substation Works

6.3.1 Work at Crystal Rig 400kV Substation

New duplicated WETSS signalling and control equipment shall be installed. Local and remote Scheme In/Out switching facilities are required. Test facility for each signalling channel is required.

Interfacing with the protection and control schemes for the NNG Offshore Transmission System feeders is required. On receipt of the first or second WETSS signal, the scheme shall initiate the tripping of feeder [redacted] and send intertrip signals to the [redacted].

The SCIS shall be modified to incorporate the new alarms, control and indication facilities.

6.3.2 Work at Fallago 400kV Substation

New duplicated WETSS signalling and control equipment shall be installed. Local and remote Scheme In/Out switching facilities are required. Test facility for each signalling channel is required.

Interfacing with the protection and control schemes for Fallago Rig 2 Wind Farm feeder is required. On receipt of the WETSS signals, the scheme shall initiate the tripping of the feeder [redacted] and send intertrip signals to the [redacted]

The SCIS shall be modified to incorporate the new alarms, control and indications.

6.3.3 Work at Eccles 400kV Substation

New duplicated LEO collections ([redacted]) are required. The existing ICS - LEO panel shall be modified. Maintenance override function shall be provided for each LEO. New LEO data and status of switchgear shall be sent to [redacted]. The SCIS shall be modified to incorporate the new alarms.

6.3.4 Work at Smeaton 400/275kV Substation

New duplicated LEO collections ([redacted]) are required. Separate [redacted] LEO and [redacted] LEO data are required. The existing ICS - LEO panel shall be modified. Maintenance override function shall be provided for each LEO. New LEO data and status of switchgear shall be sent to [redacted]. The SCIS shall be modified to incorporate the new alarms, control and indications.

6.3.5 Work at Torness 400kV Substation

New duplicated LEO collection ([redacted]) and signalling shall be installed. New ICS - LEO relay panel (LEO-B) shall be provided. Local and remote Scheme In/Out switching facilities are required. Test facility for each signalling channel is required. Maintenance override function shall be provided for each LEO. New LEO data and status of switchgear shall be sent to [redacted]. The SCIS shall be modified to incorporate the new alarms, control and indication facilities.

6.3.6 Work at Wishaw 400kV Substation

New duplicated LEO collection (for the [redacted]) and signalling equipment shall be installed. New 'ICS - LEO' panel shall be provided. Local and remote Scheme In/Out switching facilities are required. Test facility for each signalling channel is required. Maintenance override function shall be provided for each LEO. LEO data and status of switchgear shall be sent to [redacted]. The SCIS shall be modified to incorporate the new alarms, control and indication facilities.

6.4 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 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 7 details expected energisation year and our current view of potential direct capital expenditure in RIIO-T2.

Table 7: 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	0.294	0.479	0.101	0.215	0.0	0.0	0.0	0.0	0.795	1.089

7.2 Detailed costs

Table 8 below provides a cost breakdown representing the latest view of Direct costs for the proposed investment:

Table 8 Direct Costs

Contract Name	Cost (£m)	Start	Finish	Comments
Surveys	[redacted]	Oct 20	Dec 20	Outturn value
EPC Contractor		Feb 21	Dec 23	Awarded value
SCIS/HMI Updates		Nov 20	Aug 21	Outturn value
Telecoms		Feb 21	Jul 21	Outturn value
Risk		Dec 23	Dec 23	Estimated Value
Total	**£1.089**			

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

Table 9: Procurement Strategy

Contract	Units	Procurement Strategy
Surveys	As required	[redacted]
EPC Contractor	1	
SCIS/HMI Updates	1	
Telecoms	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 10: 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				
Risk				
		TOTAL	**£1.089**	**100%**

As it can be seen in Table 10, 90.42% 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 11 below provides a breakdown of the individual project risks followed by further detailed explanation regarding mitigation and likelihood.

Table 11: 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. The (T2) allowance will be subject to the Opex escalator mechanism:

Table 12: Requested Direct Allowances

	Direct allowance requested per year, £m, 18/19 price base						
	Pre-RIIO-T2	Yr 21/22:	Yr 22/23:	Yr 23/24:	Yr 24/25:	Yr 25/26:	Total (£m)
Direct Allowances Requested	0.294	0.479	0.101	0.215	0.00	0.000	1.089

It is acknowledged that a portion of the investment occurred in RIIO-T1, however, there was no means to fund such works. It was not a T1 baseline scheme and the T1 uncertainty mechanism (LSpC 6F) could not fund as the output would be delivered in RIIO-T2.

7.7 Regulatory Outputs

As the output of the project is the delivery of an operational intertrip, it is proposed that the associated Price Control Deliverable is defined as follows:

Table 13: Price Control Deliverable

OSR	Scheme Name	Output	Allowance* (Oncosted)	Delivery Date
SPT200260	**SPT-RI-204 - Wishaw-Eccles- Torness- Smeaton Operational Intertrip Scheme**	Completion of the WETSS Scheme, including the associated LEO Scheme extension.	£1.235m	31st December 2023

*Includes 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 is 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 13 below summarises the key project milestones within the delivery schedule.

Table 13: Project Milestones

Milestone	Project Phase	Estimated Completion Date
1	Issue Main ITT	Complete
2	IP3 Stage 2	Complete
3	Main Contract Awarded	Complete
4	Commence Main Site works	Complete
5	Complete Site works	December 2023

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

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).

