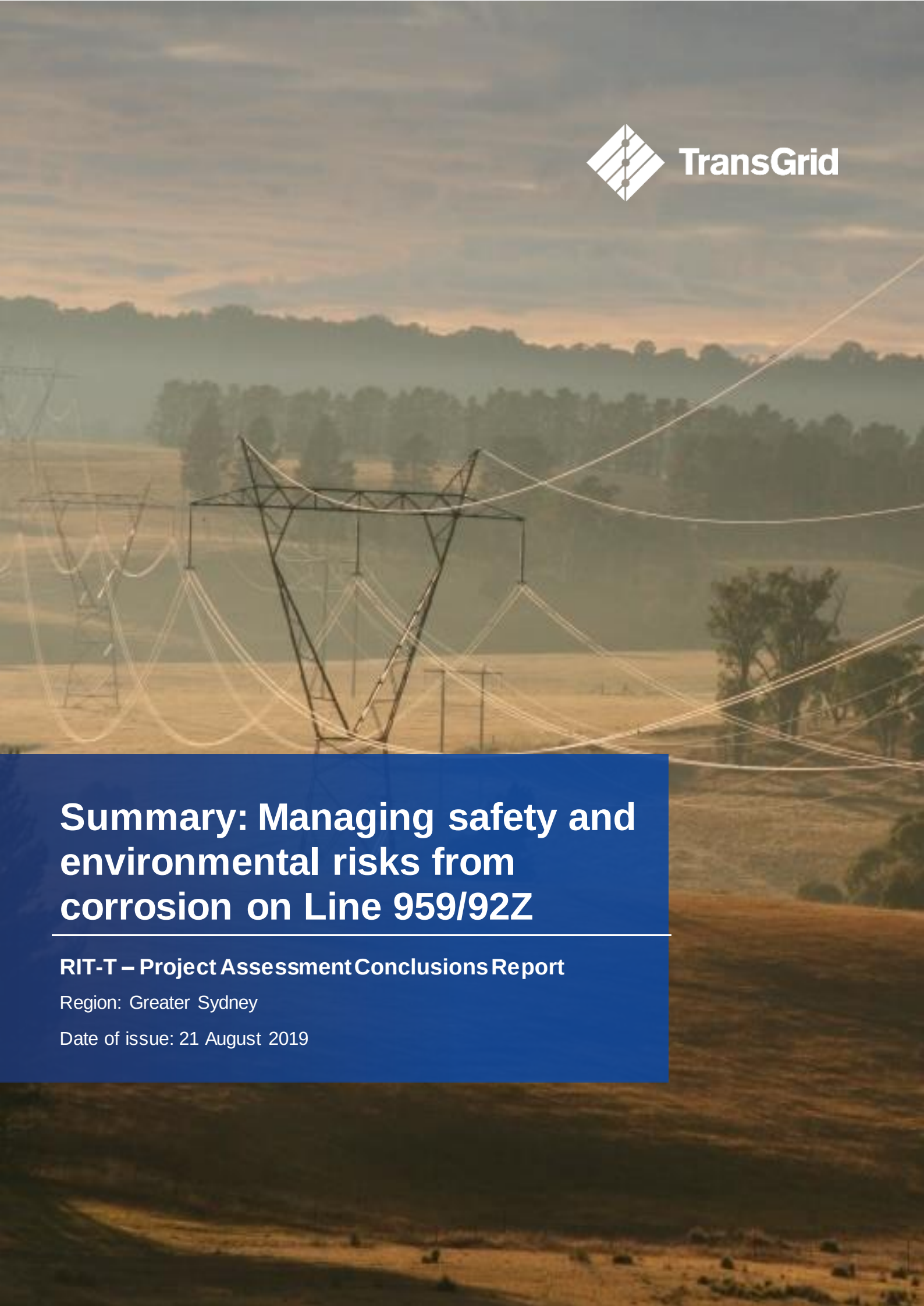


Summary: Managing safety and environmental risks from corrosion on Line 959/92Z

RIT-T – Project Assessment Conclusions Report

Region: Greater Sydney

Date of issue: 21 August 2019

Summary

TransGrid is applying the Regulatory Investment Test for Transmission (RIT-T) to options for mitigating risks caused by corrosion along Line 959/92Z. Publication of the Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process.

