NEED/OPPORTUNITY STATEMENT (NOS)

Haymarket 132 kV Connection – Replacement of Ausgrid Cables 9S6/1 and 9S9/1

NOS- 000000001448 revision 6.0

Ellipse project description: Haymarket 132 kV Replacement of Ausgrid Cables 9S6/1 and 9S9/1
TRIM file: [TRIM No]

Project reason: Capability - Asset Replacement for end of life condition
Project category: Prescribed - Replacement

Approvals

Author	Ronny Schnapp	Network and Connection Analysis Engineer
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Endorsed	Vincent Ong	Network and Connection Analysis Manager
Approved	Andrew Kingsmill	Manager / Network Planning
Date submitted for approval	[Publish Date]	

1. Background

Ausgrid has an extensive 132 kV cable supply network in the Sydney metropolitan area. TransGrid's Haymarket 330/132 kV Substation supplies Ausgrid's cables 9S6/1 and 9S9/1 to Pyrmont Sub-transmission Substation (STS).

Figure 1 shows a map of the relevant Ausgrid area network.

Figure 1: Ausgrid's Network Supplied from Haymarket Substation (Source: Ausgrid's 2015 Distribution and Transmission Annual Planning Report)

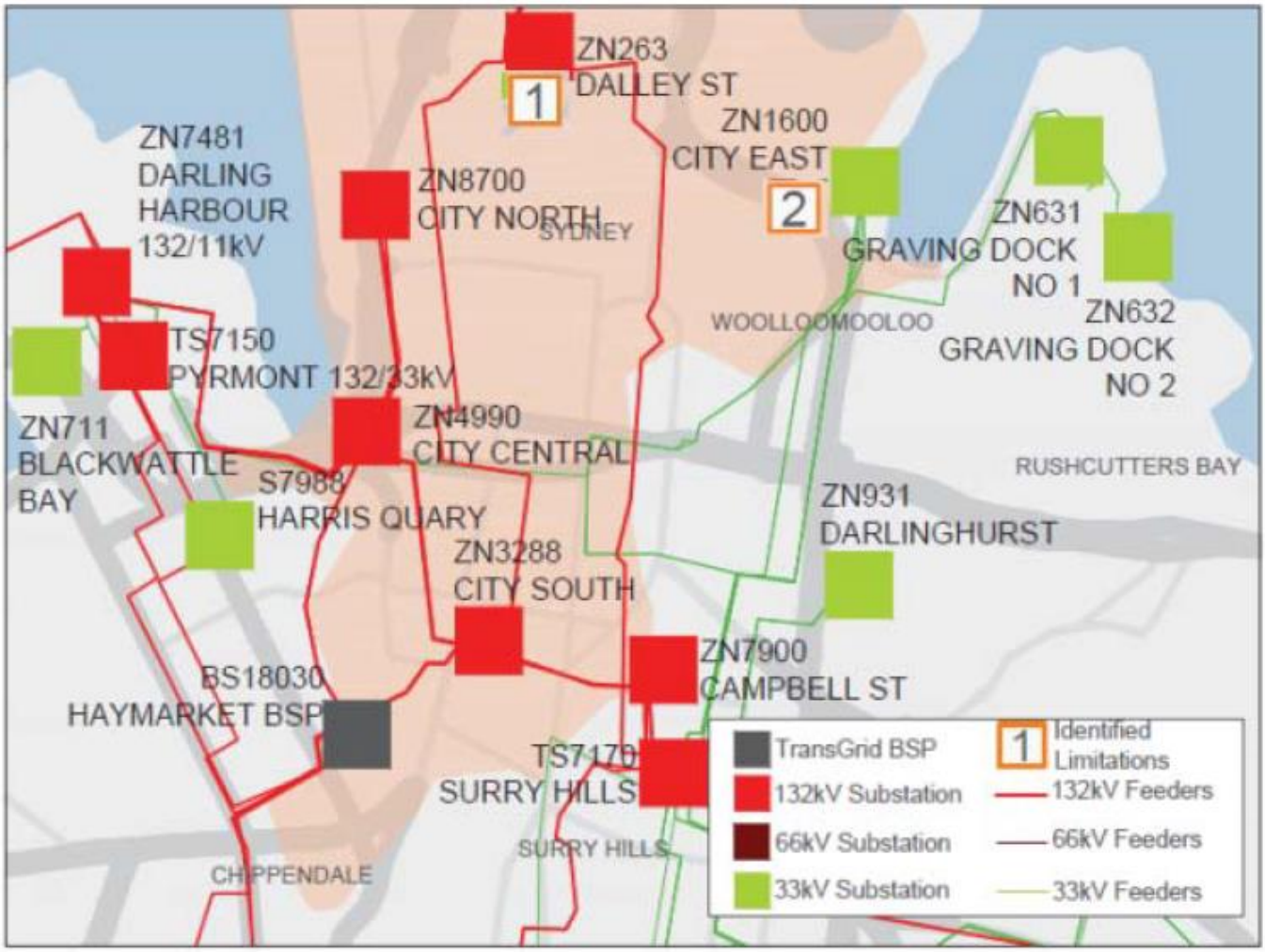

Figure 2 on page 5 shows the high voltage operating diagram (HVOD) of Haymarket substation.