9. Conclusion and Recommendations

This MSIP re-opener application demonstrates the need to modify and extend the LEO scheme and develop the WETSS operational intertrip facility.

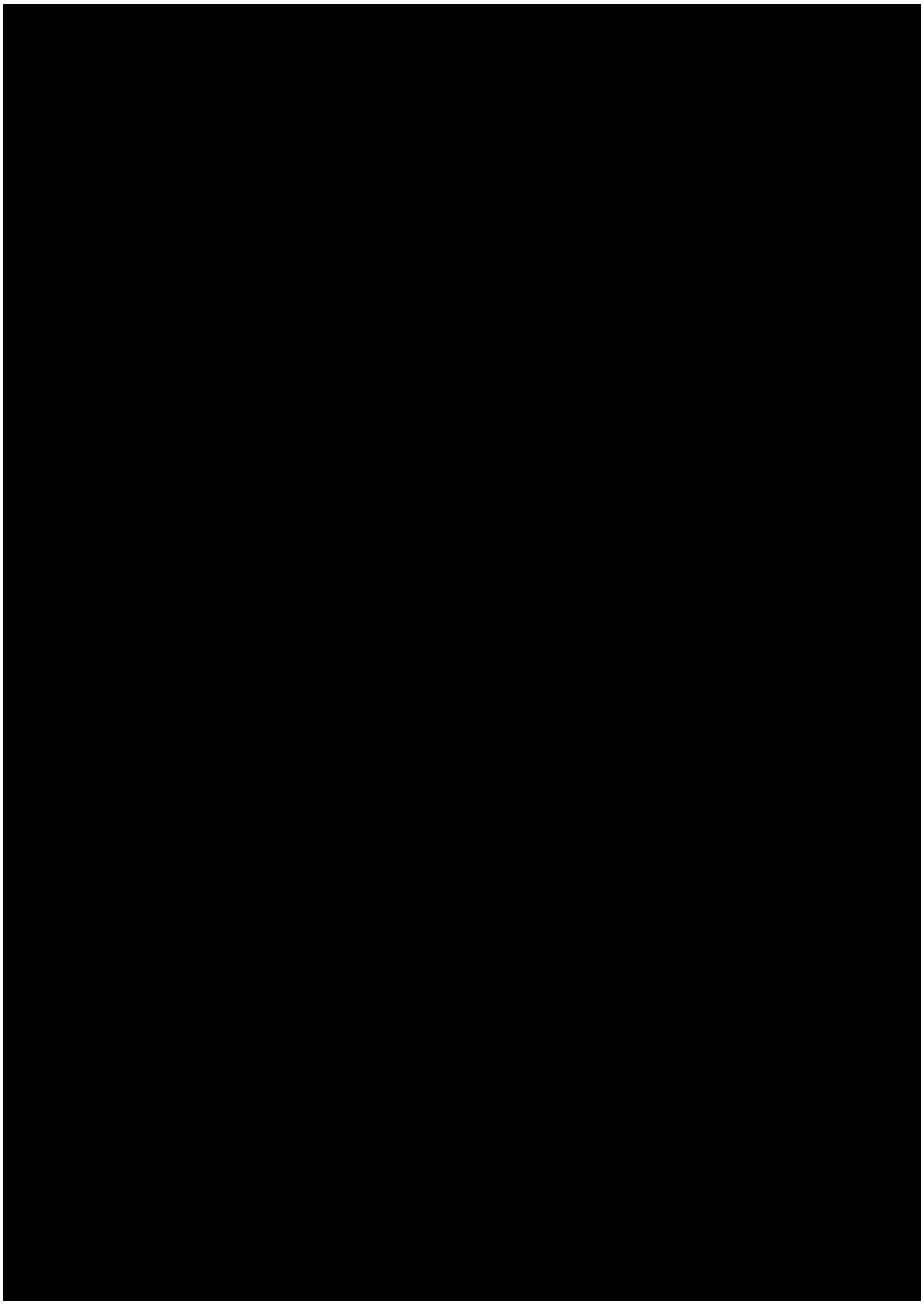
The project to modify and extend the LEO scheme and develop the WETSS has been initiated in response to a draft Planning Request received from the ESO on 9th July 2014. The required functionality of the scheme was subsequently formalised with the ESO via Transmission Owner Construction Agreements (TOCAs) in respect of the NNG Offshore Wind Farm and Fallago Rig 2 Onshore Wind Farm, and via Transmission Owner Reinforcement Instruction SPT-RI-204.