Constructed in 1965, the 23.7 km double circuit 132 kV transmission line is built on 61 steel tower structures between Sydney North and Sydney East 330 kV substations. The majority of the line passes through national parks and certain sections pass through urban areas in Sydney.

The line supplies electricity to the Northern Sydney metropolitan area including North Sydney, Ryde, Macquarie Park, Chatswood, and the suburbs along the Northern Beaches. Line 92Z, which runs on one side of the double circuit transmission line, provides connection to some of Ausgrid's loads through a tee connection at Mt Colah Switching station.

Line 959/92Z plays a critical role in providing back-up transmission supply to areas of Sydney which collectively have a 50% Probability of Exceedance[1] (POE50) summer peak load of about 700 MW – almost as large as the biggest smelter in NSW.

Corrosion-related issues that will impact the safe and reliable operation of the network have been found on Line 959/92Z. The condition issues raise a number of risks associated with asset failure, including safety and environmental (bushfire) risks.

Table 1 – Condition issues along Line 959/92Z and their consequences

Issue	Consequences if not remediated
Corrosion of tower steel members	Steel corrosion, particularly of critical members, can lead to structural failure of tower
Buried concrete foundations	Accelerated corrosion of critical member
Corrosion of earth straps	Earthing safety hazard
Corroded fasteners	Structural failure
Corroded conductor attachment fittings	Conductor drop
Corrosion of earth wire attachment fittings	Conductor drop
Corroded earth wires	Conductor drop
Conductor dampers	Accelerated conductor fatigue due to vibration

Although the structures were designed to the standards at the time of construction, the towers were designed to a lower set of criteria than the more recent design philosophies and standards.

[1] Probability of Exceedance (POE) demand is a generalised approach to defining the probability of exceedance of electricity demand forecasts. The demand is expressed as the probability the forecast would be met or exceeded, eg a 50% POE demand implies there is a 50% probability of the forecast being met or exceeded. Australian Energy Market Operator, *"Generation and Load,"* accessed 1 February 2019. http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Market-Management-System-MMS/Generation-and-Load

As the asset condition deteriorates over time, the likelihood of failure and subsequent risks may increase should these issues not be addressed.

The identified need for this RIT-T is to mitigate bushfire risks. Categorised as a reliability corrective action under the RIT-T, the proposed investment will enable TransGrid to meet regulatory obligations and standards. The option presented in this PACR will enable TransGrid to appropriately manage and mitigate bushfire and safety risks associated with corrosion on Line 959/92Z.

No submissions received in response to Project Specification Consultation Report

TransGrid published a Project Specification Consultation report (PSCR) on 26 March 2019 and invited written submissions on the material presented within the document. No submissions were received in response to this PSCR.

In the corresponding PSCR for this RIT-T, TransGrid put forward for consideration a range of credible network options that would meet the identified need from a technical, commercial, and project delivery perspective.[2] The options are summarised in the table below.

All costs presented in this PACR are in 2019/20 dollars.

Table 2 – Summary of the three credible options considered

Option	Description	Capital costs ($m)	Operating costs ($m per year)	Remarks
Option 1	Line Refurbishment	7.08	0.051	Less economical due to higher operating, maintenance and licensing costs
Option 2	Line Refurbishment with Optical Ground Wire (OPGW) Retrofitting	7.28	0.051[3]	Most economical and preferred option
Option 3	New transmission lines from Sydney North to Sydney East	> 75	0.051	Not progressed as uneconomical due to significant costs

In the PSCR, TransGrid noted that non-network options are not considered to be commercially and technically feasible to assist with meeting the identified need for this RIT-T as non-network options will not mitigate safety and environment risk posed as a result of corrosion-related asset deterioration.

Conclusion: refurbishment of Line 959/92Z with Optical Ground Wire is optimal

The optimal commercially and technically feasible option presented in the PSCR, the refurbishment of Line 959/92Z including OPGW retrofitting, remains the preferred option to meet the identified need.

[2] As per clause 5.15.2(a) of the NER.

[3] Operating costs are incurred for 3 years only under Option 2, compared to 30 years for the base case and Option 1

Moving forward with this option is the most prudent and economically efficient solution to manage and mitigate bushfire and safety risk to the As Low As Reasonably Practical (ALARP) level.