2. Need/opportunity

Ausgrid is presently revising their 132 kV cable retirement program for the inner metropolitan area. Ausgrid has informed TransGrid that at this time, they plan to replace 132 kV cables 9S6/1 and 9S9/1 Haymarket to Pyrmont STS in 2022/23. The replacement is being considered as "like-for-like" and solely driven by the condition of the cables.

Ausgrid has requested via the Joint Planning process that TransGrid carry out appropriate works to disconnect the existing cables and connect and commission the new cables at the Haymarket Substation end.

2.1 Risks

The National Electricity Rules (NER) clause 5.14 – Joint Planning requires TransGrid (and Ausgrid) to jointly plan their regional electricity network. In this case, should TransGrid not participate with Ausgrid in addressing this Need, it would be violating this statutory obligation.

The load at risk which is being assessed here is the forecast peak loading on the cables of 336 MW in 2023[1], multiplied by a load factor of 0.8.[2] This estimates that the load supplied by the cables are most likely to be at 80% of their peak loading when an outage occurs.

Assuming a load power factor of 0.95 (minimum NER requirement under clause S5.3.5), this equates to $336 * 0.8 = 269$ MW.

The risk cost of not addressing this Need is therefore composed of the following components:

- exposing customer load of 269 MW to risk of being unsupplied.
- damage to TransGrid's reputation (negative media coverage).
- litigation by customers/consumer groups.

The total cost of these risks has been calculated in TransGrid's Investment Risk Tool thus:

VCR Risk Cost (Unserved Energy)

$$VCR\ risk\ cost = load\ at\ risk * probability\ of\ cables\ not\ available\ for\ one\ day[3] * VCR[4]$$

$$\therefore VCR\ risk\ cost = 269\ MW * 24\ hrs * \$38{,}350/MWh$$

$$\boldsymbol{\therefore VCR\ risk\ cost = \$247.59\ million\ \ per\ annum}$$

Reliability Risk Cost

$$Reliability\ risk\ cost = VCR\ risk\ cost + litigation\ costs$$

$$\boldsymbol{\therefore Reliability\ risk\ cost = \$247.4m + \$0.5m}[5] \boldsymbol{= \$248.09\ million\ per\ annum}$$

Financial Risk Cost

$$Financial\ risk\ cost\ = internal\ investigation\ costs = \$0.25[6]$$

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[1] Load forecast for 2020 plus an estimated 1 MW per year growth.
See Ausgrid 2015, *Distribution and Transmission Annual Planning Report*, December 2015.

[2] Load factor = average demand / maximum demand over the period assessed.

[3] This is a snapshot of the risk cost during a single day of summer 2022/23.

[4] TransGrid's Investment Risk Tool bases the Value of Customer Reliability (VCR) on figures published by AEMO in its *Value of Customer Reliability Review - Final Report*, September 2014. In this case we use the mixed residential/industrial figure of $38,350/MWh.

[5] This component is an assumed litigation risk cost of this event.

[6] This component is an assumed financial risk cost of this event.

Reputational Risk Cost

$$Reputational\ risk\ cost\ = external\ consultations\ \&\ communications\ costs = \$0.85^{7}$$

Total Risk Cost

$$Total\ risk\ cost = Reliability\ risk\ cost + Financial\ risk\ cost + Reputational\ risk\ cost$$

$$\therefore \boldsymbol{Total\ risk\ cost} = \$\mathbf{249.19}\ \boldsymbol{million\ per\ annum}$$

A risk-cost summary extract from the Investment Risk Tool appears in Attachment 1.