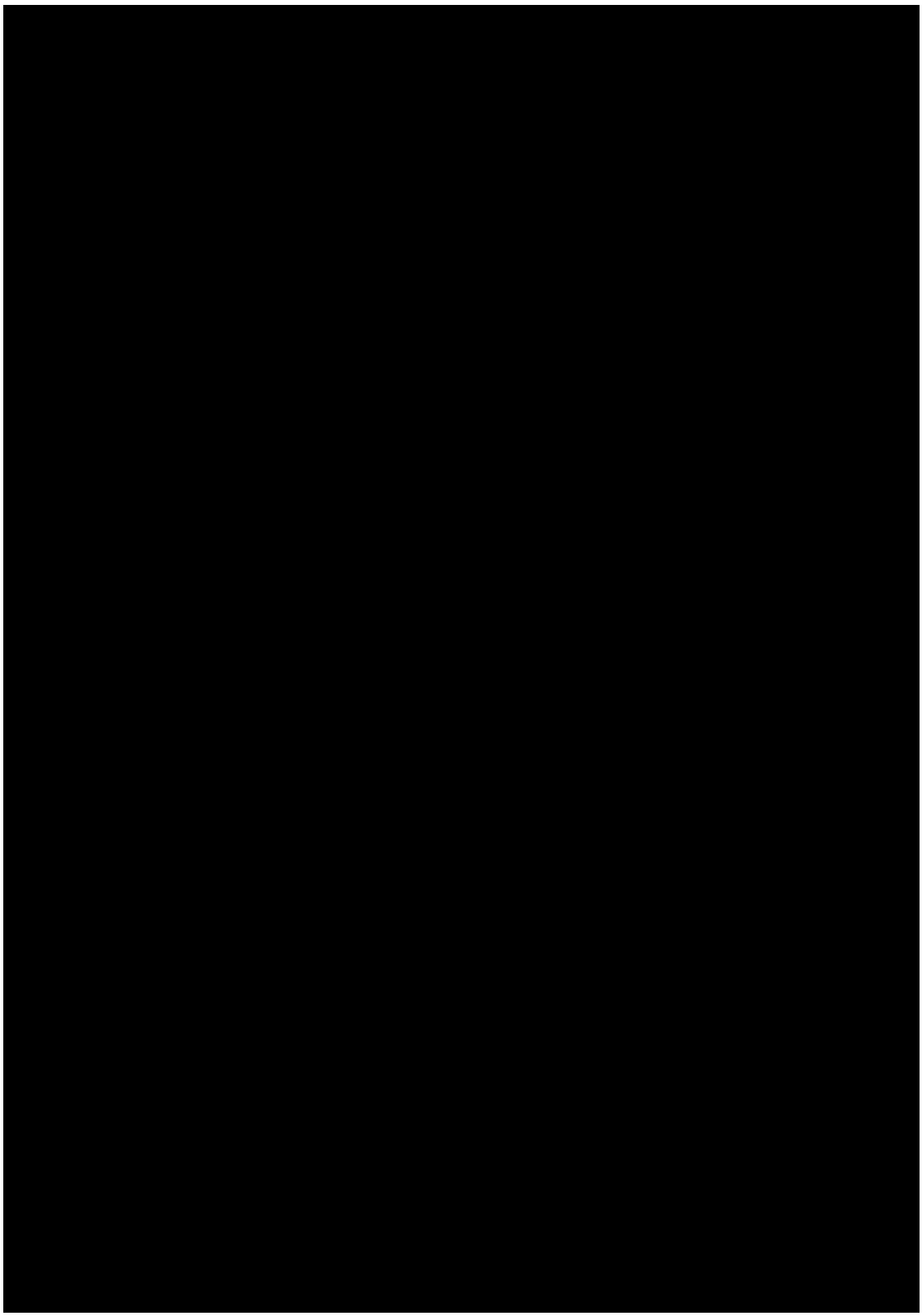
We respectfully request Ofgem's agreement to the following:

- 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 Request

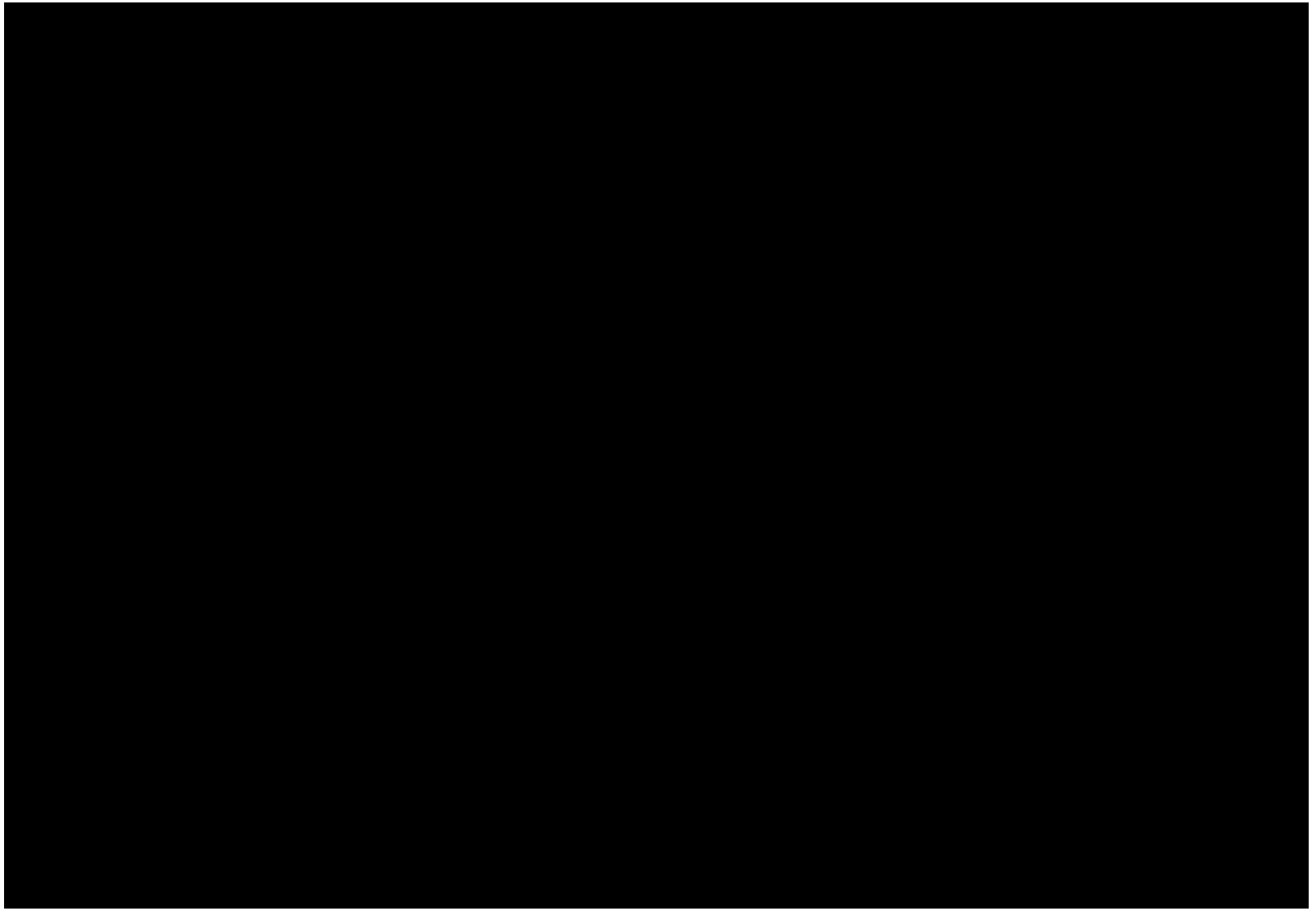
Planning Request NGET 2011/001 SP TRANSMISISON