The estimated capital expenditure associated with this option is $7.28 million ± 25%. While this option is $204,328 more expensive than Option 1 as it employs new technology (OPGW), it will provide additional operating cost savings of $51,082 per year from 2021/22 over the life of the asset.

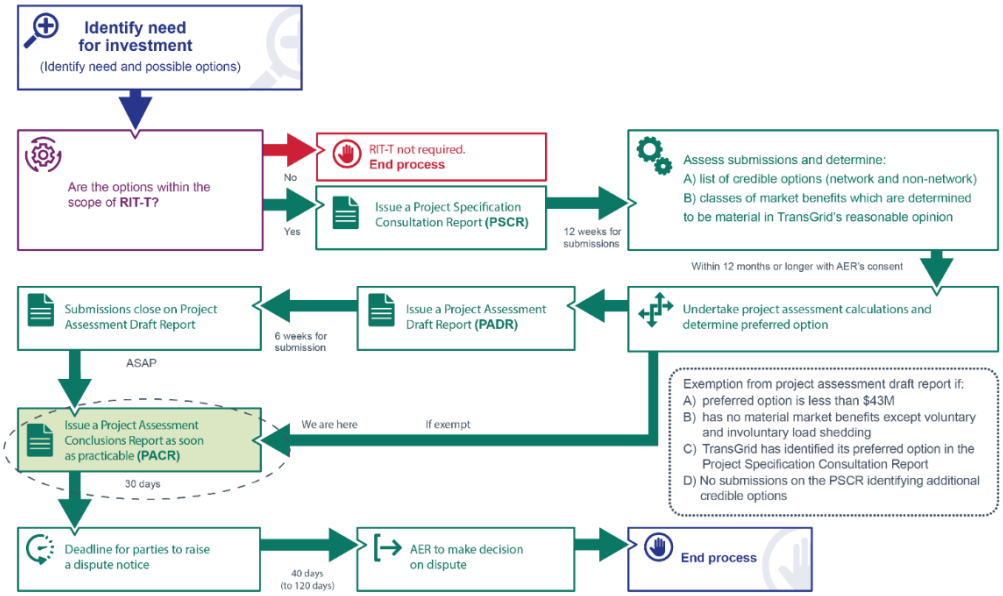
The works will be undertaken between 2018/19 and 2020/21. Planning and procurement (including completion of the RIT-T) will occur between 2018/19 and 2019/20, while project delivery and construction will occur in 2020/21. All works will be completed in accordance with the relevant standards by 2020/21 with minimal modification to the wider transmission assets.

Necessary outages of affected line(s) in service will be planned appropriately in order to complete the works with minimal impact on the network.

Next steps

This PACR represents the third step in a formal Regulatory Investment Test for Transmission (RIT-T) process undertaken by TransGrid. It follows a Project Specification Consultation Report (PSCR) released in March 2019. The second step, production of a Project Assessment Draft Report (PADR), was not required as TransGrid considered its investment in relation to the preferred option to be exempt from this part of the RIT-T process under NER clause 5.16.4(z1).This PACR represents the third stage of the formal consultation process in relation to the application of the RIT-T.

Figure 1 This PACR is the third stage of the RIT-T process[4]



[4] Australian Energy Regulator, *"Final determination on the 2018 cost thresholds review for the regulatory investment tests,"* accessed 15 March 2019. https://www.aer.gov.au/communication/aer-publishes-final-determination-on-the-2018-cost-thresholds-review-for-the-regulatory-investment-tests

Parties wishing to raise a dispute notice with the AER may do so prior to 19 September 2019 (30 days after publication of the PACR). Any dispute notices raised during this period will be addressed by the AER within 40 to 120 days, after which the formal RIT-T process will conclude.

Further details on the project can be obtained from TransGrid's Prescribed Revenue and Pricing team via RIT-TConsultations@transgrid.com.au. In the subject field, please reference "PACR Line 959/92Z project".

TransGrid intends to undertake refurbishment works between 2018/19 and 2020/21. Planning and procurement will occur between 2018/19 and 2019/20 and project delivery and construction will occur in 2020/21. All works will be completed by 2020/21.

To read the full Project Assessment Conclusion Report visit the RIT-T Consultations page on TransGrid's website.