3. Related needs/opportunities

> Need 43 – Powering Sydney's Future

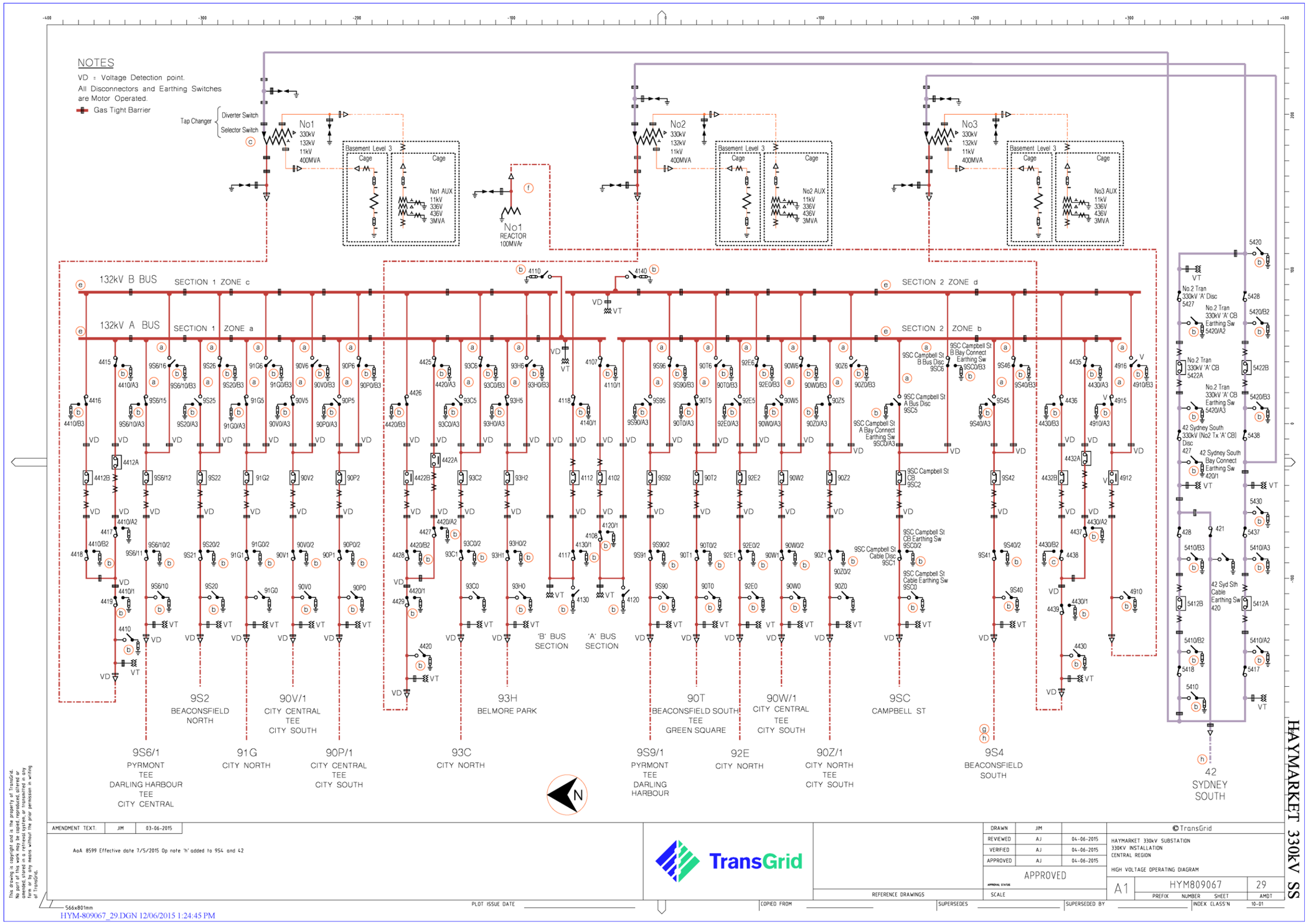
Need 1448 is independent of Need 43. These Needs are related only in that they apply to the same geographical area.

4. Recommendation

It is recommended that an OFR and OFS be completed for the connection of Ausgrid's "like-for-like" replacement cables of 9S6/1 and 9S9/1.

[7] This component is an assumed reputational risk cost of this event.

Figure 2: Haymarket 330/132 kV Substation High Voltage Operating Diagram



Attachment 1 Risk Costs Summary

Current Option Assessment - Risk Summary

Project Name: Replacement of Cables 9S6/1 and 9S9/1

Option Name: 1448 - Base case

Option Assessment Name: 1448 - Base Case - Assessment 1

Rev Reset Period: Next (2018-23)

Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF ($M)	Failure Mechanism	NoxLoC xCoF ($M)	PoF (Yr 1)	Total Risk ($M)	Risk ($M) (Rel)	Risk ($M) (Op)	Risk ($M) (Fin)	Risk ($M) (Peo)	Risk ($M) (Env)	Risk ($M) (Rep)
Cable switchbay gear	1	Electrical	Unplanned Outage - HV (Cable switchbay gear)	$249.19	Failure	$249.19	100.00%	$249.19	$248.09		$0.25			$0.85
				$249.19		$249.19		$249.19	$248.09		$0.25			$0.85

Total VCR Risk: $247.59 Total ENS Risk:

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