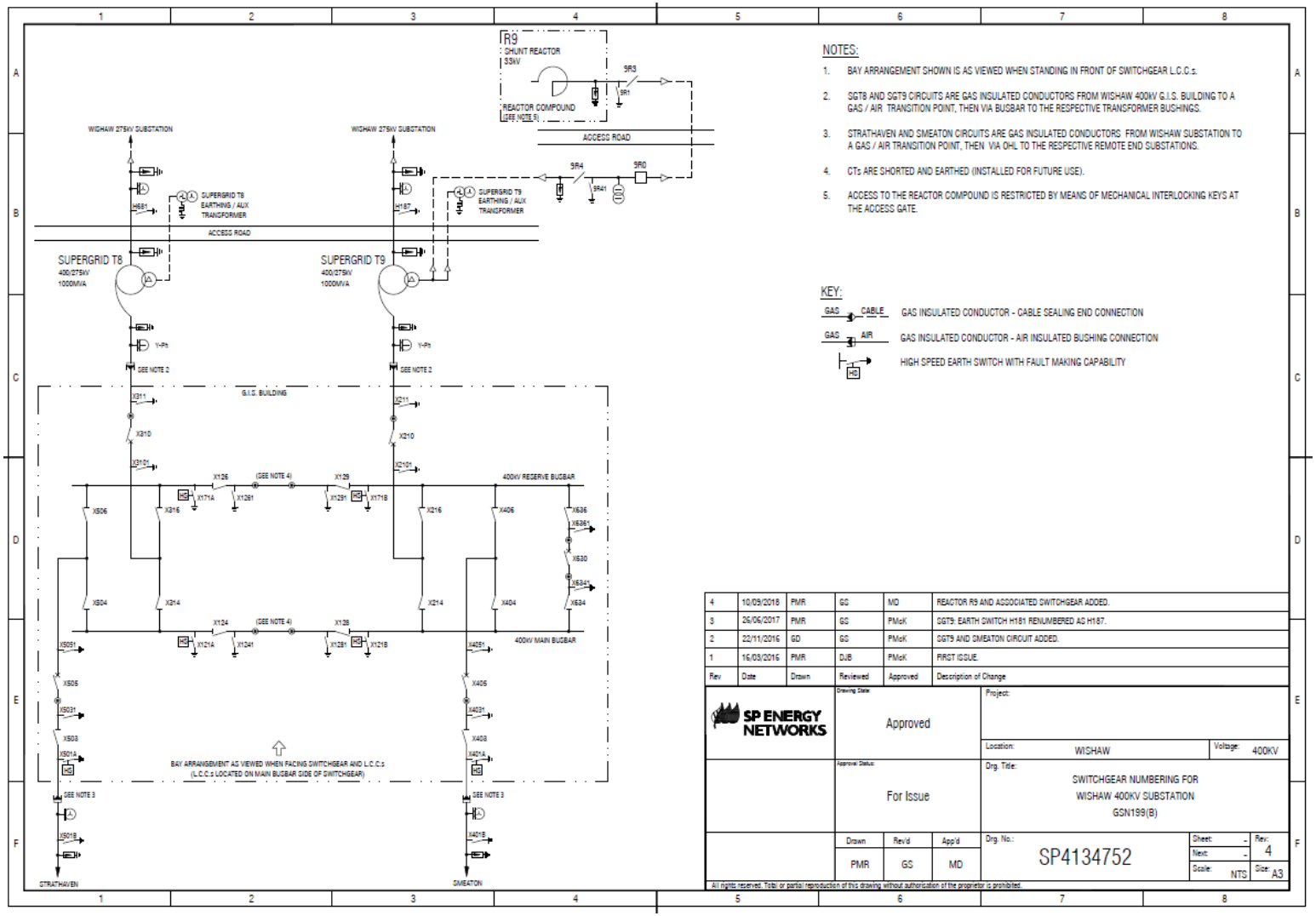
11. Appendix 2 –Diagrams

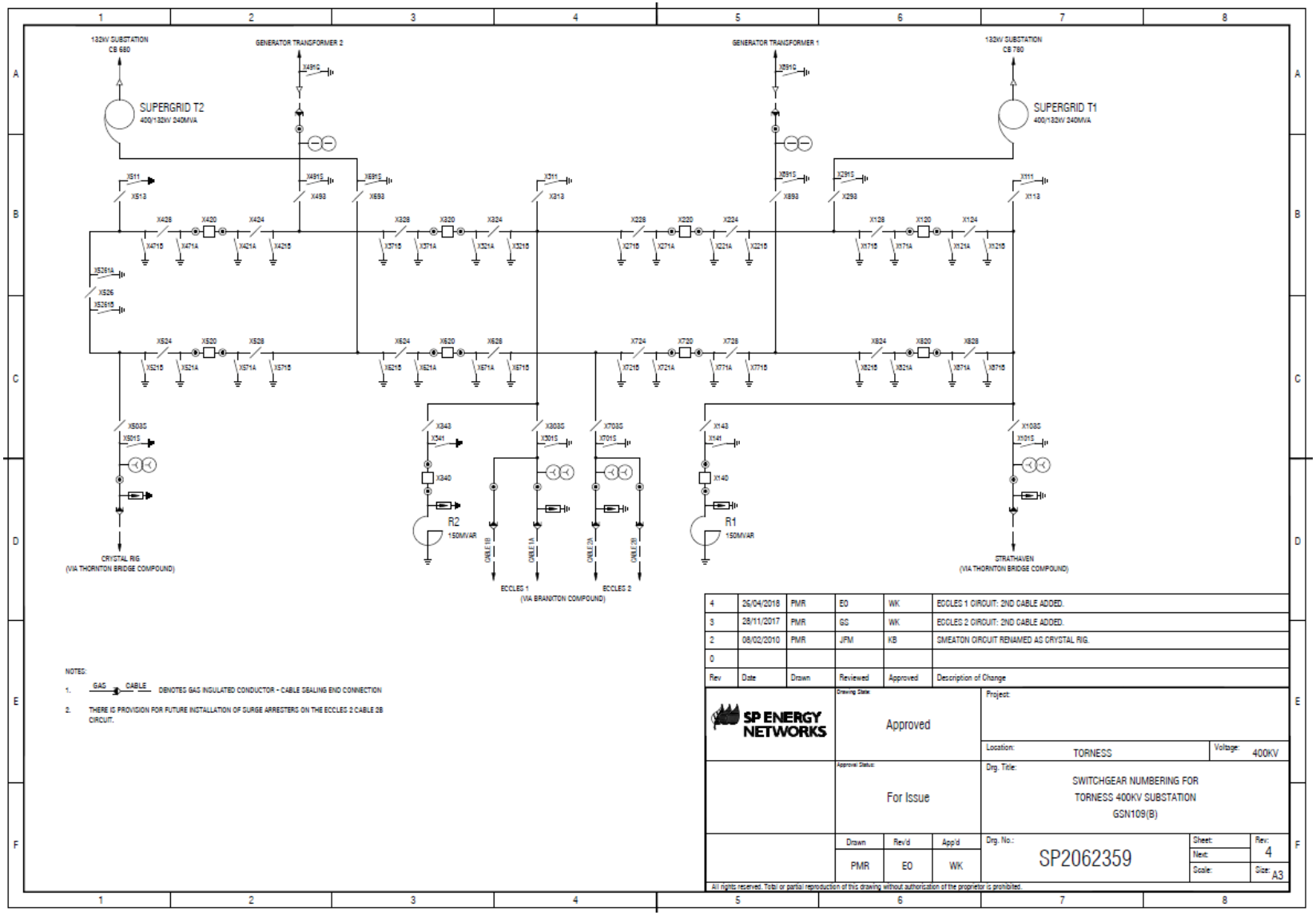
11.1 System Architecture



11.2 Proposed WETSS Logic

11.3 Substation GSN Drawings




132kV SUBSTATION
CB 680
GENERATOR TRANSFORMER 2
SUPERGRID T2
400/132kV 240MVA
GENERATOR TRANSFORMER 1
132kV SUBSTATION
CB 780
SUPERGRID T1
400/132kV 240MVA
R2
150MVAR
R1
150MVAR
CRYSTAL RIG
(VIA THORNTON BRIDGE COMPOUND)
ECCLES 1
(VIA BRANDTON COMPOUND)
ECCLES 2
STRATHAVEN
(VIA THORNTON BRIDGE COMPOUND)
NOTES:
1. GAS CABLE DENOTES GAS INSULATED CONDUCTOR - CABLE SEALING END CONNECTION
2. THERE IS PROVISION FOR FUTURE INSTALLATION OF SURGE ARRESTERS ON THE ECCLES 2 CABLE 2B CIRCUIT.
4 26/04/2016 PMR EO WK ECCLES 1 CIRCUIT: 2ND CABLE ADDED.
3 28/11/2017 PMR GG WK ECCLES 2 CIRCUIT: 2ND CABLE ADDED.
2 08/02/2010 PMR JFM KB SMEATON CIRCUIT RENAMED AS CRYSTAL RIG.
