

OPTIONS EVALUATION REPORT (OER)



Buildings Capital Works Program

OER 000000001453 revision 3.0

Ellipse project no.: P0008471

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Project reason: Support the business - Facilities upgrade or replacement

Project category: Prescribed - Asset Renewal Strategies

Approvals

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Date submitted for approval	13 December 2016	

Change history

Revision	Date	Amendment
0	15 July 2016	Initial issue
1	25 October 2016	Update to 2016/17 dollars and SFAIRP/ALARP data
2	31 October 2016	Minor corrections
3	13 December 2016	Update to format

1. Need/opportunity

Twelve substation building sites have been identified as requiring further consideration as part of our analysis that included:

- > Initial high level review of condition data.
- > Detailed review of individual site condition reports.
- > Criticality review of estimated time lines for required works.
- > Consultation with field services.

Following the analysis, 12 sites were identified as requiring further investigations to minimise potential risks to the housed network equipment for the life of the assets. The identified sites have been flagged as requiring work in the 2019-23 regulatory period, due to the condition and ongoing water ingress to the buildings. The identified sites are listed in Table 1.

Note: Following the completion of Need/Opportunity Statement (NOS) NS 1453, it was advised that the works at Narrabri are to be addressed, via a separate storm damage claim. Subsequently, the identified repair works are expected to commence soon and will likely be completed within the current regulatory period. This has negated the need for the Narrabri site to be included as requiring consideration for building works and will be removed from the list leaving a final total of 11 sites as follows:

- > Bayswater
- > Cowra
- > Dapto
- > Mt Piper 500kV
- > Newcastle
- > Sydney East
- > Sydney North
- > Sydney South
- > Tumut
- > Wallerawang 330kV
- > Wellington

By addressing the condition issues at the 11 sites it is expected this will provide further life extensions to the asset.

2. Related Needs/opportunities

Sites listed within this request may be subject to other works including substation refurbishments, secondary system replacements and unregulated communication projects. Further investigations will allow a more complete consideration of the interrelated Needs and users for each site, and to identify delivery efficiencies and cost savings as oppose to work being grouped as individual programs.

3. Options

All dollar values in this document are expressed in un-escalated 2016/17 dollars.

Base Case

The Base Case is the do nothing option whereby the building structures will be run to failure without prior consideration of replacement or repair.

Under a Base Case of 'do nothing', the associated risk cost is approximately \$2.00m per year. The risk cost by categories is outlined in Table 1.

Table 1 – Base Case risk cost by category (\$ million)

Total No. of Sites	Total Annual Risk Cost	Reliability	Financial Risk	Safety Risk
11 Sites	2.00	0.14	1.86	0

Option A – Replacement [[OFR 1453A](#), [OFS 1453A](#)]

Following the OFS process it was identified the area posing the greatest risk for failure or water ingress was the building roof area. Subsequently the capex values were realigned to focus on the replacement of the building works for roof areas. Therefore, this option involves the replacement of roofs, associated drainage and soffits at various locations to reduce the risk of failure and may provide opportunities to add some indirect efficiency, from grouping associated work at the relevant sites.

It is estimated that the un-escalated capital expenditure for this option is \$3.37m \pm 25%. Details can be found in Section 6 of Option Feasibility Study (OFS) OFS 1453A Rev 2.

Following the completion of building works at the identified sites, the risk level for this option, will significantly diminish where risk cost associated with the building works will fall to \$0.32m per year. The risk cost by category for this option is shown in Table 2.

Table 2 – Option A – replacement risk cost by category (\$ million)

Total No. of Sites	Total Annual Risk Cost	Reliability	Financial Risk	Safety Risk
11 Sites	0.32	0.03	0.29	-

The total projected risk reduction as a result of implementing the replacement option is \$1.68m per year. It is evident from Table 2 that by undertaking the roof building works there will be a reduction in the risk costs under the reliability and financial categories whilst the risk for safety is reduced to near zero.

The replacement approach would be a proactive approach reducing the failure risk, extending asset life and their protection.

4. Evaluation

4.1 Commercial evaluation

The commercial evaluation of the options is set out in Table 3.

Table 3 – Commercial evaluation (\$ million)

Option	Description	Total capex	Annual opex	Annual post project risk cost	Economic NPV @10%	Rank
Base Case	Do nothing	-	0.72	2.00	N/A	2
A	Replacement	3.37	(0.72)*	0.32	8.04	1

* There is opex savings in repair cost of \$0.72m per annum.

