NEED/OPPORTUNITY STATEMENT (NOS)

Line 20 330kV Transmission Line Renewal

NOS- 000000001427 revision 1.0

Ellipse project no.: P0008208
TRIM file: [TRIM No]

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

Approvals

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Endorsed	Steve Stavropoulos	Transmission Lines and Cables Asset Manager
Approved	Lance Wee	Manager/Asset Strategy
Date submitted for approval	24 November 2016	

Change history

Revision	Date	Amendment
0	27 July 2016	Initial issue
1	24 November 2016	Update to format

1. Background

Line 20 is a single circuit steel tower 330kV transmission line between Sydney North and Sydney West 330kV Substations, with a route length of 33.2 km and a total of 98 structures. The transmission line is a key link within the Sydney metro area, passing through urban areas of Sydney.

Field Services conducted a desktop condition assessment of the line in March 2016 which identified a number of corrosion related issues which require rectification in the short – medium term to ensure that the asset remains operational in the longer term.

This transmission line falls within a zone of low[1] steel corrosion.

2. Need/opportunity

The identified issues from the condition assessment which require rectification are summarised in Table 1.

Table 1 – Transmission Line 20 Condition Issues

Issue	Extent (% line)	Cause	Impact
Insulator pin corrosion	90%	Pollution build up and deterioration of galvanising	Conductor drop

The risk cost associated with the issues identified in Table 1 is $0.86m per annum (refer Attachment 1). The most significant element of concern is corrosion of steel pins on ceramic insulators which may result in conductor drop due to insulator failure. The pins on the underside of suspension insulator discs build up pollution and are not adequately washed by rain which leads to an increased rate of corrosion. The corrosion issues associated with insulators is consistent with other transmission lines of the same vintage in the region.

The benefit of addressing the condition issues on Line 20 is to continue providing the service at a lower risk of failure.

3. Related needs/opportunities

No related needs/opportunities have been identified.

4. Recommendation

It is recommended that options be considered to address the identified need/opportunity by 2023.

[1] Steel corrosion rate as defined in *AS 4312 – Atmospheric corrosivity zones in Australia*

Attachment 1 - Risk costs summary

Summary of results is attached below. Refer to supporting document in PDGS for full risk assessment.

Current Option Assessment - Risk Summary

Project Name: Line 20

Option Name: 1427 - Base Case

Option Assessment Name: 1427 - 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)
Conductor	225	Insulators	Conductor Drop (Conductor)	$4.77	Insulator Failure	$1,072.64	0.08%	$0.86			$0.01	$0.21	$0.64	$0.00
Conductor	225	Insulators	Unplanned Outage - HV (Conductor)	$0.00	Structural Failure	$0.28	0.08%	$0.00	$0.00		$0.00			$0.00
Conductor 2	0	Fittings	Conductor Drop (Conductor 2)	$4.77	Fitting Failure	$0.00								
Conductor 2	0	Fittings	Unplanned Outage - HV (Conductor 2)	$0.00	Structural Failure	$0.00								
Earth Wire	0	Earth Wire (inc Joints)	Earth Wire Drop (Earth Wire)	$1.22	Break	$0.00								
Earth Wire	0	Earth Wire (inc Joints)	Unplanned Outage - HV (Earth Wire)	$0.00	Break	$0.00								
Earth Wire 2	0	Fittings (inc Attachment)	Earth Wire Drop (Earth Wire 2)	$1.22	Fitting Failure	$0.00								
Earth Wire 2	0	Fittings (inc Attachment)	Unplanned Outage - HV (Earth Wire 2)	$0.00	Structural Failure	$0.00								
Structure	0	Earthing	Uncontrolled Electrical Contact / Discharge (Structure)	$0.66	Earthing Failure	$0.00	0.00%	$0.00			$0.00	$0.00		$0.00
Structure	0	Steel Structure	Unplanned Outage - HV (Structure)	$0.01	Structural Failure	$0.00	0.00%	$0.00	$0.00		$0.00			$0.00
Structure	0	Steel Structure (inc Footings)	Conductor / Earth Wire / OPGW Drop (Structure)	$5.04	Structural Failure	$0.00	0.00%	$0.00			$0.00	$0.00	$0.00	$0.00
				$17.68		$1,072.92		$0.86	$0.00		$0.01	$0.21	$0.64	$0.00

Total VCR Risk: $0.00

Total ENS Risk: $0.00

Number of Components

The number of components used in the - Risk costs summary model has been derived as follows:

- Insulators: The extent of insulators on the transmission line with advanced corrosion condition issues identified in Table 1 (90%) multiplied by the total number of suspension insulators on the line (3 per suspension structure).

Probability of Failure

As per - Risk costs summary model.

Consequence of Failure

As per - Risk costs summary model.