0
Rev Date Drawn Reviewed Approved Description of Change
SP ENERGY NETWORKS
Approved
For Issue
Project:
Location: TORNESS
Voltage: 400KV
Drg. Title:
SWITCHGEAR NUMBERING FOR
TORNESS 400KV SUBSTATION
GSN109(B)
Drawn Rev'd App'd
PMR EO WK
Drg. No.: SP2062359
Sheet:
Next:
Rev: 4
Scale:
Size: A3
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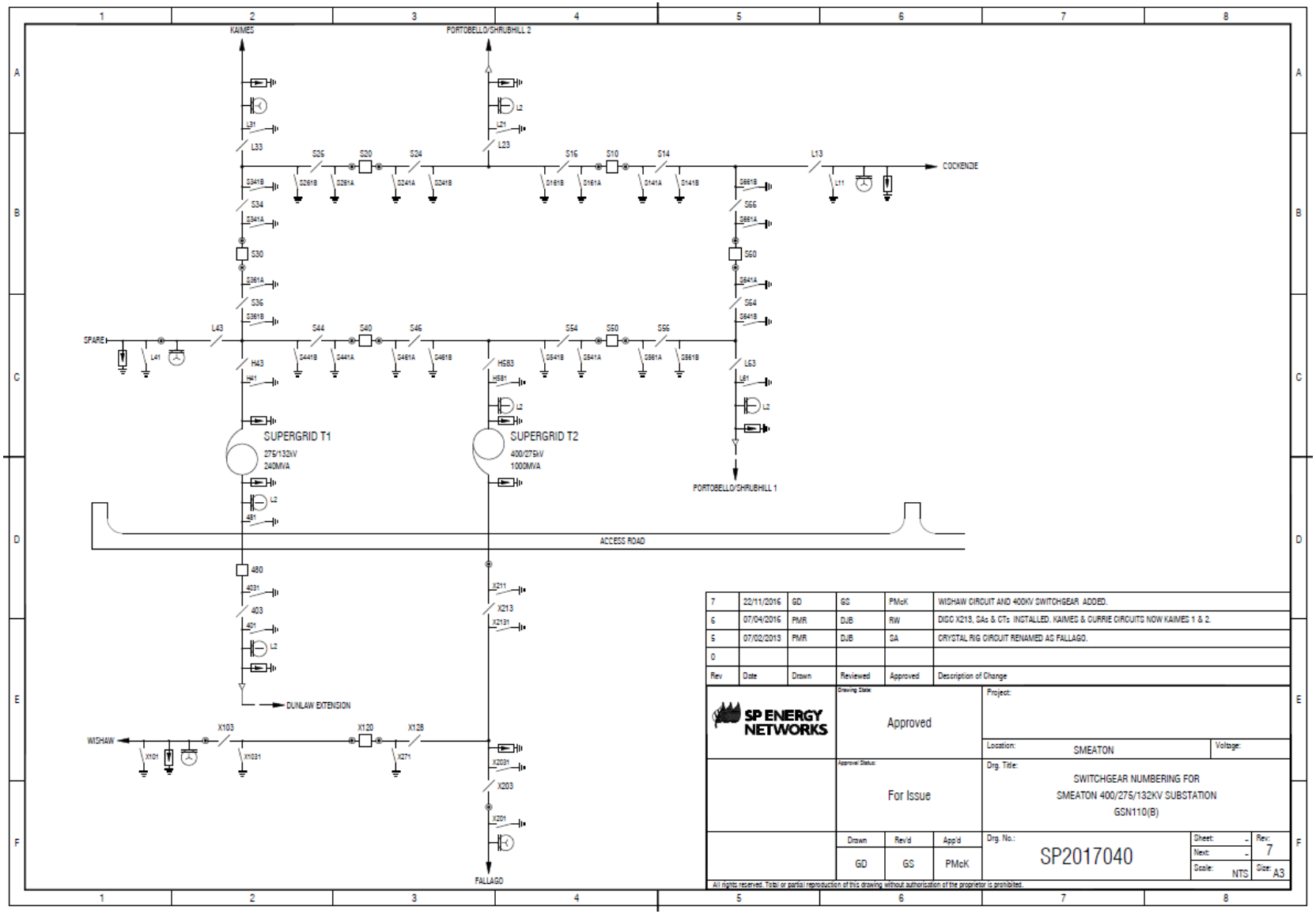
KAIMES
PORTOBELLO/SHRUBHILL 2
COCKENZIE
SPARE
SUPERGRID T1
275/132kV
240MVA
SUPERGRID T2
400/275kV
1000MVA
PORTOBELLO/SHRUBHILL 1
ACCESS ROAD
DUNLAW EXTENSION
WISHAW
FALLAGO
7 22/11/2016 GD GS PMcK WISHAW CIRCUIT AND 400KV SWITCHGEAR ADDED.
6 07/04/2016 PMR DJB RW DISC X213, CAs & CTs INSTALLED. KAIMES & CURRIE CIRCUITS NOW KAIMES 1 & 2.
5 07/02/2013 PMR DJB GA CRYSTAL RIG CIRCUIT RENAMED AC FALLAGO.
0
Rev Date Drawn Reviewed Approved Description of Change