The commercial evaluation is based on:

- > a 10% discount with sensitivities based on TransGrid's current AER-determined pre-tax real regulatory Weighted Average Cost of Capital (WACC) of 6.75% (\$13.60m) and 13% (\$5.10m) for the upper bound
- > An analysis period of 40 years for the asset life has been applied for the proposed roof replacement works.

As indicated in Table 3 the overall commercial evaluation for this option has returned a positive Net Present Value (NPV) of \$8.04m.

Capital and operating expenditure

For this option, there are no other ongoing capital expenditure considerations beyond the replacement. However, there will likely to be minor on-going operating expenditure considerations due to each site undergoing periodic condition inspections of the buildings as part of the annual maintenance routines. Further, following roof replacement works, it is anticipated no further operating expenditure will be required for at least five years to the roof area.

Where it is determined to “do nothing” and run to failure, the risk for the nominated sites may be for failures to occur during the regulatory period and the added need for replacement or major repair works. Where sites do not fail it is anticipated future maintenance cost will rise to address the deterioration of the building's roof area. By doing nothing it will impact the ongoing operating expenditure until the repairs are addressed or completed.

Regulatory Investment Test

No Regulatory Investment Test for Transmission (RIT-T) analysis is required as the works are condition based.

4.2 SFAIRP/ALARP evaluation

Options to reduce the network safety risk as per the risk treatment hierarchy have been considered in other lifecycle stages of the asset, and it has been determined that no reasonably practicable options exist to reduce the risk further than those capital investment options listed in Table 1.

Evaluation of the proposed options has been completed against the SFAIRP (So Far As Is Reasonably Practicable)/ALARP (As Low As Reasonably Practical) obligation, as required by the Electricity Supply (Safety and Network Management) Regulation 2014 and the Work Health and Safety Act 2011. The Key Hazardous Events and the disproportionality multipliers considered in the evaluation are as follows:

- > Catastrophic failure of asset/uncontrolled discharge or contact with electricity/ unauthorised access to site - 3 times the safety risk and 10% of the reliability risk (applicable to safety)

The results of this evaluation are summarised in the tables below.

Table 4 – Feasible options (\$ thousand)

Option	CAPEX	Expected Life	Annualised CAPEX
Cowra	164	40 years	4
Mt Piper 500	205	40 years	5
Sydney South	524	40 years	13
Wallerawang 330	236	40 years	6
Wellington	251	40 years	6
Newcastle	467	40 years	12
Dapto	325	40 years	8
Sydney East	322	40 years	8
Sydney North	337	40 years	8
Tumut	178	40 years	4
Bayswater	358	40 years	9

Table 5 – Annual risk calculations (\$ thousand)

Options	Safety Risk Pre-Invest	Safety Risk Post-Invest	Reliab. Risk Pre-Invest	Reliab. Risk Post-Invest	Safety Risk	Reliability Risk
Cowra	123	15	26	3	108	22
Mt Piper 500	123	15	1	107	108	1
Sydney South	92	15	38	6	77	32
Wallerawang 330	123	15	9	1	108	7
Wellington	123	15	1	0	108	1
Newcastle	62	15	26	6	47	19
Dapto	92	15	6	1	77	5
Sydney East	62	15	0	0	47	0
Sydney North	62	15	13	3	47	10
Tumut	62	15	13	3	47	10
Bayswater	92	15	6	1	77	5

Table 6 – Reasonably practicable test (\$ thousand)

Option	Network Safety Risk Reduction ¹	Annualised CAPEX	Reasonably practicable ² ?
Cowra	3	4	No
Mt Piper 500	0	5	No
Sydney South	3	13	No
Wallerawang 330	1	6	No
Wellington	0	6	No
Newcastle	2	12	No
Dapto	1	8	No
Sydney East	0	8	No
Sydney North	1	8	No
Tumut	1	4	No
Bayswater	1	9	No

4.3 Preferred option

The outcome of the SFAIRP/ALARP evaluation is that none of the options presented are reasonably practicable, and are therefore not required to satisfy the organisation's SFAIRP/ALARP obligations.

The commercial evaluation however supports Option A, therefore Option A is the preferred option

5. Recommendation

From the above commercial, technical and ALARP evaluation of the available option, it is recommended that detailed scoping for Option A is undertaken.

¹ The Network Safety Risk Reduction is calculated as 3 x Safety Risk Reduction + 0.1 x Reliability Risk Reduction

² Reasonably practicable is defined as whether the annualised CAPEX is less than the Network Safety Risk Reduction