SP ENERGY NETWORKS
Approved
For Issue
Project:
Location: SMEATON
Voltage:
Drg. Title:
SWITCHGEAR NUMBERING FOR
SMEATON 400/275/132KV SUBSTATION
GSN110(B)
Drawn GD
Rev'd GS
App'd PMcK
Drg. No.: SP2017040
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Rev: 7
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Size: A3
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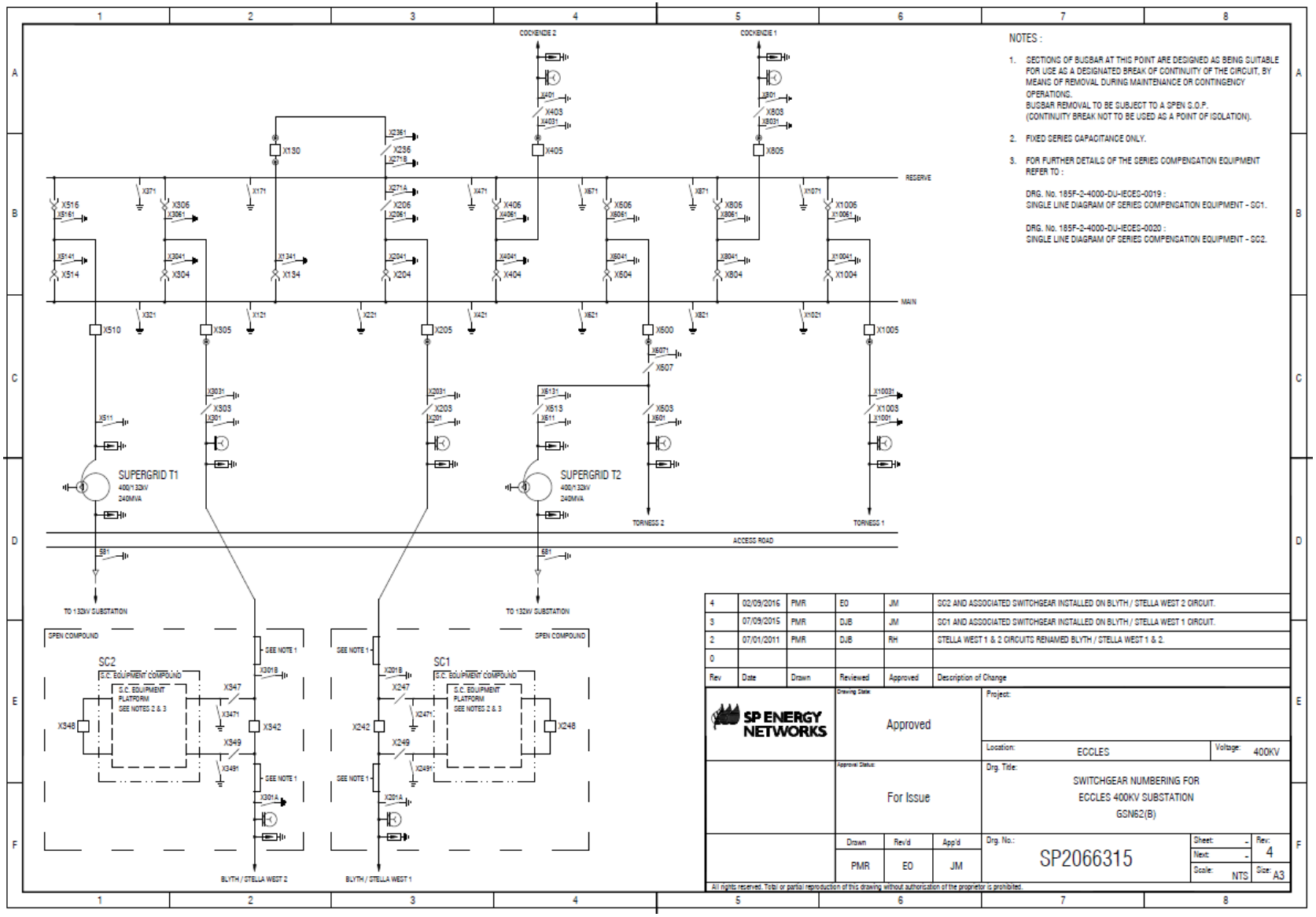
COCKENZIE 2
COCKENZIE 1
RESERVE
MAIN
ACCESS ROAD
SUPERGRID T1
400/132kV
240MVA
SUPERGRID T2
400/132kV
240MVA
TORNESS 2
TORNESS 1
TO 132kV SUBSTATION
TO 132kV SUBSTATION
SPEN COMPOUND
SPEN COMPOUND
SC2
S.C. EQUIPMENT COMPOUND
S.C. EQUIPMENT PLATFORM
SEE NOTES 2 & 3
SC1
S.C. EQUIPMENT COMPOUND
S.C. EQUIPMENT PLATFORM
SEE NOTES 2 & 3
SEE NOTE 1
BLYTH / STELLA WEST 2
BLYTH / STELLA WEST 1
NOTES :
1. SECTIONS OF BUSBAR AT THIS POINT ARE DESIGNED AS BEING SUITABLE FOR USE AS A DESIGNATED BREAK OF CONTINUITY OF THE CIRCUIT, BY MEANS OF REMOVAL DURING MAINTENANCE OR CONTINGENCY OPERATIONS.
BUSBAR REMOVAL TO BE SUBJECT TO A SPEN S.O.P.
(CONTINUITY BREAK NOT TO BE USED AS A POINT OF ISOLATION).
2. FIXED SERIES CAPACITANCE ONLY.
3. FOR FURTHER DETAILS OF THE SERIES COMPENSATION EQUIPMENT REFER TO :
DRG. No. 185F-2-4000-DU-IECEC-0019 :
SINGLE LINE DIAGRAM OF SERIES COMPENSATION EQUIPMENT - SC1.
DRG. No. 185F-2-4000-DU-IECEC-0020 :
SINGLE LINE DIAGRAM OF SERIES COMPENSATION EQUIPMENT - SC2.
4 02/09/2016 PMR EO JM SC2 AND ASSOCIATED SWITCHGEAR INSTALLED ON BLYTH / STELLA WEST 2 CIRCUIT.
3 07/09/2015 PMR DJB JM SC1 AND ASSOCIATED SWITCHGEAR INSTALLED ON BLYTH / STELLA WEST 1 CIRCUIT.
2 07/01/2011 PMR DJB RH STELLA WEST 1 & 2 CIRCUITS RENAMED BLYTH / STELLA WEST 1 & 2.
0
Rev Date Drawn Reviewed Approved Description of Change
SP ENERGY NETWORKS
Drawing Stage: Approved
Approval Status: For Issue
Project:
Location: ECCLES
Voltage: 400KV
Drg. Title: SWITCHGEAR NUMBERING FOR ECCLES 400KV SUBSTATION GSN62(B)
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App'd JM
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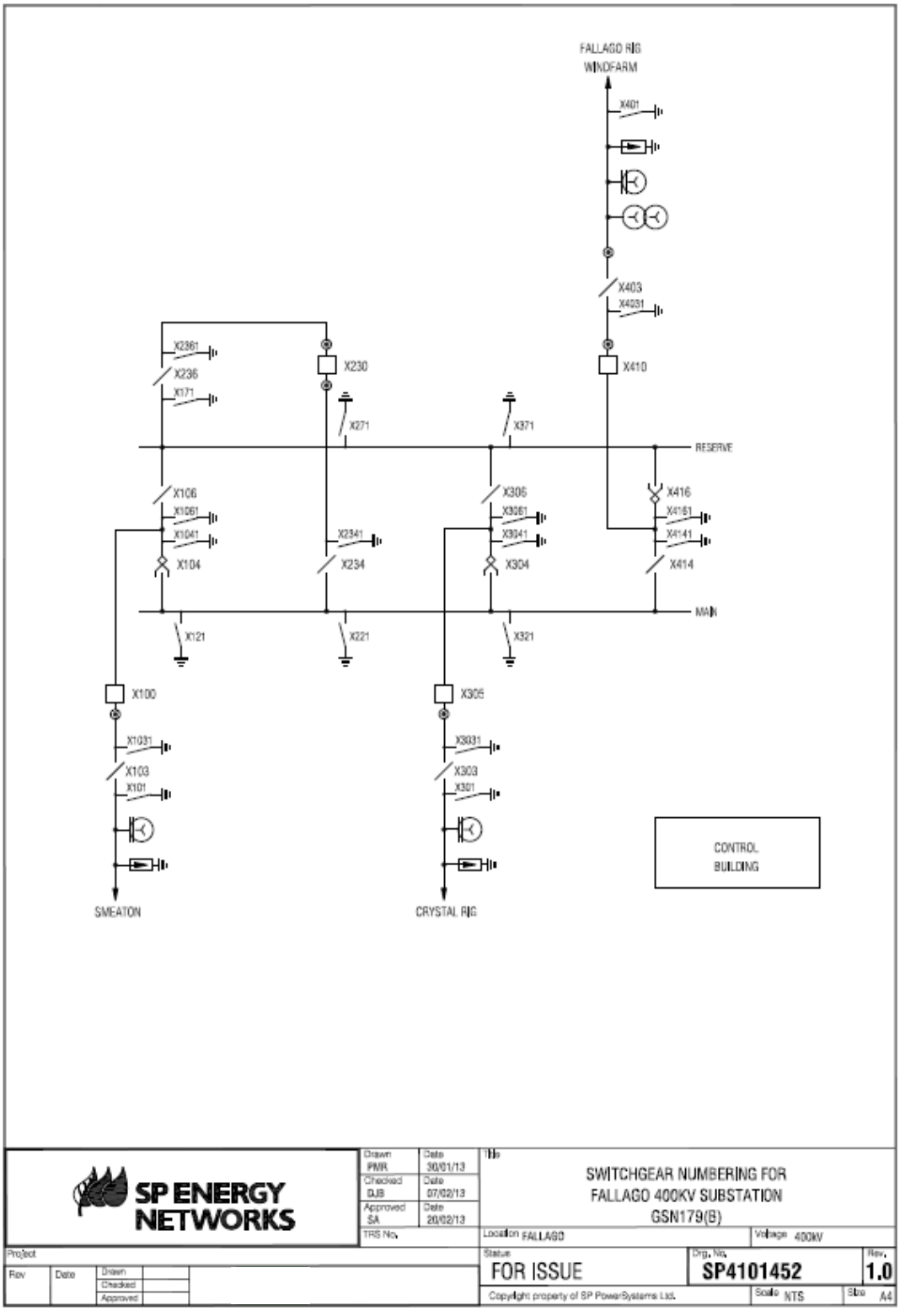
FALLAGO RIG
WINDFARM
X401
X403
X4031
X410
X2361
X236
X171
X230
X271
X371
RESERVE
X106
X1061
X1041
X104
X2341
X234
X306
X3061
X3041
X304
X416
X4161
X4141
X414
MAIN
X121
X221
X321
X100
X1031
X103
X101
X305
X3031
X303
X301
SMEATON
CRYSTAL RIG
CONTROL
BUILDING
SP ENERGY NETWORKS
Drawn PMR 30/01/13
Checked DJB 07/02/13
Approved SA 20/02/13
TRS No.
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
Copyright property of SP PowerSystems Ltd.
Scale NTS
Size A4